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Arrow Guides in Iran: History, Construction, and Techniques

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Abstract

A study of the arrow guide or nāvak in Iran. It covers the technical aspects of arrow guides and how they may have entered Iran. In Persian, arrow guides are called nāvak and their projectiles are called tīr-e nāvak. However, sometimes nāvak is used for the arrow as well, and even the bow. It also covers how outside cultures viewed Iran as a source of innovation in the further development of these devices. In Arabic they are called majrā and this is the term most familiar in the west due to two important translations of Arabic archery manuals into English, Arab Archery and Saracen Archery, but they were mentioned earlier as nāvak in an English translation of part of the Hidāyat ar-Rāmī, where they were mistakenly described as crossbows. Essentially, an arrow guide is a partially closed tube used with a bow to shoot a short arrow drawn much farther than its length would normally allow. This produces a projectile that has increased velocity and less friction through the air than a regular arrow. The arrow guide has had a long history in Iran, probably entering in the last years of the Sasanian Dynasty, surviving the Arab conquest and persisting until the gradual takeover by firearms. It was fertile ground for invention with many variations being spread across the Islamic world. The persistent association with Iran in Arabic archery manuals reflects the perception that much of its development was tied to Persian users. Here, Persian and Arabic sources are examined. Reference is made to original artefacts and reconstructions.

Keywords: Archery, Arrow guide, Bow and Arrow, Majrā, Nāvak, Tīr-e Nāvak.

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Introduction

The purpose of this article is to show how and why arrow guides were used in Iran. They. will be described and their features will be explored. Technical aspects of the weapon will be detailed based on experiments carried out by the author. In Persian, arrow guides are called nāvak and their projectiles are called tīr-e nāvak. However, sometimes nāvak is used for the arrow as well, and even the bow (Khorasani, Lexicon of Arms and Armor from Iran, 2010: 244). In Arabic they are called majrā and this is the term most familiar in the west due to two important translations of Arabic archery manuals into English, Arab Archery (Faris & Elmer, 1945) and Saracen Archery (Latham & Paterson, 1970), but they were mentioned earlier as nāvak in an English translation of part of the Hidāyat ar-Rāmī (Beveridge, 1911), where they were mistakenly described as crossbows.

Essentially, an arrow guide is a partially closed tube used with a bow to shoot a short arrow drawn much farther than its length would normally allow. This produces a projectile that has increased velocity and less friction through the air than a regular arrow. Arrow guides were used from as far west as Morocco and as far east as Korea. Iran formed a major site for its further development and transmission farther west and to the south as well.

The original design was elaborated in its diffusion west by diversifying the types of missiles it could be used to shoot and modifying the basic design for specialist aims. Thus, the so-called shāh majrī[1] was developed to increase safety for the user and increase the types of projectiles that could be shot. Another type was design to shoot pellets, at which it was safer than the normal pellet bow. In all probability, the arrow guide was made obsolete by the introduction of firearms which fulfilled the same purpose more effectively.

It was probably used in Iran from the late Sasanian period well into the Timurid period. Needham (Needham al., 1994: 166 note i) cites Huuri for this attribution, but circumstantial evidence would also support this conclusion[2]. It is referred to as the "qaus al-nāwakīyah (the tube-bow)". It is mentioned in Persian archery manuscripts produced in Iran and in India, while Arabic archery manuals mention it in the context of Iran and in relation to Persian archers as well as locally. It was rarely illustrated though there are a few paintings.

Description of Arrow Guides

Arrow guides fall into three categories of which one will be discussed here. They are, in order of appearance in literature, the nāvak/majrā, the nāvak-e qabze and the bilek siperi. These are three very different devices though the nāvak-e qabze and the bilek siperi may be related to each other. The devices covered by the terms nāvak or majrā are long wooden or metal objects with a hollow and are at least the length of a regular arrow. The basic type has the hollow open on the side opposite the bow grip and they are not attached to the bow. They are temporarily attached to the drawing hand by a loop,

button, or ring. In some of the more complex types, the bowstring must be threaded through a slot in the arrow guide itself. In others, it is clipped to a runner inside the hollow by protruding buttons.

To visualise the arrow guide, imagine a hollow cylinder slightly longer than an arrow with one end cut like a reed pen. Then have the side of the cylinder opposite the nib shaved down to open out the hollow inside. This is roughly what the arrow guide looks like. Its cross section varied from half to three quarters of a circle, depending on the design and what part of the guide is being examined. In most guides, the end nearest the drawing hand is the most open and the section closest to the bow at full draw is more enclosing. In use, a cord is put in holes where the nib would be, and a small arrow is placed into the hollow through the slot. The bowstring is placed in the nock of the arrow and the cord is grasped by the fingers of the drawing while the bowstring is drawn by the thumb. The side of the index finger pushes against the arrow holding it in the channel of the guide. As the bow is draw the arrow guide and the small arrow are pulled back until the drawing hand is in the position it would be for a full-length arrow. The point of the small arrow is between the drawing hand and the belly of the bow. When the bowstring is released, the bowstring and arrow slide along the hollow and the guide itself is prevented from moving by the cord held by the fingers of the drawing hand. The small arrow shoots out of the guide at high velocity.

