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The Archery Section of a Persian Combat Arts Manuscript from the Safavid Era: Šarif Mohammad's Compendium on Warfare

Safevi Dönemi'nden Bir Fars Savaş Sanatları El Yazmasının Okçuluk Bölümü: Šarif Muhammed'in Savaş Üzerine Özeti

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Abstract

This study examines Šarif Mohammad's early Safavid-era Persian manuscript on combat arts, focusing on its significance as a historical military manual. The purpose is to analyze its technical content of archery techniques, to understand its role in martial training and warfare. Using philological and comparative methods, the study cross-references the manuscript with other Persian, Arabic, and Ottoman sources to contextualize its martial teachings. The research highlights the manuscript's value in reconstructing Safavid-era combat practices, offering insights into the interplay between martial arts, culture, and military science. By documenting these techniques, the study contributes to preserving Persia's martial heritage and broader military traditions.

Keywords: Persian Archery, Historical Warfare, Combat Manuscripts, Military Training, Archery

Öz

Bu çalışma, Šarif Muhammed'in erken Safevi dönemi Farsça el yazmasını, tarihi bir askeri el kitabı olarak önemine odaklanarak incelemektedir. Amaç, okçuluk tekniklerinin teknik içeriğini analiz etmek, dövüş eğitimi ve savaştaki rolünü anlamaktır. Filolojik ve karşılaştırmalı yöntemler kullanılarak, çalışma el yazmasını diğer Farsça, Arapça ve Osmanlı kaynaklarıyla çapraz referanslayarak dövüş öğretilerini bağlamlandırmaktadır. Araştırma, el yazmasının Safevi dönemi savaş uygulamalarını yeniden yapılandırmadaki değerini vurgulayarak, dövüş sanatları, kültür ve askeri bilim arasındaki etkileşime dair içgörüler sunmaktadır. Bu teknikleri belgeleyerek, Perslerin savaş mirasını ve daha geniş askeri geleneklerini korumaya katkıda bulunmaktadır.

Anahtar Kelimeler: Pers Okçuluğu, Tarihi Savaş, Savaş El Yazmaları, Askeri Eğitim, Okçuluk

1. Introduction

The manuscript in question, written by Šarif Mohammad b. Ahmad Mehdi Hosseyni during the reign of Šāh Esmā'il I (r. 1502-1524 CE), is a valuable but possibly understudied example of Persian military literature from the early Safavid period. Currently housed in the National Library of Malek (Ketābkhāne-ye Melli-ye Malek) in Tehran, this work appears to be a miscellany (*majmuʿa or jāmiʿ*) - a compilation of diverse subjects, a common feature in Persian manuscript traditions.

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2. The Manuscript's Structure and Content

While the text covers a variety of topics, Chapter 13 stands out for its focus on combat and equestrian arts, including:

- Archery (*tirandāzi*)
- Wrestling (*koshti*)
- Lance and spear combat (*neyzebāzi*)
- Horsemanship (*ashsavāri*)
- Sword maintenance and sharpening (*āhangari*)

An initial overview of this material first appeared in the article "*A Persian Manuscript on Archery, Spear Fighting, Sword Tempering, Lance Fighting, and Horsemanship by Šarif Mohammad b. Ahmad Mehdi*," which provided a broad introduction to the martial topics covered in Chapter 13 of the source manuscript.[1] Later, a complete translation of the chapter in the book *Persian Archery and Swordsmanship: Historical Martial Arts of Iran* was provided.[2] However, that treatment did not include the detailed technical classification and systematic analysis found in the present work, which now offers a comprehensive breakdown dedicated to the archery section. This eclectic yet practical selection suggests that the manuscript may have served as a training manual for warriors.

3. Archery Techniques

The first part of this chapter covers essential archery techniques, including:

1. Grasping the bow grip correctly,
2. Drawing the bow to its full extent, locking (the lock is formed by placing the index finger over the thumb, securing them in place) into position, aiming at the target,
3. Executing a smooth release,
4. Pausing before advancing to advanced archery techniques
5. Unrestrained/free shooting
6. Grouping arrows consistently,
7. Holding a shield [Shooting from behind a shield. This usually describes shooting from behind a convex circular shield that is supported on the elbow by its handles and sometimes balanced upright by its carrying strap around the archer's neck], and
8. Maintaining tight body alignment upon release to ensure control and precision.

3.1 Grasping the bow grip

The author gives clear instructions on the correct bow grasp. He emphasizes keeping the left hand firm and positioning it so that the target is hidden behind the fist. This advice echoes a principle found in *Saracen Archery*, where it is noted: "*Some archers say that if you cover your opponent with your left fist and shoot, you will kill him-but this is true only at a certain distance.*"[3] The underlying meaning

[1] Moshtagh Khorasani, Manouchehr and Bede Dwyer, A Persian Manuscript on Archery, Spear Fighting, Sword Tempering and Lance Fighting and Horsemanship by Šarif Mohammad the Son of Ahmad Mehdi, *Pan-Asian Journal of Sports & Physical Education*, 4/1, March 2012, pp. 1-17.

[2] Moshtagh Khorasani, Manouchehr, *Persian Archery and Swordsmanship: Historical Martial Arts of Iran*, Frankfurt am Main 2013. The archery section was annotated with Bede Dwyer.

