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Reconstruction of a Persian Reinforced Bakhter Armor from the Period of 1540-1650: A Comprehensive Study

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Abstract

In recent years there has been a growing interest among historians, historical martial artists, reenactors, and those who are interested in Eastern culture as well as in Persian offensive and defensive weapons to have a more detailed study of armor. The change in the paradigm of defensive weapons throughout Western Asia (the last quarter of the 15th to the first quarter of the 16th century) has not yet been fully investigated. Reconstruction of mail-and-plate armor from a period between 1540-1650 CE is quite challenging as most museums or major private collections do not have a complete set. Based on a detailed study of existing sets of joshan armor and several technical assumptions related to the design of this type of armor, the present study tries to reconstruct a fully protective complex of a joshan armor that was worn by a noble Persian warrior. The purpose of the following article is to reproduce a Persian mail-and-plate armor from a period between 1540-1650 CE in its original size and design with its inherent properties and qualities. Different existing sets of this type of armor from museums are studied and compared to different miniatures and literary sources. Based on the collected information gained from theoretical and practical research, the article presents a historical armor design and provides advice on the practical reconstruction and production of such a set of armor. Armor masters were looking for the best combinations and ratio of plates and mail armor in one set. They were experimenting with the shapes and sizes of plates, the number of holes, diameters, geometry, and method of ring interconnections. Characteristic of the armor of this period is rather large plates and a small number of their rows (3-5 rows on the chest/back), a small overlap of the plates in a row, basically only the same standard plates are used, large mail rings (inner diameter about 10 mm).

Keywords: Reinforced Armor, Bakhter, Armor Plate, Combined Mail Weaving, Mail Armor, Anatomical Mail Collar, Jošan, Yushman, Kalantar.

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Introduction

In recent years there has been a growing interest among historians, historical martial artists, reenactors, and those who are interested in Eastern culture as well as in Persian offensive and defensive weapons to have a more detailed study of armor. The change in the paradigm of defensive weapons throughout Western Asia (the last quarter of the 15th to the first quarter of the 16th century) has not yet been fully investigated. For a short period, mail and mail-plate armor had a leading position as equipment for warriors and almost completely replaced other types of armor. After coming to power in Iran, the Safavid dynasty accelerated this process in the whole region. Successful military campaigns and the growth of Persian state power strengthened the positions of the military aristocracy. This power boosted a revolutionary development of armor design throughout the whole eastern region. Reconstruction of mail-and-plate armor from a period between 1540-1650 CE is quite challenging as most museums or major private collections do not have a complete set. Based on a detailed study of existing sets of joshan armor and several technical assumptions related to the design of this type of armor, the present study tries to reconstruct a fully protective complex of a joshan armor that was worn by a noble Persian warrior. The research question is whether it would be possible to conduct such a project taking into consideration the need for a thorough comprehensive study and the technical complexity of its implementation. The research method of this paper is empirical. The main hypothesis of this paper is whether it would be possible to create a Persian ring-and-plate armor made of riveted rings and hardened plates that was worn by Persian warriors around 1540-1650 CE. This main hypothesis can be broken down into three minor ones:

- Would it be possible to combine different types of mail armor weaving together?
- Would it be possible to integrate a mail collar protection (garibān) by the method of weaving?
- Would it be possible to integrate the rows of steel plates into armor sleeves made of mail armor?

Mail-and-plate armor terminology

Russian scholars differentiate three types of plate-and-mail armor: a) Bakhtertsy, b) Yushman, c) Kalantar (see: Bobrov & Khudyakov, 2002: 106 – 168), and d) reinforced mail armor.

a) Bakhtertsy or Bakhter (Russian: Бехтерец) is one of the types of ring-plate armor that existed in the 15th-17th centuries, and in some regions even later, on a vast territory from Poland to India. Behterets have small horizontal plates that are arranged in vertical rows without gaps. Further, they are joined by rings, and embedded in mail. Usually, armor consists of a large number of small plates, most often rectangular plates, fastened in a double or triple overlap (the overlap reaches half the area of the other plate) with three or more rows of rings, and having five or more rows on the chest and dorsal parts.