Aiming is essentially the same as when using a long arrow. The major differences are that it is very difficult for the archer to see the arrow in flight because of its size and speed and the arrow tends to travel in a straight line relative to the guide rather than the bow as would a normal arrow. The lack of visual confirmation of the flight of the arrow makes adjusting the aim quite difficult. However, at long distances even sight of a regular arrow can be lost so archers have learned to compensate for the difficulties.

Guides can be separated into several types. The ones considered here are the plain open sided guide, the enclosed guide, and the guide with a captive runner. The plain guide has described above and one like that was sometimes called a qalam after the reed pen it resembled. Other terminology referred to the cross-sectional shape of the outside of the guide such as square or octagonal, but these were terms related to its appearance rather than its function. The hollow and the slot were common to all of these. Guides were also made from several materials. In areas with strong bamboo, like Korea, guides were made from a straightened bamboo shaft with the internal nodes cut away and a slot carved along the side of the tube. In Iran and further west, hardwood was the choice. “Guides are usually of hard, seasoned wood, free from moisture in order to avoid warping and contortion” (Faris & Elmer, 1945: 127). Metal guides were also made for shooting all-metal darts, which were intended to be heated red hot at the tip for starting fires in wooden buildings (Faris & Elmer, 1945: 127).

The enclosed guide or shāh majrā is detailed in Saracen Archery, the translation of a

mid-14th century Mamluk manuscript on archery (Latham & Paterson, 1970: 145-146). The author has built one of these and found that it is useful for shooting all kinds of projectiles including nocked darts, un-nocked darts, and small objects like metal balls. A tube is made with one end closed. Two matching slots are cut into it, one on the top and one on the bottom. The bottom one is slightly larger than the bowstring while the top one has a wider rear section so that arrows can be dropped into the internal hollow. One major disadvantage of this device is that it is not good for shooting downwards. Slight angling of the feathers can create enough friction to prevent the arrow falling out, but metal balls and unfletched arrows are a problem. Nocked arrows are less prone to this difficulty. Its other disadvantages include the increased friction of having two sides that can contact the string and the larger diameter of the device, which makes it more bulky than the basic guide. One more disadvantage is that the string passes through the slots. This means that the bow has to be unbraced to attach the guide and then re-braced with the string through the slots. Its advantages are the ability to shoot many kinds of projectiles and even multiple projectiles while being so simple to use and relatively safe compared to regular guides. An archer can be trained how to use a shāh majrā in one day and without the dangers of a basic arrow guide. Aiming is essentially the same. One unusual feature share with the following device is shooting multiple projectiles in one action. This appears to be an effective idea, but in reality the energy supplied by the bow is divided by the number of projectiles so if three are shot, each has the energy of one third of energy available.

The guide with a runner and its variations are first mentioned in the Tabṣirat arbāb al-albāb fī kayfiyyat an-najāt fī l-ḥurūb or "the Enlightenment for the Intelligent on the Means of Deliverance in Warfare" by Marḍī ibn ʿAlī aṭ-Ṭarsūsī in the last quarter of the twelfth century CE (Cahen, 1947-1948: 132-133). This device is a long tube, hollow inside, with a slot on the side which does not quite meet either end. Inside the hollow is a horn runner with two buttons that protrude through the slot. The buttons engage with the bowstring and allow it to propel the runner from one end of the guide to the other. The end towards the archer is closed and a small hole allows a cord to be used to attach the guide to the hand drawing the bow. Just in advance of where the front surface of the runner would be, at its rear most placement, a hole is drilled to allow the insertion of one or more small darts or pellets. The description of the small darts is "arrows whose length, with iron and feather, that of the little finger"[3]. The "iron" here is the metal arrowhead. Because of the horn runner inside the guide, the arrows do not need nocks to clip onto the string since this function is supplied by the runner and its "buttons". This means they can be stacked in the tube and all shot at once. In this manuscript these are defined as "ḥusbān" that scatter like grasshoppers. However, later archery manuscripts define arrows of this length as jarād[4] or locusts/grasshoppers.

The Persian sources from Iran refer generically to the arrows as tir-e nāvak and shooting this way as nāvak andāxtan (Khorasani, Persian Archery and Swordsmanship:

Historical Martial Arts of Iran, 2013: 86 & note 1048), while those from outside Iran in Persian offer more detail. Arabic sources, possibly quoting aṭ-Ṭabarī [5], have many more names related to specific sizes of short arrows and their uses. Their main characteristics were that they were usually no more than half the length of a regular arrow and sometimes much shorter. In general, they were heavier than would be expected because their construction used heavier woods and large iron arrowheads. This was important because very light projectiles could result in a broken bow. X-rays of a groups of surviving tir-e nāvak show large heads and long tangs, which increase both weight and strength[6].