[3] Latham, J.D. und W.F. Paterson, *Saracen Archery: An English Version and Exposition of Mamluke Work on Archery (ca. A.D. 1368),* The Holland Press, London, 1970, p. 60.

may be more general: the bow hand should be aligned with the target to ensure proper aim. The text specifically recommends the famous hawk's claw grip (*čangal-e bāz*), describing it as follows:

> One should hold [the bow] with the small finger, ring finger, and middle finger tightly clenched, while keeping the index finger slanted. The thumb is then placed over the middle and ring fingers. This is the famous hawk's claw grasp—also known as the grasp of Bahrām Gur.

Bahrām Gur, the legendary Sasanian king, was celebrated for his archery skills, further associating the technique with elite marksmanship. This method is confirmed in other Persian archery treatises, such as the *Resāle-ye Kamāndāri*, where the *qabẓe-ye čangal-e bāz* is detailed as a grasp in which the thumb and index finger are separated, with the tip of the index finger pressed against the back of the bow.[4] An almost identical technique is also recorded in *Saracen archery*, underlining its widespread use across archery traditions.[5]

However, one should note that the Persian archery manuscript *A Complete Guide about the Science of ArcheryA Complete Guide about the Science of Archery* differentiates between the hawk's claw grasp and *bahrâmi* grasp as: "*The hawk's claw grasp is where the thumb and the index finger are separated from each other and the top/tip of the thumb nail is placed on the back of the bow. The bahrâmi grasp is where the grasp of the bow is held tightly with the root of the thumb and the palm of hand is kept empty and the fingers are bent and hold the bow grip tightly*".[6]

Šarif Mohammad b. Ahmad Mehdi asserts that the hawk's claw grasp (*čangal-e bāz*) prevents the bowstring from striking the archer's sleeve—a flaw allegedly common with other grasping methods. However, this claim appears speculative and may reflect the author's personal preference rather than a universal truth, as string-snapping incidents likely depend on additional variables such as posture, draw length, or sleeve design. A more plausible interpretation is that the hawk's claw minimizes the risk of technical errors like the internal draw. This method's finger positioning—particularly the slanted index finger and locked thumb—could enforce better form, reducing variability compared to other grasps. This grasp is also described in the period Persian manuscript *A Complete Guide about the Science of Archery* in chapter seven.[7]

Šarif Mohammad b. Ahmad Mehdi specifies seven distinct error categories about the archer's left hand. The descriptions in the archery manual are put in italics.

- *The first mistake happens when the string hits the nose.* This happens either when the left hand turns to the right at the wrist, when the power of the bow overcomes the archer, or when the face turns away from the target.
- *The second mistake occurs when the string strikes the wrist joint.* This comes about by a bow strung too slack (low brace height), or a feeble grasp upon the bow, or plucking at release.
- *The third mistake happens when the arrow strikes the bow's handle.* This occurs by a release marred by tension, or an arrow ill-matched to the bow's nature, too weak to bear its force or too stiff for the bow.
- *The fourth mistake is seeing blood on the fingers of the bow hand.* This results from grasping the bow grip too tightly.

[4] Resāle-ye Kamāndāri [Archery Manuscript], annotated by Iraj Afšār, Majjale-ye Barrasihāye Tārixi *Journal of Historical Research*, 2, year 3, 1968, p. 81.
[5] Latham, J.D. und W.F. Paterson, *Saracen Archery: An English Version and Exposition of Mamluke Work on Archery (ca. A.D. 1368),* The Holland Press, London, 1970, p. 44.
[6] Dorudbāši Beyhaqi, Nezāmeldin Ahmad ibn Mohammad ibn Ahmad Šojāeldin, *Jâme al-Hadâyat fi Elm al-Româyat* [*A Complte Guide about the Science of Archery*], annotated by Mohammad Taqi Daneshpaǰuh, *Farhang Irān Zamin* [*Culture of the Country of Iran*], Vol. 11, 2nd Edition, 1975.
[7] Dorudbāši Beyhaqi, Jâme al-Hadâyat fi Elm al-Româyat.

• *The fifth mistake is when the fingers of the bow hand darken or blacken.* This can happen if the grip is too large for the archer, often due to having shorter fingers.

• *The sixth mistake occurs when gripping the bow handle causes the nails to dig into the palm.* This is the opposite of the previous issue—here, the archer's fingers are too long for the grip, or the grip itself is too small.

• *The seventh mistake occurs when the archer breaks their thumbnail on the bow hand.* This happens when the thumb remains rigid instead of relaxing as the arrow passes. In more severe cases, the arrow may split the thumb's skin or the fletching may lodge into it.

Šarif Mohammad adds that another mistake is the *qabze-ye modavvar* (round grasp), and all common people use the round grasping. The round grasp is not very effective and it is understandable that the author should consider it a fault. Normally, you would either put the thumb on top of the index finger (the underside of the thumb resting on the side of the index finger) or put it against the nail of the index finger at the same level as the index finger. The closest draw to this is the hawk's claw without the index finger kept out of the way on the back of the bow. The manuscript *Resāle-ye Kamāndāri* describes the *qabze-ye modavvar* as the following:

> If all four fingers the sabbābe (index finger), the vasati (middle finger), the benser (ring finger), and the xenser (small finger) are placed on their position and the ebhām (thumb), which is responsible for the executor of the arrow, is raised and positioned between the sabbābe (index finger) and the vasati (middle finger), this way of holding a bow is called qabze-ye modavvar. This grasp is good for shooting at qočāq and is more used with bows with a round grip qabze-ye gerd.[8]

This grasp is also mentioned in the archery manual *Jāme al-Hadāyat fi Elm al-Romāyat* [*A Complete Guide about the Science of Archery*] as:

> Additionally, if all four fingers the index finger, the middle finger, the small finger and the ring finger are placed on their position, the thumb, which is the duct for the arrow, is raised and positioned between the index finger and the middle finger, this way of holding a bow is called "rounded grasp". This grasp is good for throwing qočâq and this is a qočâq seat and is more used with bows with a round grip. This way of grasping the bow is called "grabbing the four" [fingers].[9]

Šarif Mohammad also cautions against blisters forming on the bow hand. This occurs when the hand twists during use, causing the palm to lose contact with the grip ("emptied"), which leads to skin friction and blistering, particularly near the base of the little finger. The issue is common with bows featuring small, round setback handles.