The wide geography of the Bakhter circulation is so significant that it is not surprising that local features appear on this type of armor.

b) Yushman (Russian: Юшман) is derived from the Persian word jošan. This armor consists of long horizontal plates integrated into mail armor and it resembles laminar armor, such as Roman lorica segmentata. Yushman is made from large plates with a small overlap in rows (2-8 plates in a row on the chest, 9-20 plates in a row on the back), and it has always a central axial cut in front.

c) Kalantar (Russian: Калантарь): It is a ring-plate armor made of square or rectangular plates woven into mail armor on four sides of the plate.

d) Reinforced mail armor: This type of armor can be added to the list as its own armor type. It is a mail armor with several rows of overlapped steel plates (usually 1-3). The rows are located in the most commonly endangered areas.

Although Russian sources state that Bakhter is a Persian term and that type of armor was sent from Iran to Russia originally, no equivalent word for Bakhter related to armor could be found in Persian sources. However, Persian sources use the baqaltāq بغلطاق or baqaltāq بغلطاق to refer to an unspecified type of armor (see: Sa'di, 2005: 235; Mobārak Šāh Faxr-e Modabbar, 1967: 467; Molavi, 2006: 368). More research should be done on whether baqaltāq is the same as Bakhter. However, we should note that Persian period sources only use the term jŏšan جوشن as a type of mail-and-plate armor (see: Tarsusi, 1977:121, vol. 2; Moshtagh Khorasani, 2010) from the list above. A further differentiation for terminology is used as far as the size of the plates is concerned. The iron of the steel plate of a jŏšan armor is called qeibe غیبه. Hence a jŏšan armor with small plates is called jŏšan-e xord qeibe غیبه خرد جوشن (a jŏšan جوشن armor with small iron/steel plates) (Tarsusi, 1977, 121, vol. 2). Another type of mail-and-plate armor was called tanure تنوره. Tanure تنوره is an armor made of mail and iron/steel plates similar to jŏšan جوشن; however, the iron/steel plates (qeibe غیبه) of it are larger as the ones used in jŏšan جوشن. For reasons of simplicity, the author of the present article uses the Russian terms of mail-and-plate armor classification. Persian sources use kalāntar کلانتر to refer to "sheriff" or "head of a tribe" or simply "bigger". But it is not used to refer to any type of armor.

Historical background

Based on pictorial sources and miniatures from the 15th-16th centuries, we can see a wide variety of mail and mail-and-plate armor worn by Persian warriors and their opponents. At the turn of the 15th-16th centuries, the main models were being formed, which later became a "classical" armor type in the modern view of researchers. During this period, no evident classification of mail and plate armor types could be done. Armor masters were looking for the best combinations and ratio of plates and mail armor in one set. They were experimenting with the shapes and sizes of plates, the number of holes, diameters, geometry, and method of ring interconnections. Characteristic of the armor

of this period is rather large plates and a small number of their rows (3-5 rows on the chest/back), a small overlap of the plates in a row, basically only the same standard plates are used, large mail rings (inner diameter about 10 mm). A reinforced version of the armor appears, which also includes a ring-plate hem and sleeves (see: Fig. 1, the fragment of Shahnameh Ferdowsi, Tabriz, 1524, publication of the Saltykov-Shchedrin Library).

Fig. 1: A reinforced version of the armor, Shahnameh Ferdowsi, Tabriz, 1525.

Alexander (1992: 160) states that this type of mail-and-plate armor was used by Mamluks, Ottomans, and Aqqoyunlu alike but each style had its specific features as far as the type of buckles used for fastening. A Mamluk plate-and-mail armor from the Furusiyya Foundation is dated 1428-1442 CE (see: Mohamed, 2008: 298-299). All steel plates are gilded. The frontal plates are set in two columns of steel plates. Each column consists of seven plates. They are connected to riveted mail rings. The side plates consist of two columns of steel plates that are connected via riveted mail rings. Each column consists of seven overlapping steel plates. The back of the armor is protected by three

columns of overlapping steel plates. Each column consists of 20 plates. Similar plate-and-mail armor from Timurid Iran can be found in the collection of the Furusiyya Foundation (see: Mohamed, 2008: 300-301). This armor is inscribed with the name of the grandson of Timur, Ibrāhim Sultān ben Shābrukh ben Timur. The front part of the armor consists of two columns of gilded steel plates. Each column consists of six plates. Each side of the armor has two columns of steel plates that are integrated into the mail armor separate from each other. Each column consists of six overlapping steel plates. The back of the armor is protected by three columns of overlapping steel plates. Each column consists of 21 plates. An Iranian mail-and-plate armor from the Nasser Khalili Collection from the 15th century has body protection integrated into the mail armor. The frontal plates consist of two columns and each column consists of four plates. The sides of the body are also protected by steel plates. This armor is inscribed with the name "The Sultan, Khalid son of ..." (see: Alexander, 1992: 68-69).