Two tīr-e nāvak in the author's possession have been examined. They were probably collected in India and brought back to Britain. They conform to the general description in the Hidāyat ar-Rāmī, the first being 31.5 cm long with the arrowhead making up 4 cm on this length. There were traces of the bases of three feathers on the shaft. The head was unusual for a guide arrow because it was in the shape of a small leaf, but solidly built with a notch on each side of the blade. When placed inside a guide, the arrowhead was vertical and the notches prevented the sharp edges of the blade from cutting into the wood[7]. This design may have been developed to permit the long-distance harassing of horses and unarmored men. Notched points like this have not been seen in regular war arrows. The shaft was reed and a wooden nock piece had been inserted at one and an iron tanged arrowhead had been inserted at the other. Sinew wrapping secured both ends from splitting. The second is 30.5 cm long with the head being 3.3 cm long. There are two small copper ferrules below the head and a sinew wrap below them. The head is of a type often found on war arrows, being a slightly flattened diamond section forming two raised edges that that are cut off less than halfway down the arrowhead where it changes to an octagonal cross section and finally to a round one. Both arrows have quite long fletching, the remaining bases of the feathers are 10 cm and 10.5 cm respectively. There is a chance the arrows had been repurposed from broken long arrows since the placement of the fletching is more like standard arrows than what is recommended for darts[8]. The nocks are 5 mm wide and 6 mm deep, which is common for long arrows of similar origin.

Fig. 1: Two original tīr-e nāvak with two contemporary long arrows. Indian subcontinent, 18th century.

Arrow Guides in Iran

Arrow guides may have been introduced into Sasanian Iran by the armies of the Blue Turks when they attacked the eastern borders of the empire. Late Sasanian Iran was militarily innovative and open to outside ideas. They fought long wars on their eastern and western borders and had to deal with incursions from the north as well. Arrow guides were well known by the time of the Abbasid Caliphate and many archery manuals of that period mention them. The entry for nāvak in the Lexicon of arms and Armor from Iran gives references from Persian literature going back to the famous poet, Daqiqi (d. 977 CE) (Khorasani, Lexicon of Arms and Armor from Iran, 2010: 244) .

The first mention of a nāvak from a Persian language source in English was in Henry Beveridge's article, Oriental Crossbows (Beveridge, 1911). This was based of the Hidāyat ar-Rāmī[9], an encyclopaedia of archery written in Persian in Delhi in the year 1500 CE. Beveridge was under the impression that the description he found was that of a crossbow. He conflated two descriptions, one of a crossbow, the taxš-e kamān and the other of an arrow guide, the nāvak. This confusion was not unique to him because the arrow guide was entirely unknown in Europe at the time of writing and a superficial understanding of crossbow construction combined with the similarities of some of the details between their projectiles could easily lead a researcher astray. George Dennis in his translation of Maurice's Strategikon (Dennis, 1984) equates another version of the arrow guide, called solenarion in Greek, with a crossbow and it took the work of Nishimura (Nishimura, 1988) to point this out. A full description of the arrow guide and its use was published in English in 1945 by Faris and Elmer in Arab Archery (Faris & Elmer, 1945: 124-131), but the edition was limited, and its major audience was archers rather than historians.

To return to Beveridge, he writes "Nāwak is a diminutive of nāo, a tube, and this seems to be the original meaning of the word, though nāwak is often used to mean a small arrow or bolt,". Significantly, he quotes Muḥammad Budha'i[10] as saying it was "The old man's provision (dastmāya)". Beveridge explains that Budha'i said that "the nawak was invented by old men when they could no longer use the common bow and the long arrow" (Beveridge, 1911: 346). This is one of the origin myths of the arrow guide and is also seen in Arab Archery (Faris & Elmer, 1945: 125): "The Persians, accordingly, for the use of old men and youngsters who were unable to effect the long and hard draws resulting from the very long arrows, evolved shooting with the ḥusbān and dawdan arrows; thereby bringing up the driving force of their shots to a par with the shots of the strong men who could draw the long arrow to its full limit".[11]

A more detailed translation of the arrow guide section in the Hidāyat ar-rāmī on arrow guides is given in McEwen's translation of chapter twenty (McEwen E., 2001: 46-49). The basic guide is called "the 'guide of the hand' (nāvak-i dastī)" (McEwen E., 2001: 47). This gives the names for the parts of a guide as well. The tip of the guide is called the nib (minqār). The inside of the guide is called "in the middle of the guide"

(dar-i miyān-i nāvak). The slot is called shikāf-i nāvak. As to the measurements of guide arrows, "The aforementioned arrow, including the arrowhead, should be made twelve or thirteen fingers in length. The arrowhead being one finger and the rest shaft (tīr). The aforementioned arrowhead should be a mail piercer (zira dūz) or barley shaped (shākal-i jau)". (McEwen E., 2001: 48).