3.2 Drawing the Bow to Its Full Extent:

As far as locking into position and the characteristics of the thumb are concerned, the author of the text stresses the following points:

• *When nocking at the middle of the bowstring, cover the nail of your thumb by two dāng (one sixth) with the index finger. Lock on the bowstring by putting the distal segment (end or tip) of your thumb on the middle segment of your middle finger.*

• *Maintain firm tension in the thumb throughout the draw and keep the thumb's locked position against the middle finger unchanged. The index finger should remain relaxed (no active tension).*

• *Verify arrowhead is perfectly straight and ensure arrow nock is properly aligned with the bowstring. The arrow nock should rest between (but not contact) the thumb (below) and index finger (side).* Never pinch/squeeze the nock between

[8] Resāle-ye Kamāndāri [Archery Manuscript], annotated by Iraj Afšār, Majjale-ye Barrasihāye Tārixi, *Journal of Historical Research*, Number 2, year 3, 1968, p. 81.

[9] Dorudbāši Beyhaqi, Jāme al-Hadāyat fi Elm al-Romāyat.

thumb and index finger. The nock should float freely between them. The bowstring alone should secure the arrow.

• *Position the bowstring precisely at the midpoint of your index finger.* At the draw initiation, the fingertip may naturally contact the string

• *The thumb should not lose its firm pressure [on the middle segment of the middle finger] at any point of the draw, yet there is no pressure [on the arrow nock] so that even if he draws the arrow ten times and brings it back, the arrow does not go out of its way, hence even a bee would not be disturbed if it was sitting on the nock.*

Šarif Mohammad also warns against bruising the thumbnail, which occurs when the index finger presses too hard on it. This issue stems from improper hand positioning during drawing, specifically, when the index finger applies excessive pressure on the thumb instead of resting lightly. Persian archery manuals describe four primary drawing techniques: *borutkeš* (mustache draw), *abrukeš/ sormekeš* (eyebrow draw), *riškeš* (beard draw), and *sinekeš* (chest draw). In this respect, Dorudbāši Beyhaqi states in the archery manual "*A Complete Guide about the Science of Archery*] states, "*There are four types of pulling the bowstring: eyebrow draw, mustache draw, beard draw, and side of the body draw*".[10] However, there appears to be no consensus among authors or archery masters regarding a preferred method, as each advocates for their own variation.

Dorudbāši Beyhaqi states in the archery manual "*A Complete Guide about the Science of Archery* states, "*There are eyebrow-draw, chest-draw, and mustache-draw. Leave the eyebrow and the chest and do a mustache-draw.*" However, the same author adds, "*The best draw is to draw on the mustache and pass the earlobe. The archer should not raise his shoulders* [hunch them under the pressure of the bow as seen in many miniatures] *upon drawing the bow and he should hold his left arm like a column. This drawing is called eyebrow draw and people from Isfahan and others use the eyebrow draw to shoot an arrow and among them* [the usage of] *this term is common.*"[11] This means that archers from Isfahan preferred the eyebrow draw.

On the other hand, Šarif Mohammad favors the *mustache draw*, explicitly instructing that *"the arrow should be drawn level with the mouth."*

Šarif Mohammad also identifies thirteen mistakes in the drawing (right) hand of an archer. These include:

• *The first mistake occurs when drawing the bow: the right hand tends to move downward.* This can happen in two ways—either by rotating the hand downward at the wrist or by lowering the hand toward the chest during the draw. The first disrupts a clean release, while the second complicates aiming.

• *The second mistake is to "draw the plumes" and release quickly.* The exact meaning of this phrase is unclear, but it may refer to snap shooting, where an archer draws and releases without proper aim. Alternatively, "draw the plumes" could be a colloquial expression for drawing the bow itself. If so, the author is likely highlighting the issue of snap shooting, a common problem when an archer uses a bow that is too heavy for their strength.

• *The third mistake happens when the archer draws and releases toward the right.* This means the drawing hand drifts to the right of the aiming line during the shot, causing the arrow to deviate off-target.

• *The fourth mistake occurs when the archer draws and releases toward the left, causing the bowstring to strike their face.* If the left hand drifts leftward out of alignment, the string's path may cross the cheek or even graze the left shoulder.

• *The fifth mistake happens when nocking the arrow, as the bowstring digs too deeply into the index finger.* This can refer to two distinct errors: First, if the fingertip is trapped inside the bowstring and pressed against it, causing injury to the tip. Second, if the base segment of the index finger is forced against the string. Both faults damage different parts of the finger, but the second error also risks breaking the arrow at the nock or deflecting its flight path.

[10] Dorudbāši Beyhaqi, Jāme al-Hadāyat fi Elm al-Romāyat.
[11] Dorudbāši Beyhaqi, Jāme al-Hadāyat fi Elm al-Romāyat.