Alexander (1992: 72-73) shows a body armor or shirt made of riveted mail rings and plates attributed tentatively to the Ottoman Empire from the Nasser Khalili Collection. However, the steel plates are bigger. The frontal plates consist of eight plates in four rows of two plates each. The steel plates only cover the frontal parts of the body and the back and sides of the body. Each side plate consists of four smaller plates. A more detailed mail-and-plate armor from India can be seen in Nasser Khalili Collection (see: Alexander, 1992: 160-161). This armor set which is tentatively attributed to Bijapur India has an intricate backing consisting of multiple small steel plates. These consist of 3 columns and each column contains 34 small plates that overlap each other on their length and are connected via riveted mail rings. The side plates consist of two large steel plates that are connected via riveted mail rings. The frontal plates consist of two large steel plates that are integrated into the mail armor via riveted mail rings. Â similar Indian armor can be found in the David Collection (see: von Folsach et al., 2021: 160-161). The back of this armor has five columns of small steel plates overlapping each other. The belly is protected by four steel plates arranged in two columns each consisting of two overlapping steel plates. The sides are also protected by four steel plates each. This armor is tentatively attributed to the 17th century (before 1691 CE) (see: von Folsach et al., 2021: 160). A similar 17th-century armor made of plate-and-mail from India is kept in the Metropolitan Museum of Art (see: Pyhrr et al., 1991: 41). There are also similar Indo-Persian armor sets made of overlapping steel plates and riveted mail rings from the collection of the Polish museums (Zbiory Muzeum Zamkowego w Malborku, Zbiory Muzeum Wojska Polskiego w Warszawie, Zbiory Muzeum Narodowego w Krakowie, Chodynski, 2000: 209-217).

Probably such armor had a rather heavy weight, was expensive, and was supposed to be worn by wealthy riders. Presumably by the second half of the 16th century the size of the plates began to decrease and the such trend continued until the beginning of the 17th century. Similar types of armor made of riveted mail rings and steel plates were

used by Russians such as a plate-and-mail armor attributed to Tsar Michaeil Fjordorvich (1620), and a plate-and-mail armor attributed to Nikita Ivanovich Romanow (first half of the 17th century) (see: Miller, 1982: plates 14, 18). There is also a different style of integrated rectangular plates placed in the whole armor and connected via riveted rings from Sind, India. One example is kept in the Stibbert Museum (see: Probst, 1997: 90-91). For similar pieces of leg armor from Egypt or Syria, Iran, and Anatolia from the collection of the Furusiyya Foundation, see Mohamed (2008: 302-304). Over time, the geometry of plate profiling becomes more complicated. The method of making half of each plate overlaps the other in a row became standard practice at this time. The nature of combat clashes and tactics of conducting battles require greater mobility and constant combat readiness for heavily armed warriors. Bakhter armor became popular with an axial cut on the chest (wrap over), a large number of plate rows (5-8 rows on the chest/back), and wedge-shaped rows of plates appearing along the center of the back/chest and sides. The number of rows of rings between the rows of plates decreased (see: Fig. 2, 3, and 4; Shahnameh Shiraz, Shahnameh Shah Tahmaspi, 1537).

Fig. 2-4: Reinforced ring-plate Bakhter armor, Shahnameh Shiraz, Shahnameh Shah Tahmaspi, 1537.

Mail rings were reduced in size, and armorers started to use monolithic and welded types of rings more often. Thus, there is a request to lighten the armor and improve weight distribution throughout the body of a warrior without losing protective capabilities. The main models were being finalized. The reinforced version of Bakhter was becoming more and more complex. Armors were made by pre-orders and sometimes they had an exquisite finish. Undoubtedly, it was available only to noble warriors and aristocracy (this fact is confirmed by miniatures of adjacent regions). At the same time, there was a development of firearms in the region and their massive use on the battlefields. The confrontation between gunpowder weapons and protective equipment encourages craftsmen to look for new technical solutions. Massive ringed plate armor was simplified and lightened, becoming variants of reinforced mail armor. Reinforced mail armor is undergoing evolutionary transformations which are manifested in the differentiation of armor and the improvement of the protective qualities of mail protection. Differentiation leads to the abandonment of plate sleeves and in some cases from plate hem in a favour of mail elements. The development of mail-and-plate protection of the hips also affects

the weight of the main armor skirt and lightens it. At times, it was completely left out.