The majority of surviving tīr-e nāvak come from the areas of the modern countries of India and Pakistan[12]. This could be because of the habit of Indian rulers of maintaining large arsenals which survived the conquest of the English. In Iran, the warfare after the collapse of the Safavid Dynasty scattered or destroyed many collections of arms and armor. By that time, arrow guides were falling into disuse because of their replacement by firearms for long distance shooting.

Fig. 2: Several replica nāvak. Top, simple bamboo. Middle, two standard wooden nāvak, the lower one in the qalam form. Bottom, shāh mājra or enclosed guide.

Anecdotes of the use of arrow guides in war are mentioned in the Ādāb al-ḥarb wa-l-shajāʿa of Fakhri-e Modabbar (McEwen E., 1974)[13]. He writes: "on the gates of castles and forts and places of war (jang-jāy-hā) this weapon may be of use, and the guide dart (tīr-i nāvak), the 'sneak' (?) (ghadrak), the 'faller' (?) (uftak), the 'little locust' (malakhak), … are all suitable for sieges and may be of use in these places". (McEwen E., 1974: 81). In a reference to Bilgatigin, former grand chancellor to Alptigin who became ruler of Ghazni, he writes in relation to the siege of Gardīz that "They came near to taking the fortress, but a sharpshooter loosed a dart from a nāwak (tīr-i nāwakī). He was martyred on the spot, and the army retired from there without attaining its goal" (McEwen E., 1974: 85-86).

The Effectiveness of Arrow Guides in War

Arrow guides have had several important functions in warfare. A summary follows.

- Increased range compared to regular arrows.
- Flatter trajectory enabled easier aiming at long distances.
- The ability to carry at least twice the number of regular arrows.

• The difficulty of an enemy unfamiliar with arrow guides shooting back the small arrows.

• The high velocity of the small arrows, plus their size, prevented the enemy from easily dodging them at long range.

Due to the sensitivity of the arrow guide to movements of the archer, they are best used on foot. The occasionally unpredictable movements of a horse would increase the risk of accidents which would discourage their use by cavalry. A limitation of arrow guides is also caused by the types of projectiles they are best designed to shoot. Even medium sized broad heads[14] are difficult to use with an arrow guide because their blades would cut into the material of the guide.

Previous publications dealing with arrow guides have expressed doubts of their efficiency compared to regular long arrows. The main problem was seen to be the friction between the bowstring and the guide as well as a potentially high level of friction between the arrow and the internal surface of the groove. The author was able to test this hypothesis at a flight archery match where several archers used the same bow and different arrows. Arrows shot from the arrow guide outdistanced all of the other arrows shot from the bow. The explanation of this may lie in the limited contact between the arrow and the guide. When the bowstring is released by the archer, only a small part of the arrowhead remains in contact with the inside of the guide. The bowstring itself may completely disengage from the sides of the guide or retain only one point of contact as indicated by the tendency of some guides to rotate in use.

The type of tīr-e nāvak commonly used in warfare and associated with Iran from early times is the ḥusbān[15]. Latham and Paterson define its properties as "ḥusbān: about 15 in". (Latham & Paterson, 1970: 149). Quoting from some of the manuscripts they use for their translation, they reinforce this dimension with "No arrow for use with a guide should be longer than 2 spans (shibrs) and a digital phalanx (ʻuqdah; in all about 16 in.). The war variety, that is, the ḥusbān (ʻhailstonesʼ), should measure 2 spans" (Latham & Paterson, 1970: 29). However, it should be noted that Marḍī refers to a ḥusbān as being a small arrow shot by means of a special type of arrow guide (Cahen, 1947-1948: 133) As discussed above, this is more likely what later authors called a jarād and defined as being from 1 span to 1/3 spans. At the lower end of this range, it is a perfect match for Marḍīʼs ḥusbān.

Fig. 3: Replica tīr-e nāvak in a guide showing how it fits in the groove.

Reasons for their Decline and Disappearance

The arrow guide may have survived in India until the nineteenth century as indicated by the many surviving guide arrows. It was a survivor too in Korea and the practice of shooting short arrows with arrow guides (tong-ah) is still performed there. However, its military use in the Middle East had ceased. Its last mention in a Persian archery manual of the Safavid Dynasty, during the reign of Shah Tahmāsp I (Khorasani, Persian Archery and Swordsmanship: Historical Martial Arts of Iran, 2013: 86)[16], showed clear knowledge of the device but declined to give many details outside of its relationship with flight archery. This suggests its military use was mainly historical since the manuscript is very detailed in most aspects of archery.

The guide was mainly a long-range weapon since the archer had to concentrate on many variables shooting it. The prospect of imminent danger from close adversaries would certainly make it harder to stay calm and take all necessary precautions. In the literature, sieges are mentioned as a particular strength of this weapon. In that case the archer was protected by fortifications or siege works and could concentrate on his accuracy. In the open in strong formations, the archer was also protected though the slow rate of fire would not recommend it for open battle[17].