• *The sixth mistake occurs when drawing the bowstring digs too deeply into the index finger*. This description appears to be repeated in the text, suggesting the copyist may not have recognized that there were two slightly different versions of the index finger fault.

• *The seventh mistake happens when, upon release, the bowstring strikes the index finger*. This happens either because the archer releases with the index finger still in front of the string or the archer places the fingertip on the string but fails to remove it at full draw.

• *The eighth mistake occurs when the archer strikes the thumb with the bowstring*. This happens if the thumb is released before the index finger, causing the string to snap against the thumb's tip—a common and well-documented error.

• *The ninth mistake happens when blood pools on the surface of the thumb*. This may result from either bruising due to a string impact, or blood accumulating beneath the skin from an overly tight thumb ring.

• *The tenth mistake occurs when the top of the thumbnail breaks off*. This injury typically results from multiple faults, most commonly: Failing to press the thumb tip firmly enough against the middle finger during the draw.

• *The eleventh mistake happens when the thumbnail bruises*. This subungual hematoma (blood under the nail) typically results from the index finger pressing too tightly over the thumb, placing only the tip of the index finger on the thumb (inadequate support), or allowing the thumb to separate from the middle finger during draw or release. This painful condition was particularly common among archers using the thumb draw technique with insufficient finger alignment.

• *The twelfth mistake occurs when blood penetrates the nail matrix (root) of the thumb*. While similar to nail bruising, this is a more severe injury.

• *The thirteenth mistake happens when the flesh below the thumb joint thickens*. This develops when the unsupported thumb allows the ring to scrape against the knuckle (due to inadequate middle finger reinforcement) or chronic friction causes callus formation (particularly on the dorsal thumb surface where the ring contacts).

There are five archer's facial mistakes. The first is hitting the ear [the ear is hit with a long draw when the drawing hand moves out of line slightly behind the head]. *The second is hitting the beard (String Slap)* [the drawing hand drifts behind the head, causing the string to graze the ear or beard upon release. The ear or the beard can be hit if the face is turned to the right away from the target and moves into the path of the string. *The third is closing one eye. The fourth is to have a side-eyed gaze. The fifth is twisting the mouth.* [Closing one eye (for aiming) and twisting one's mouth can be either results of or indicators of turning the head into the path of the string]. Breathing through the nose and keeping the mouth closed are solutions to the problem by calming the archer and reducing movement of the head, and breathing out when releasing the arrow is a feature that the Chinese and Japanese practise as well.

Šarif Mohammad writes, *"The deficiencies of the fingers: Either they are loose, or they are tight, or they are covering [holding] the wrong place, or they are stiff like a hard thing such as a stone."* This succinctly captures the key ways archery technique can falter:

a) Loose FingersBow Hand: The three lower fingers (middle, ring, and little) must grasp the bow firmly. If loose, the grip shifts, causing blisters.

• Drawing Hand: These fingers must support the thumb tightly. If lax, the thumb lock weakens, allowing the thumb ring to slip. This leads to overcompensation—hooking the thumb around the string, which slows release and causes string plucking. Poor thumb positioning also risks rubbing, blisters, and pain during draws.

b) Tight Fingers

• Bow Hand: Excessive tension in the thumb and index finger destabilizes the bow grip.

• Drawing Hand: Clasping the index finger too tightly around the thumb disrupts the release and risks injury.

c) Covering the Wrong Place

• Proper thumb placement on the bow hand is critical, as is the index finger's alignment over the thumb on the drawing hand. Correct positioning ensures a fast, clean release.

d) Hard (Stiff) Fingers

• Likely refers to a rigid thumb on the bow hand, increasing susceptibility to injuries (skin splits, bruising) and negatively affecting arrow flight.

Though brief, Mohammad's observation demonstrates a keen awareness of these technical pitfalls. Regarding aiming with the bow, the author advises: "*Look at the target by aligning your left eye outside the bow grip and your right eye inside the bow grip, sighting over the arrowhead.*" This method, often attributed to different archery masters, appears in numerous archery texts.

Šarif Mohammad further advises: "*When drawing the bow, keep your head straight (facing the target) and your chest expanded. This prevents the head from turning sideways and helps align the lower bow limb properly from the left.*" This refers to correcting the bow's vertical alignment if it has drifted leftward during the draw. Šarif Mohammad further instructs: "Keep the bow hand aligned straight with the target. Before drawing, step forward with the left foot and pull the arrow slowly across the mouth." This describes the traditional 'mustache draw' technique.

3.3 Executing a smooth release

The author of the text states,

> "In drawing the bow, the archer brings the left foot (front foot) close to the right leg, retracting it from an extended position. When the arrowhead reaches the finger of the bow hand, the archer simultaneously opens the index finger. The middle finger, thumb (of the drawing hand), the ring finger, and the little finger remain firmly closed in place. Immediately after release, the right hand (drawing hand) and left hand (bow hand) are pulled back, and the thumb of the drawing hand is placed on the bow handle [for placing the next arrow]. Three actions are performed at once: Shouting (likely a sharp exhalation or battle cry), striking the ground with the foot (possibly the front foot for balance or emphasis), and follow-through (maintaining motion after release). If the target is far, the archer places weight on the right leg (back foot). If the target is close, the archer places weight on the left foot (front foot)."

3.4 Pausing Before Advancing to Advanced Archery Techniques

Before progressing to more demanding practices like *čostandāzi*—shooting with a "hard bow"—the author emphasizes the importance of understanding different bow types. *Čostandāzi* was a technique employed by champion archers, requiring significant strength to draw. The term implies a "hard bow," referring to the power or high poundage of the bow (as noted in the *Digital Lexicon of Dehxodā*).[12] The author states that the bow should be of moderate length—neither too long nor too short.