Around this period, the armorers started to make a distinction between two types of mail-and-plate armor, namely Bakhter and yushman. Yushman became a universal armor as it was simple to manufacture and affordable armor. On the other hand, the Bakhter armor symbolized the high status of the owner in the military organization and at the same time, it was the top of the evolutionary development of armor in that region. Numerous pictorial sources from Central, West, and South Asia confirm the popularity of reinforced Bakhter armor among the nobility of these regions. Because export deliveries of armor from Iran did not cover the needs of its neighboring regions, there was a high demand for Bakhter armor. Such a situation contributed to the growth of local production of Bakhter armor. Another distinction of Bakhter armor can be made namely a reinforced Bakhter. This armor was a combination of Bakhter armor and reinforced mail armor. Reinforced Bakhter is a Bakhter armor that has a ring-plate structure for protecting the sides of the body. The base plate forms most rows of the armor. These plates have a constant width throughout their length. They are combined with alternating rows of mail rings of different sizes.

Experimental trials of reconstruction of a reinforced Bakhter armor

The author of the present article made a replica of a Bakhter armor attributed to 1540-1575 CE that is kept in the Moscow State Museum in 2007. The main plate types of this armor were thoroughly investigated for reconstruction. In 2009, the author of the article made a version of Ottoman's type yushman armor. In 2015, experimental samples of other types of Bakhter armor protection were made. These were made based on the Bakhter armor from the Regional Museum of Voronezh, Russia. However, studying the examples of armor in available museums and private collections, it was not possible to find surviving examples of reinforced Bakhter's armor. Separate fragments of ring-plate armor do not provide any useful information. It can be assumed that the protective hem and sleeves were completely or partially dismantled to lighten the armor at the final stage of military operation or they were possibly lost. Indirectly, this may be seen by very short mail stripes along the lower edge of the armor with rings that are not typical of this zone. Based on pictorial and literary sources, we can confidently assert that reinforced Bakhter armors existed. To reconstruct a reinforced Bakhter armor, the following steps were taken:

• A study of extant specimens of Bakhter armor sets in museums' collections and pictorial sources;

• An analysis of main dimensional parameters of Bakhter plates and their types;

• An investigation of technologies for the manufacture of Bakhter plates, their forging profile, types of hardening, finishing, and protective coatings;

• An examination of combined mail weaving techniques, ring characteristics, protective properties, mobility, and weight;

• An exploration of modeling methods to shape the structures of ring-plate armor and its features, such as advantages and disadvantages;

• An establishment of assembling schemes of Bakhter's plates in rows and testing the possibility integrating of plates rows into different mail weaves;

• A setup of schemes of mail conjugation with combined types of weaving mail rings;

• A design and experimental probes to create an anatomical mail collar with combined weaving;

• Comparative analysis of characteristics of protective properties of mail-and-plate types of armors;

• Probing methods of natural and artificial aging of metal;

• Looking for the possibility of future museum exhibits;

• Making functional fittings of Bakhter armor;

• Producing fittings on mail-and-plate armor dated early 16th -17th centuries.

The Bakhter armor is a modular system. The base element of it is a standard plate. The basis for the design was a plate of Bakhter armor stored in Voronezh Regional Museum (the Russian Federation). The armor can be dated to the middle of the 16th century (see: Fig. 5).

©Fig. 5: Base plates Bakhter armor, Musem of Voronezh, Russia. Photograph Oleg Belov.

The base plate size is about 50x30mm, and there are 8 holes (4 on each side).

Thickness is about 1 mm. The plates have a forging profile (punch) in two projections, the depth of which is about 2 mm. The first and last plates of each row have end holes for mail attachments. The plates of the original armor were covered with rust. However, there are visible traces of gilding as an ornamental pattern or arabesques. Nothing is known about the heat treatment of these plates and protective coatings. Based on the type of plate and the nature of the decorative finish, there is a high probability of their production in northern Iran.