The introduction of handguns rendered the arrow guide obsolete. They could shoot farther and their heavy projectiles could do more damage. They were not, in their earliest forms, as accurate as a skilled archer with an arrow guide, but a gunner could be trained in a few weeks while an archer needed months to master an arrow guide with a strong bow. Many inaccurate gunners could do more damage than a few accurate archers, whatever their equipment.

Unique features in Iran and parts of Central Asia meant that large infantry armies equipped with firearms did not start to dominate immediately. The large cavalry armies of the White Sheep Turkmen and the early Safavids managed to coexist with firearms as long as they were free to manoeuvre and did not let themselves be trapped into pitched battles. Even by this period though, infantry were better off adopting firearms than staying archers of any kind. Archery persisted among cavalry in Iran and neighbouring countries because it had an advantage over using single shot muzzle loading pistols and carbines, but eventually it died out as had the arrow guide.

Conclusion

The arrow guide has had a long history in Iran, probably entering in the last years of the Sasanian Dynasty, surviving the Arab conquest and persisting until the gradual takeover by firearms. It was fertile ground for invention with many variations being spread across the Islamic world. The persistent association with Iran in Arabic archery manuals reflects the perception that much of its development was tied to Persian users. At the time of writing, the various specialist arrow guides are known only from Islamic sources. The basic arrow guide is much the same from Morocco to Korea, but the fully

enclosed guide (shāh majrā) and the many forms of pellet shooting guides seem to be tied to the central and western ends of its distribution.

Its complexity and technical innovation show the strong development of novel ideas over many centuries. While this is not an exhaustive account, it does give a general overview of how this development is tied to Iran by many of the surrounding cultures both linguistically and by the direct assignment of origins. In Iran itself, arrow guides are referred to in the sections of archery manuals relating to flight archery showing the sporting connotation of its use historically.

There are probably items in Iranian and other collections that may be identified as either examples of the tīr-e nāvak or the arrow guide itself. It is hoped that this article may led others to identify and publish them thus enriching the field of Persian archery history.

Appendix 1

Object	Weight (Grams)	Length (cm)[18]	Centre of Gravity (cm)[19]
Full length arrow #1	20.7	72.2	25.2
Full length arrow #2	25.12	71.5	23.8
Tīr-e nāvak #1	14.93	30.6	8.9
Tīr-e nāvak #2	13.59	31.4	23.8

Appendix 2

General Archery Terms

- Draw Length The distance the arrow is drawn from the bow. This can also mean the length of a matching arrow from the back of the point to the base of the nock.
- Draw Force The force needed to pull bowstring to the draw length appropriate to the bow.
- Flight Archery Shooting context where the goal is to shoot an arrow to the greatest distance.
- Foot The part of the arrow shaft immediately adjacent to the arrowhead.
- Nock The slot at one end of an arrow to receive the string.

Endnote

1. The best description of this device is in Saracen Archery (Latham & Paterson, 1970: 145-146) where it is also called the "sultan of arrow-guides". It may be significant that the royal attribute is indicated by the Persian word, shāh.

2. Maurice's Strategikon mentions the solenarion in c. 602 CE (Dennis, 1984). The possible source is the expansion of the Turkish Empire. Chinese sources from the Tang Dynasty also mention the device. The suggestion is that the Turks developed the arrow guide to shoot back Chinese crossbow arrows (Needham al., 1994).

3. "des flèches dont la longueur, avec fer et plume, soit celle du petit doigt´ in Cahen's French translation.

4. جراد

5. Kitab al Waḍiḥ fī r-Rami, "The Clear Book of Archery" by Aḥmad ibn ʿAbd Allāh Muḥibb ad-Dīn aṭ-Ṭabarī (d. 1295 CE ?). This writer must be distinguished from the famous historian, Abū Jaʿfar Muḥammad ibn Jarīr aṭ-Ṭabarī (839-

923 CE) because he is confused in some later literature (e.g. Muṣṭafā Kānī (Hein, 1925 and 1926: 299).

6. The X-Ray image of several tīr-e nāvak darts was made available to the author several years ago by the late Dr Charles E. Grayson. The originals are now in the Grayson Collection at the Department of Archaeology at the University of Missouri, Columbia.

7. The author, for reasons of safety, has chosen not to test this style of arrowhead. There is a strong chance that it would split a softwood guide and injure the hand. Even if it did not immediately damage the guide, it could score the internal surface and permanently weaken the device. It is possible that it was meant to be used with very hard wood such as ebony, which is mentioned in the Hidāyat ar-Rāmī (McEwen E., 2001: 48), or that it was for use in a metal (iron or copper) guide (Faris & Elmer, 1945: 143). In the latter case, the notches may be to protect the edges of the arrowhead from being blunted by the metal guide.

8. This practice is also known in sieges and a report of it is noted during the Mongol conquest of North China, "On the third day the Mongols the city on three sides… When the supplies were quite exhausted, coins were melted down to make arrowheads. And every long Mongol arrow picked up was cut into four pieces and each one was shot back by means of a 'whip tube'" (Needham al., 1994: 164).