Bow Selection for Specific Arrows

• *Tir-e xāki* (ground arrow): A narrow, short bow is recommended, such as the Kermān bow or the *igi* bow. Similar bows were used with the mail armor arrow.

• *Tir-e sahar*: A strongly curved bow—like the bow of the plateau or the *Adarneh* bow-was preferred.

[12] Lexicon of Dehkhoda, last accessed on 01.05.2025, https://www.parsi.wiki/fa/wiki/210726/%da%86%d8%b3%d8%aa-%da%a9%d9%85%d8%a7%d9%86

- Flight-shooting arrow: A short bow measuring nine fists in length was ideal.

- *Note:* If using Ottoman measurements (where a *fist* = 4 *parmak*, based on Sultan Selim III's standards), this would equate to ~113.66 cm—likely referring to the strung bow length, not the physical bow. Intriguingly, this matches the shortest bows crafted by the Turkish bowmaker Muhyiddin during the reign of Bayazid II (1447–1512), whose bows ranged from 9 to 12.5 fists.[13]

The Damascus bow (likely a Mamluk-style bow at the time) required careful treatment:

- It should not be exposed to moisture.

- In hot climates, it tended to become excessively stiff.

3.5 Unrestrained/Free Shooting

The author instructs thus on shooting with perfect freedom [where the archer's form remains utterly undisturbed]. He says, "*What is throwing freely? It consists of placing a water bowl upon the arm, drawing the arrow and shooting it - and the water bowl does not fall*". This method proves the archer maintains absolute stillness in the release arm. The practice also appears in Kāni's teachings on archery discipline. As Paul Klopsteg records in *'Turkish Archery and the Composite Bow*', translating Hein's observation: "*Upon completion of the loose, the right hand may drop downward but should not move in any other direction. The motion must be so slight that if a cup of water were placed on the hand, it would remain there without spilling a drop. For this reason the archers used to say, when they saw a fellow archer moving his right hand sidewise after the loose*, *"Comrade, you are letting your cup fall!*".[14] This water-cup test demonstrates three essentials of free shooting:

1. No lateral motion in the release hand
2. Minimal vertical drop of the arm
3. Complete absence of compensatory movements in the body.

3.6 Grouping (Classifying) Arrows

Šarif Mohammad provides detailed information on arrow dimensions and their characteristics. Regarding arrow size, he explains, "*Scholars, based on geometric principles, divided the arrow into thirty-seven parts, with a total length of thirty-three fingers. Of these, ten parts are "dead" [the section from the bowstring to the bow handle], while the remaining twenty-seven parts are "alive" [the portion extending beyond the bow handle]*". According to *Saracen Archery*, one finger equals 2.078 cm, making thirty-three fingers approximately 68.574 cm (27 inches).[15] This length is relatively short for an arrow drawn to the ear. The same source notes that in Syria, the standard *maydāni* arrow measured "one and one-eighth carpenter's cubits plus half a *qīrāt*" (about 30 inches), termed *tamām* ("full length").[16] War arrows were typically one *qīrāt* (1.1 inches) shorter. The Mamluk draw was closer to the Persian style than the Turkish, as was the Crimean Tatar technique. While earlier studies suggested Persian arrows measured 83–85 cm, newer research may offer updated figures. Persians were renowned across the Middle East for their long draws. Considering the "live" and "dead" portions, the ten dead parts (roughly 7.29 inches) likely correspond to the bow's brace height—a reasonable measurement for

[13] Moshtagh Khorasani, Manouchehr, *Persian Archery and Swordsmanship: Historical Martial Arts of Iran*, Niloufar Books, Frankfurt am Main 2013.
[14] Klopsteg, Paul E, *Turkish Archery and the Composite Bow: A Review of an Old Chapter in the Chronicles of Archery and a Modern Interpretation*, Evanston, Published by the Author, 1947, p. 100.
[15] Latham, J.D. und W.F. Paterson, *Saracen Archery: An English Version and Exposition of Mamluke Work on Archery (ca. A.D. 1368),* The Holland Press, London, 1970, p. 160.
[16] Latham, J.D. und W.F. Paterson, *Saracen Archery:* p. 27.

a composite bow. If the arrow were 85 cm (33.46 inches) long, the brace height would be approximately 9 inches, still within the expected range for Middle Eastern composite bows. The first figure aligns with smaller Turkish bows, while the latter suits larger Persian bows, possibly suggesting the arrow length derives from a Persian source. Šarif Mohammad distinguishes between several types of arrows based on their fletching length (measured in parts of the arrow's total division):

- *Tir-e nāv* – A short arrow (no fletching details provided).
- *Tir-e partāb* (flight shooting arrow) – Fletching equals one part. This extremely short fletching suggests it may refer to a dart rather than a full-length arrow.
- *Tir-e sahar* (morning arrow) – Fletching equals ten parts, matching the bow's brace height. Such long fletching would produce a slow but highly stable arrow, suitable for short-range accuracy.
- *Tir-e xāki* (earth arrow) – Fletching equals five parts. According to the *Digital Lexicon of Dehxodā*, this was a small, lightweight arrow with a bone head, designed for maximum distance. In Turkish tradition, a similar *heki* arrow was a second-rank flight arrow—this fletching length balances low drag with directional control.[17]
- *Tir-e pišro* (forwarding arrow) – Fletching equals two parts. This closely corresponds to the Turkish *pişrev*, the most prestigious competition arrow in flight shooting.