The key objective was to create a Bakhter armor that is based on historical patterns and pictorial sources. In the process of designing the Bakhter armor, preference was given to armor with an axial cut (wrap over) on the chest. Under the designed size of the product, the distribution of plates in rows looks like the following:

• The chest has 6 columns of 19 steel plates each,
• The back has 7 columns of 25 steel plates each,
• Each side has 3 columns of 12 steel plates each,
• Thigh protection has 16 columns of 10 steel plates each.
• The central row of the back and the central rows of the sides are wedge-shaped.

Thus, the number of base plates is 472 pieces, or 90% of all plates in the armor (see: Fig. 6).

©Fig. 6: Frontal and back of the Bakhter armor, personal photo archive of Gorbatko S., 2023.

For plate production, experimental research was conducted to determine the manufacturing technology, the necessary production tools, and the attachments used. All plates are hand-made and treated manually at different production stages, such as initial material aging, marking, metalwork, forging, hardening, grinding, and applying of protective coating. In total, about 720 pieces were produced. More plates were manufactured to experiment with the possibility of the ideal joining of plates in rows and it was tested by probing different possible options. The plates in rows were assembled in a half-overlap system with flat rings measured at 13x10x0.9 mm. Between them, each row was fastened with flat rings measured at 11.5x8x0.8 mm. The dimensions of the rings correlate with the diameter of the holes and their distribution on the plate, providing the necessary protection and sufficient mobility to the plates. To form the mail field of the remaining parts of armor, the flat rings of 11.5x8x0.8 mm and 12.4x9x0.9 mm were used. Studies have shown that the alternation of rings of different dimensions in mail protection combines the advantages of each type. Smaller rings are responsible for providing the maximum protection area (density), meanwhile, large rings create the necessary strength and mobility of the mail armor. All rings were riveted. The classic scheme of weaving rings “4 in 1” was used. The results of the analysis of basic criteria

values, such as mass, mobility, density area per square cm, and combined weaving, prove its optimality. For rings manufacture, 1.4 mm wire diameter for rings of 13x10x0.9 mm and 12.4x9x0.9 mm were used. Additionally, 1.2 mm diameter wire for rings of 11.5x8x0.8 mm was used. Both wires are made of low-carbon steel which is comparable in its mechanical properties to steel wire mid of the 16th century. Samples of Persian, Ottoman, and Indian mail armors are known and made according to combined schemes using rings of different types and connection methods as well as production technologies. During the armor-making process, the schemes of combined mail-weaving conjugation were studied. The longest pairings - the lines joining the sleeves to the armor body were calculated and made following the distribution of the mail armor for arm protection (Fig. 7).

©Fig. 7: View of the place attachment of the sleeve to the body, personal photo archive of Gorbatko S., 2023.

The collar and armpit areas are the most vulnerable parts of any armor and require special attention. The anatomical mail collar is designed and made according to the principle of a truncated cone. It is attached to the armor (Fig. 8).

©Fig. 8: Mail collar of the Bakhter armor, personal photo archive of Gorbatko S., 2023.

Underarm zones are formed by special triangular mail inserts and integrated into the structure of the sleeve with a complex attachment (Fig. 9).

©Fig. 9: Underarm of the Bakhter armor, personal photo archive of Gorbatko S., 2023.

Only after numerous long-term probes, modeling attempts, and lots of experiments, I was able to achieve the desired result. Doing an experimental study, I found out that using same-size rings (for weaving mail armor) significantly simplifies the design of the armor. As part of dedicated research of plates rows and columns and their integration into the mail armor, I could prove the following fundamental rule: only if the distances between the rings' center and the center of the holes in the plates coincide or are comparable, it is possible to integrate plates row/column into the mail weaving without distortion and changes in the spatial row/column position. Therefore, it is theoretically possible to weave some Bakhter plates into a mail sleeve provided that all rings are of the same size. This makes sure that the direction of the rings in the rows of the body and the sleeves of the armor coincide. We should consider that in sleeves the plates are located perpendicularly to the mail armor surface. Turning the mail by 90 degrees changes the distribution of the rings in the rows (the rows are stretched, Fig. 10), as a result of which the distances between the center of the rings increase.

©Fig. 10: Sleeves of the Bakhter armor, personal photo archive of Gorbatko S., 2023.

This creates additional difficulties. In the case of using a combined mail and plates, it is impossible to integrate the rows of Bakhter's plates into the sleeves. Obvious that such basic knowledge and little secrets were extremely important for armorers and masters. As a result, the size of plates and rings was initially selected based on the framework for developing armor designs. Functional fittings are represented by a system of buttons/ loops (7 pieces) and buckles/belts (3 pieces) (see: Fig. 11).