9. This is catalogued as Ethé's Cat., No. 2768 (Beveridge, 1911: 345) and two other copies in the British Museum are referred to in Rieu's Cat., II. 488 (Beveridge, 1911: 345)

10. The author of the Hidāyat ar-rāmī (هدایهٔ الرامی) or "the Archer's Guide", Muḥammad Buda'i, محمد بدائی. British Library Or. 14143.

11. More recent work on the manuscripts of the Arabic work translated as Arab Archery has found both the name of the original author and the approximate date of its composition. See (Al-Sarraf, 2004: 167-168, note 84). This is significant since the manuscripts found predated that used for the translation by more than a hundred years. The author is named as Abū Muḥammad Jamāl al-Dīn 'Abdallāh Ibn Maymūn al-Murrākishī. The two manuscripts referred to were dated in the second half of the 14th century.

12. See an example at the Grayson Collection in the Museum of Missouri Columbia: MAC 1995-0344 is a single tīr-e nāvak of 24.5 cm length with a point of 2.5 cm. MAC 1998-0337 consists of 15 arrows ranging from 21 25.5 cm in length.

13. In modern Persian orthography this is the Ādāb al-Harb va al-Šojā-e by Mobārak Šāh Faxr-e Modabbar Mohammad ben Mansur ben Said.

14. A broad head is generally defined in archery literature as any wide bladed arrowhead designed to cause damage by blood loss due to its effect in cutting through tissue. The iconic triangular shaped arrowhead is an example of the type. In modern usage it refers to hunting arrowheads designed to cause death by haemorrhage.

15. حسبان.

16. The original manuscript source was Jāme al-Hadāyat fi Elm al-Romāyat by Nezāmeldin Ahmad ben Mohammad ben Ahmad Šojāeldin Dorudbāši Beyhaqi

17. It is faster to shoot with an arrow guide than a crossbow with a comparable range.

18. The length of arrows is conventionally measured from the tip to the nock.

19. The centre of gravity here is measured from the point of balance to the tip of the arrow.

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ناوک‌های «کمان» در ایران: پیشینهٔ تاریخی، ساخت و فنون به‌کارگیری

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چکیده

این پژوهش به ناوک‌های کمان، به شیوه‌های بهره‌گیری و تاریخ احتمالی ورود آن به ایران می‌پردازد. در زبان فارسی بدین رزم‌افزار «ناوک» (مجرا) و به پرتابه‌های آن‌ها «تیر ناوک» گفته‌اند. باوجود این، واژهٔ ناوک برای «تیر» و حتی «کمان» نیز در زبان فارسی به‌کار رفته است. اصطلاح رزم‌افزار ناوک چنان با نام ایران درهم تنیده است که از نگاه فرهنگ‌های بیرونی (خارجی)، ایران خاستگاه این جنگ‌افزار و توسعه‌دهندهٔ آن بوده است. این دو، در زبان عربی به‌عنوان «مجرا» نامیده شده‌اند؛ این اصطلاح عربی در غرب بسیار شناخته شده‌تر است؛ دلیل آن، به ترجمهٔ دو کتاب دستنامه (راهنمای) این موضوع از عربی به انگلیسی، یعنی «راهنمای کمان‌وری عربی» (راهنمای تیراندازی با کمان عربی) و «کمان‌وری مسلمانان» برمی‌گردد. باوجود این، پیش از رخداد، واژهٔ ناوک، به‌دلیل ترجمهٔ بخشی از کتاب هدایات الرامی، به انگلیسی ترجمه و شناخته شده بود؛ اما در ترجمه به اشتباه از آن با عنوان کمان‌های زنبورکی (/صلیبی) نام رفته است. منظور از ناوک (مجرا) تیر (پیکان)، یک لولهٔ نیمه‌بسته بر روی یک کمان برای پرتاب یک تیر با اندازهٔ کوچک اما برای شلیک به فاصلهٔ دورتر استفاده است. این ابزار موجب سرعت بیشتر تیر و اصصکاک کمتر آن با هوا به‌هنگام شلیک، در سنجش با یک تیرپرتاب معمولی، خواهد بود. به گمانی تاریخ ورود این رزم‌افزار به ایران، به روزگار فرجامین ساسانی برمی‌گردد؛ این رزم‌افزار با ورود «تازیان» نیز حفظ و تا زمان «ورود اسلحه» گرم نیز در ایران روایی داشته است. این رزم‌افزار، زمینهٔ ابداع بسیاری از رزم‌افزارهای دیگر در جهان اسلام بوده است. درهم‌تنیدگی نام ایران با این رزم‌افزار در دستنامه‌های عربی کمترین گواه توسعهٔ این جنگ‌افزار توسط ایرانیان است. از این‌روی، در این پژوهش به برخی منابع عربی-فارسی، با ارجاع به اشیاء اصیل و نیز بازسازی شده، پرداخته خواهد شد.

کلیدواژگان: کمان وری، تیر ناوک، تیرو کمان، مجرا، ناوک.