Another mistake is having a wagging arrow and this is due to twenty four mistakes [this means faults that cause the arrow to wag or otherwise move other than smoothly]. *Four* [mistakes] *are because of fingers. One is due to the wind. And nineteen* [mistakes] *are because of the arrow. The one [mistake] which is due to an arrow: One* [mistake] *is due to the softness of the wood* [of the shaft] [a soft arrow is too flexible and its frequency of vibration causes irregular flight], *one* [mistake] *is because of its crack* [an unseen crack can cause the shaft to flex in a non-uniform manner. It can also cause the arrow to break on shooting], *one* [mistake] *is because of its long size and the other due to the short size of it* [too long an arrow is inefficient because the extra length adds weight and drag] *when the middle of the arrow is thick* [the thickness of the center of the arrow is critical to its overall stiffness] *and the arrowhead is heavy* [too heavy an arrowhead reduces the range of the arrow], *narrow* [it is not certain what is meant here. It could be thin in which case it means the arrowhead would be ineffective], *light* [light arrowheads require very good releases to fly straight. They have less impact when they strike] *and inappropriate* [using the wrong arrowhead can affect the arrow's flight and its utility. Generally, one would use a heavy arrowhead at close range, a light one at long range and one suited to the type of fletching and arrow]. *It is due to the thickness of the arrow shaft* [thickness is loosely related to stiffness and too stiff an arrow will fly to the right and possibly hit the bow handle as it passes] *or the narrowness of the arrow shaft* [too small a diameter might produce a weak shaft that bends too much around the bow and flies to the left]. *Sometimes it is due to the release of a decayed shaft that has one side which is long and the other side short or it is long and short or it is either long or short* [these three conditions are to do with rotting or weakness in a part of the shaft. There might be a section of rotten wood concentrated on one side of the shaft or at one end].

Šarif Mohammad enumerates thus the faults of arrows: "*One is when the arrow is short, the other when the arrow is long and the wood [of the arrow shaft] is soft and the wood* [of the arrow shaft] *is too hard and an arrow* [shaft] *which has a crack and an arrow* [shaft] *which is wide or when the arrow is thin.*" This compact listing represents seven critical faults that masters would expand upon in teaching:

a) An arrow too short for the archer's draw [causes overdrawing and risks injury]

b) An arrow too long for the archer's draw [reduces power and accuracy]

[17] The *Digital Lexicon of Dehxodā,* last accessed on 28.04.2025, https://www.parsi.wiki/fa/wiki/195833/%d8%aa%db%8c%d8%b1

c) Wood too soft for the bow's strength causes excessive flex and erratic flight.

d) Wood too hard for the bow's strength [results in poor energy transfer].

e) A cracked or weakened shaft may break or flex unpredictably.

f) An overly wide shaft creates excessive drag and stiffness.

g) An overly thin shaft lacks strength and may snap.

Šarif Mohammad notes that arrows should be fletched in a manner resembling the feather arrangement on a hen, emphasizing symmetry and functionality. This classification is exceptionally valuable because the relative fletching lengths provide insight into each arrow's intended use:

- Shorter fletching (1–2 parts) = long-range flight arrows (minimized drag).
- Longer fletching (5–10 parts) = stability and accuracy at shorter distances.

The author highlights *xadang* (poplar) and *kelk* (reed) as the optimal materials for arrowshaft construction. Poplar was commonly used for military arrows in many regions, including Iran and England, particularly for ordinary arrows. Poplar can be coppiced (cut back to produce new shoots), ensuring a steady supply of straight, usable shafts. Unlike sawn planks, coppiced shoots retain an uninterrupted grain structure, making them stiffer and stronger for a given diameter. Despite its utility, Persian archers in India considered poplar shafts to have some deficiencies, though the exact drawbacks are unspecified. Reeds (likely *Phragmites australis*) are hollow, yet their strength is concentrated at the surface, meaning they provide equal strength to solid wood without the added weight. *Phragmites australis* is a single global species, but its properties vary with growing conditions—harsher environments produce thinner, harder stems, closely matching historical arrowshafts. Due to its stiffness, reed has often been mistaken for bamboo by non-specialists, though it is distinctly different. No traditional arrow wood compares to reed in terms of stiffness relative to diameter, making it an exceptional material for high-performance arrows. In the context of arrow construction, "reed" (*kelk*) is the more accurate translation, as it better reflects the material's properties compared to alternatives like bamboo. While poplar was valued for its ease of production and reliability, reed stood out for its lightweight rigidity, making it the superior choice where performance was prioritized. The variability in reed quality also suggests that archers selectively sourced the best stems for optimal arrow flight.[18]

About the Characteristics of the arrowhead

- *Sahar* (Dawn): [Description pending further research].
- *Kapar* (Shed): [Description pending further research].
- *Sabukul-e Gilāni* ("Gilāni Arrowhead"): *Gilāni* refers to the Gilān province in northern Iran, suggesting a regional design. Its exact form requires further study.
- *Čangāl-e Peykān-e Gari* ("Forked Arrowhead"): A bifurcated or barbed head, possibly for hunting or causing wider wounds.
- Four-Lobed Rounded Head: A heavy, rounded arrowhead with a four-sided pyramidal tip, designed to pierce shields effectively. (This matches historical armor-piercing styles with a reinforced, blunt-force profile.)
- A rounded, conical head (length ~1 finger) for penetrating armor. It is possibly similar to the olive-shaped head (*zeytuni*). Its form is debated in the Turkish interpretation.[19] It has a smooth, bullet-like profile, and a "waisted" design that narrows before flaring at the base for shaft attachment.
- Tri-Lobed Head: Three-bladed design optimized for piercing *jōšan* (cuirass) and *zereh* (mail armor).