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ناشر: پژوهشگاه میراث‌فرهنگی و گردشگری

مقدمه

هدف از این پژوهش بیان چگونگی و چرایی استفاده از ناوک (مجرا) در کمان در ایران است. در اینجا به توصیف و بررسی ویژگی‌های آن‌ها پرداخته خواهد شد. جنبه‌های فنی این سلاح براساس آزمایش‌های عملی انجام شده توسط نویسنده، به تفصیل بیان خواهد شد. در زبان فارسی بدین ابزار تیراندازی، «ناوک» و به پرتابه‌های آن‌ها «تیر ناوک» گفته‌اند. باوجود این، واژهٔ ناوک برای «تیر» و حتی «کمان» نیز در زبان فارسی به‌کار رفته است (Khorasani, 2010: 244). این دو، در زبان عربی به‌عنوان «مجرا» نامیده شده اند؛ این اصطلاح عربی در غرب بسیار شناخته شده‌تر است؛ دلیل آن، به ترجمهٔ دو راهنمای این موضوع از عربی به انگلیسی، یعنی «راهنمای کمان‌وری عربی» (راهنمای تیراندازی با کمان عربی (Faris & Elmer, 1945)) و «کمان‌وری عربی» (Latham & Paterson, 1970) برمی‌گردد. باوجود این، پیش از این، واژهٔ ناوک، به‌دلیل ترجمهٔ بخشی از کتاب هدایات الرامی (Beveridge, 1911)، به انگلیسی شناخته شده بود؛ اما در ترجمه از آن با عنوان «کمان‌های زنبورکی یا صلیبی» نام رفته است.

منظور از ناوک (مجرا) تیر (پیکان)، یک لولهٔ نیمه بسته برروی یک کمان برای پرتاب یک تیر با اندازهٔ کوچک، اما برای شلیک به فاصلهٔ دورتر استفاده می‌شود. این ابزار موجب سرعت بیشتر تیر و اصصکاک کمتر آن با هوا به‌هنگام شلیک، در سنجش با یک تیرپرتاب معمولی، خواهد بود. ناوک‌های تیراندازی از غربی‌ترین نقطه، یعنی مراکش تا به شرقی‌ترین نقطه، یعنی کشور کره مورد استفاده بوده است. با وجود این، ایران مهم‌ترین مرکز در گسترش و انتقال آن به غرب و جنوب (آسیا) بوده است. بدیهی است که با پیدایی اسلحهٔ گرم (مدرن)، به‌ویژه با دورهٔ صفوی در ایران، این رزم‌افزار به فراموشی رفت. از شمار آخرین موارد گزارش آن در دستنامه‌های کمان‌وری به روزگار صفویه و دورهٔ «شاه تهماسب» برمی‌گردد.

بحث و تحلیل

ناوک‌های تیراندازی کمان به گمانی از اواخر دورهٔ ساسانی تا به دورهٔ تیموری در ایران کاربرد داشته است. متون فارسی به ساخت آن در پهنهٔ جغرافیایی ایران و هند سخن سر داده‌اند. هم‌چنین دستنامه‌های کمان‌وری عربی نیز به موضوع ساخت آن در درهم تنیدگی با ایران و برخی منابع محلی ایرانی اشاره دارند. ناوک‌های تیرپرتاب به سه دسته تقسیم می‌شوند که تنها یک مورد در اینجا مورد بحث خواهد بود؛ از این‌دسته می‌توان این‌چنین نام‌برد: ۱. ناوک (مجرا). ۲. ناوک قبضه. ۳. بیلک سپری. این سه هرچند با هم بسیار متفاوت‌اند، اما به گمانی ناوک قبضه و بیلک سپری از یک گونه هستند. ناوک مجرا، ابزاری چوبین بلند یا ساخته شده از فلز به اندازهٔ درازی یک تیر معمولی بوده است.

به گمانی ناوک‌های پیکان برای نخستین‌بار و در نتیجهٔ تازش ارتش «ترکان گوگ‌ترک» (آبی) به‌هنگام حمله به مرزهای شرقی شاهنشاهی ساسانی، به ایران معرفی شده باشد. ایران ساسانی متأخر، دارای ساختار نظامی خلاقانه و البته بسیار باز در پذیرش دیگر گونه‌های (رزم‌افزار) خارجی بود. آن‌ها در مرزهای شرقی و غربی خود جنگ‌های طولانی داشتند و مجبور بودند با هجوم‌های شمال نیز مقابله کنند. ساسانیان جنگ‌های بسیاری در مرزهای شرقی و غربی خود با دشمنان داشتند و در مرزهای شمالی نیز مجبور به مقابله با دیگر دشمنان خود بودند. ناوک تیرها به روزگار خلفای عباسی از راه دستنامه‌های کمان‌وری شناخته شده‌اند. مدخل

ناوک در «فرهنگ رزم‌افزارهای ایران» (ر.ک. به: مشتاق خراسانی) به منابعی ارزشمند در ادب پارسی چون دقیقی (توسی) ارجاع داده است. با وجود این، نخستین ارجاع به واژهٔ «ناوک» در زبان انگلیسی به مقالهٔ «بیوریج» (Beveridge, 1911) برمی‌گردد. او این واژه را از nāo به‌معنی «لوله، مجرا» گرفته است. «مک ایون» (McEwen) در برگردان دیگر به انگلیسی و از واژگان «ناوک دستی» استفاده کرده است.