[18] Moshtagh Khorasani, Manouchehr, *Persian Archery and Swordsmanship.*

[19] Yücel, Ü. *Türk Okçuluğu*, D. Ayan (ed.), Ankara, AYK Atatürk Kültür Merkezi Başkanlığı, 1999.

• Long Rounded Head: An elongated, narrow rounded head effective against mail ar or (likely by splitting riveted rings).

• "Nail Arrow": A short, stout head resembling a nail, used to penetrate hide or wooden shields.

These terms are highly technical, and precise correlations with archaeological finds require further research. Regarding the target, the author of the text states,

> "If he wants to pierce the stone with the arrowhead, he places the stone in the fire so it gets red and then places it in the old vinegar so that it absorbs water [liquid] and so that when he shoots with an arrow it [pierces and] submerges in the stone. If one wants the arrow to pierce the mortar and brass lute. One should place the steel arrowhead on the arrow[shaft] similar to the way of a spearhead/lancehead and not place the arrowhead in the arrow[shaft] so that the arrow[shaft] does not break and the top of the arrow[shaft] is not damaged and the arrowhead is tempered in oil. If he wants to pierce the glass so it does not break, he covers the glass in paper so that it dries and fills the glass with stones [pebbles] so that it gets heavy and attaches to it, and the arrowhead should be wider than the arrow[shaft], then he shoots at it and it does not break and opens the paper".

On piercing hard targets, the author instructs:

> To pierce stone with an arrow, one should place the stone in fire until glowing red, then quench it in aged vinegar so it absorbs moisture. When shot, the arrow will penetrate and lodge in the stone. To pierce mortar and brass instruments, one should fix the steel arrowhead like a spearhead - mounted forward on the shaft, not socketed within it - to prevent breakage. The arrowhead must be oil-tempered. To pierce glass without shattering, one should wrap the glass completely in paper and fill it with pebbles for weight. The arrowhead should be wider than the shaft. When shot, the glass will pierce cleanly without breaking.

The author's instructions suggest two distinct methods for specialized arrowheads:

For stone/mortar/brass penetration: "*Place the steel arrowhead on the arrowshaft similar to a spearhead/lancehead, not placed in the shaft, with oil tempering.*"

- This likely describes a reinforced tanged head with external ferrule
- Contemporary tests show traditional socketed heads fail at the socket base when impacting hard materials
- Surviving armor-piercing specimens suggest a hybrid design: tanged heads with protective metal sleeves
- The "spearhead" mounting may indicate an elongated head secured by both tang and external binding]

For glass penetration: "Cover the glass in paper, fill with pebbles, and use a wide arrowhead."

• Confirmed by Ottoman artifacts in Topkapi and Askeri Museums

• Matches ballistic principles where slightly blunt projectiles create cleaner glass penetration

The author also provides useful methods for quenching arrowheads. One method is to crush capers, collect the liquid, and then quench the arrowhead in it. When shot at glass, the treated arrowhead will not break the glass [the idea being that an extremely hard arrowhead is needed to shatter the glass]. *Another method involves combining yellow arsenic, red arsenic, sheep's blood, and garlic liquid to form a paste. The arsenic is sieved through silk using garlic liquid, then mixed again with garlic liquid and blood before being used to quench the arrowheads* [note that garlic contains sulfur, which may contribute to the process]. *A third method involves pounding three ratl of "white hellebore from Tabar". Three ratl of water is added to the hellebore and boiled. Then three ratl of zarārih-a type of insect* [probably Cantharis vesicatoria, or Spanish fly]-*are pounded and added to the mixture, along with cow urine and the urine of a child who wets the bed. The arrowheads are then quenched in this*

solution [Zarārih was also used in the production of crucible steel.[20] According to Dehxodā's lexicon, it is a small green insect, about four centimeters long, with a foul odor. It contains 3-5% cantharidin and is poisonous].[21]

Weight measurements in historical Persia showed significant regional and temporal variation, with the *man* and its subdivisions, the *ratl*, serving as the key units. One *ratl* was traditionally defined as half a *man*, but the exact weight of a *man* varied by time and place. According to Emam Shushtari, one *man* in his time was equivalent to 1,091 grams. However, as noted in the *Lexicon of Borhān* (cited by Dehxodā), the *man* was not a fixed measure and varied in different regions and periods. One prominent variant was the *man-e Tabrizi* (Tabriz *man*), which had several definitions. According to one interpretation, it consisted of 40 *estār*, with each *estār* equal to 15 *mesqāl*, for a total of 600 *mesqāl*. The *mesqāl* itself was divided into smaller units: 1 *mesqāl* = 6 *dāng*, and 1 *dāng* = 8 *habbe*, with a single *habbe* corresponding to the weight of one grain of barley (*jo*). However, *Nāzem al-Otabā* (as quoted by Dehxodā) provided an alternative definition, describing the *man-e Tabrizi* as 40 *sir*, with each sir weighing 16 *mesqāl*, for a total of 640 *mesqāl*. This discrepancy suggests that the *man-e Tabrizi* was subject to adjustments over time. To complicate matters further, *Anjoman Ārā* observed that the *man* was not uniform throughout Persia. While the Tabriz *man* was originally 640 *mesqāl*, it was later recalibrated to 1,000 *mesqāl*, reflecting either regional differences.[22] In Persian sources, the *ratl* was traditionally defined as half a *man*. According to Emam Shushtari, one man weighed 1,091 grams, making the Persian ratl approximately 545.5 grams. Surprisingly, this measurement does not match the Baghdad *ratl* (406.25 g), despite Persia's historical and cultural ties to Mesopotamia. Instead, it more closely resembles the Cairo *ratl* (437.5 g), differing by only about 108 grams.[23]