از شمار مهم‌ترین کاربردهای ناوک تیر در جنگ:

- افزایش برد تیر در سنجش با تیرهای قدیمی (سنتی).
- هدف‌گیری آسان‌تر هدف‌ها.
- امکان حمل بیشتر این‌دست پیکان‌ها در سنجش با تیرهای بلند.
- عدم آگاهی (عدم شناخت کافی) دشمنان در زمان شلیک این‌دست تیرهای کوچک.
- اندازهٔ کوچک و سرعت بالای آن‌ها، جایی برای رهایی و فرار دشمن باقی نمی‌گذارد.

با توجه به مشکلاتی که یک سواره‌نظام و به‌شکل تصادفی ممکن است با آن روبه‌رو شود، این‌دست پیکان‌ها برای استفاده پیاده‌نظام بهترین بوده‌اند. از دیگر مشکلات این‌دست کمان می‌توان به اصطکاک میان رشتهٔ کمان (چله) و ناوک تیر یا اصطکاک میان کمان و شیار بیرونی ناوک اشاره کرد.

به‌طور کلی، تیر ناوک در ایران هم‌زمان با به‌کارگیری و استفاده از «تیر حسبان» (= تیر کوچک به اندازهٔ یک به‌دست در برابر تیر ناوک (بزرگ) در جنگ کاربرد داشته است. بنابر توضیح «لتهام و پترسون» (Latham& Paterson) نوع جنگی حسبان باید به اندازهٔ دو کف دست بوده باشد.

باوجود این، استفاده از ناوک تا سدهٔ نوزدهم میلادی در هند رایج بوده است؛ این موضوع از راه میراث برجای مانده قابل فهم است. هم‌چنین، این‌که ناوک در کشور کره نیز رایج بود، از آن‌چه که هنوز به‌نوعی در آنجا دیده می‌شود، گواهی می‌گردد. واژهٔ کره‌ای برای نامیدن آن tong-ah است. هم‌چنان‌که پیش‌تر آمد، آخرین دورهٔ استفاده از ناوک در ایران به روزگار صفوی برمی‌گردد. منابع صفوی داده‌های دقیق از این افزار به‌دست می‌دهند، اما از بیان جزئیاتی خارج از فضای کاربرد کمان‌وری سخنی نگفته‌اند (Moshtagh Khorasani, 2013: 86). این می‌تواند بدان‌معنا باشد که کاربری آن صرفاً مقطعی بوده است؛ زیراکه نسخه‌های (فارسی) در چنین مواقعی به شرح جزئیات می‌پردازند. همان‌گونه که آمد، پیدایی اسلحهٔ گرم یکی از دلایلی مهم کم‌رنگ شدن کمان‌وری قدیمی شد؛ چگونگی حمل، تجهیز، تسلیح شدن و عمق تخریب اسلحه‌های گرم (مدرن) از کمترین دلایل فراموشی کمان‌وری بوده است.

نتیجه‌گیری

چنین به‌نظر می‌رسد که ناوک از روزگار پایانی ساسانی وارد ایران شد؛ این رزم‌افزار از زمان تازش اعراب تا به روزگار آمدن اسلحهٔ گرم (مدرن) در ایران روایی داشته است. با توجه به پس‌زمینهٔ آن در ایران، آمدن اسلام بهانه‌ای شد تا با گونه‌های مختلف، در سرتاسر جهان اسلام گسترش یافت. درهم تنیدگی به‌کارگیری ناوک ایرانی و عربی در دستنامه‌ها، پرتوافکن این دیدگاه است که کاربران آن بیشتر ایرانی‌ها بوده‌اند. بیشتر متخصصان ناوک از راه منابع اسلامی (دوران اسلامی) شناخته شده هستند؛ هرچند، اساس

ناوک از مراکش تا به کشور کره یکی است، اما به‌کارگیری ناوک (شاه-مجرا) به مناطق میانی و غربی برمی‌گردد.

نوآوری‌ها همواره بر اندیشه‌های خلاقانه استوار و این یکی نیز موجب گسترش نیرومندانهٔ همان فکر می‌شود. از همین‌روی، گسترش ناوک با نام ایران گره‌خورده است؛ از تأثیر زبان‌شناختی آن تا به تأثیرگذاری مستقیم آن بر فرهنگ‌های مجاور. در پیشینهٔ آن در خود ایران و بنابر برخی منابع، گویی این موضوع با برخی مسائل ورزشی و مسابقه دادن درهم‌تنیده بوده است.