3.7 Holding a Shield [& Shooting in Armor]

The author of the text also emphasizes the importance of mastering archery while using a shield, wearing armor, or wearing a helmet, stating: "Another thing to note is that he should know [how to perform] archery with a shield, in armor, and when wearing a helmet, and he should know the science of his weapon as well as the relationship between some [weapons] and the others. Shooting from behind a shield typically involves using a convex circular shield, supported by a handle gripped at the elbow, and sometimes a carrying strap around the neck for stability. Some practical challenges are that the shield must remain steady during the draw; any movement disrupts aim and execution. It takes dedicated practice to master balance and positioning. Shooting in a helmet requires other skills as well. Persian helmets from the early Safavid period, as seen in contemporary art, posed unique difficulties because metal ear flaps restricted the draw, forcing archers to anchor at the corner of the mouth or the edge of the ear flap instead of the usual jawline. The nasal guard risked interfering with the bowstring, requiring a sharper turn of the head toward the shoulder than standard draws. Both shield and helmet use required special training to adapt techniques and avoid obstacles.

3.8 Maintaining tight body alignment upon release to ensure control and precision.

The author emphasizes proper hand placement and body alignment, noting that the archer must position the hands "elegantly and well" to ensure that the arrow reaches its target. This

[20] Khayyām-e Neyšāburi, Omar ben Ebrāhim, *Noruẓnāme* [*Book of Nowrūz*]. Annotated by Ali Hosuri, Tehrān, Cešme, 2003, 69.
[21] The *Digital Lexicon of Dehxodā,* last accessed on 02.05.2025, https://www.parsi.wiki/fa/wiki/256836/%d8%b0%d8%b1%d9%88%d8%ad
[22] *The Digital Lexicon of Dehxodā*, last accessed on 28.03.2025, https://www.parsi.wiki/fa/wiki/408854/%d9%85%d9%86https://www.parsi.wiki/fa/wiki/408854/%d9%85%d9%86
[23] The Digital Lexicon of Dehxodā, last accessed on 28.03.2025, https://www.parsi.wiki/fa/wiki/264527/%d8%b1%d8%b7%d9%84

requires maintaining a firm stance, even after release-relaxing too soon will compromise accuracy. In addition, the archer must understand his equipment: the draw weight of the bow, the proper length of the bowstring, and the proper dimensions of the arrow. The diameter of the arrow affects the stiffness, which must match the power of the bow. For a right-handed archer using a thumb draw, a stiff arrow will drift to the right, while a weak arrow will drift to the left. Therefore, the balance between the strength of the bow and the stiffness of the arrow is critical to accuracy.

4. Conclusion

This comprehensive study of Šarif Mohammad's early Safavid martial arts manuscript provides invaluable insights into the martial traditions and military science of sixteenth-century Persia. Through meticulous analysis of the text's detailed instructions on archery, swordsmanship, lance fighting, and horsemanship, we gain a profound understanding of the sophisticated training methods employed by Safavid warriors. The manuscript emerges not only as a technical manual, but also as an important cultural artifact that bridges the gap between theoretical military knowledge and practical application on the battlefield. The research demonstrates how Šarif Mohammad's work systematized combat training through precise anatomical instructions, error-correction methods, and equipment specifications for archery practices. Of particular note is the manuscript's holistic approach to warrior training, integrating physical techniques with psychological discipline and equipment mastery. The detailed archery section alone, with its emphasis on biomechanics, grip variations, and error diagnosis, reveals a level of sophistication comparable to modern sports science. By contextualizing this manuscript within broader military traditions through comparative analysis with Ottoman, Mamluk, and other Persian sources, this study highlights both the unique aspects of Persian martial arts and their connections to broader Eurasian fighting systems. The technical terminology and methods described in the manuscript provide crucial evidence for reconstructing historical martial practices that have often been overlooked in conventional military histories.

In addition, this study sheds new light on the material culture of Persian warfare, particularly through its detailed discussion of weapon construction, maintenance, and specialized use. Instructions on the tempering and penetration techniques of arrowheads, for example, provide concrete evidence of the metallurgical knowledge of the period and its application to military technology. The study also raises important questions for future research, particularly regarding the actual battlefield application of these techniques and their evolution throughout the Safavid period. The manuscript's emphasis on individual combat skills suggests interesting avenues for investigating how these methods were adapted for different military contexts, from skirmishes to siege warfare. Ultimately, this research makes significant contributions to several fields: military history, Iranian studies, material culture studies, and the growing discipline of historical martial arts reconstruction. By bringing Šarif Mohammad's compendium to scholarly attention and analyzing its contents in depth, we not only preserve an important aspect of Iran's cultural heritage, but also provide a valuable resource for understanding the complex interplay between martial practice, technology, and society in early modern Persia. The manuscript stands as a testament to the rich intellectual tradition that underpinned Persian warfare, combining empirical observation with systematic instruction in a way that deserves recognition alongside the more widely studied European and East Asian military traditions.

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