©Fig. System of buttons, loops and buckles, personal photo archive of Gorbatko S., 2023.

Buckles with belts are installed within the abdomen area and the upper chest. They bear the main weight of the armor. Survived armor examples that possess axial cuts usually do not have traces of fastening belts and buckles in the chest area (near the rows of plates), as they were probably fastened with buttons with loops or ordinary cloth ties installed there. This is confirmed by visual sources. In this case, it was not possible to place a different fastening system in order not to lose the level of protection or plate mobility in this area. All metal parts of functional fittings are made of cast bronze. The models were specially developed based on individual findings and examples of belt sets. All buttons are decorated with natural stones. The front edges of the armor and the collar are covered in goat skin to form structural integrity. The belts are made of two layers of dyed calfskin with a 3.5-4 mm thickness. Decorative accessories are represented by medallions (18 pieces), stars (62 pieces), and mail weaving made of brass rings. The brass rings measure 12x9x0.9 mm and form the decorative edges of sleeves and thigh protection. Six-pointed stars are made of cast brass. The star is one of the most common decorative elements in the region. The medallions are made of cast bronze with natural

stones inserted. Models of medallions were developed based on the style of functional fittings and decorations of the 17th century. It was possible to create an artistic image of an armor that can be called "Dawn Star". It is a proposed name for this armor for a future armor exhibition. Fig. 12 shows the whole armor on a mannequin.

©Fig. 12: Bakhter armor model, personal photo archive of Gorbatko S., 2023.

Fig. 13 shows the whole armor on a male model.

©Fig. 13: Whole Bakhter armor model, personal photo archive of Gorbatko S., 2023.

Findings

The whole process of research and armor production stages took about 5 years of intensive work. During this time the armor was altered and refined several times based on updated research findings. As a result, this project was completed. The weight of the reinforced Bakhter armor sample is 14 kg. Its measurements correspond to 52-54 which fits a person with a height of 180cm. During this time, valuable experiences and knowledge were gained. Production technologies were studied and all stages of design were worked out. As a result, independent studies had been carried out. As an example, a separate study and production of leg and knee protection were carried out (see: Fig. 14). For a similar Persian leg and knee protection from the 15th to early 16th century.

©Fig. 14: Persian Bakhter leg and knee protection, personal photo archive of Gorbatko S., 2023.

Thanks to these leg protectors, it was possible to design the thigh protection of the armor.

A comprehensive study made it possible to have a closer look at the work of masters from the 15th-17th centuries. It also sheds light on armor production workshops, blacksmiths, forges, foundries, jewelry workshops, and procurement warehouses. To feel the spirit and try to immerse into their planning, and designs to reveal century-old secrets of craft and art. This way, we can appreciate the level of skills, diligence, and resourcefulness of all those involved in the manufacture of armor in conditions of manual labor and historical tools. This shows the level of very high skills of Iranian masters.

Conclusion

Based on a comprehensive study and the implementation of numerous different tasks, the version of Persian reinforced Bakhter armor of 1540-1650 CE was reconstructed. The armor fully complies with the design task and possesses all inherent qualities and properties. It provides the basis for future research. The results of each study (of the complex) will be presented in separate future articles. Within the research process, the main prerequisites for the integration of Bakhter's plates rows into mail armor were formulated. Several important design features of combined mail and plates have been identified and proven. Thus, the research question can be answered positively that a successful implementation of such a project is possible despite all difficulties. The hypothesis about the possibility of creating a reinforced Bakhter armor and proving its existence as a part of the protective armor complex of Persian warriors in 1540-1650 CE is confirmed. Further, the hypothesis about the possibility of using combined sizes of mail rings and their weaving for the creation of Bakhter armor was confirmed. The hypothesis about the possibility of using an anatomical mail collar with combined mail weaving was also confirmed. The hypothesis about the possibility of integrating Bakhter's plates rows into sleeves with a combined mail canvas was refuted.

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بازسازی یک زره ایرانی: «بختر»، براساس نمونه‌ای از دورهٔ زمانی ۱۵۴۰-۱۶۵۰: مطالعهٔ سنجشی

سرگئی گورباتکوف[I]

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چکیده

در سال‌های اخیر، موضوع توجه به جزئیات رزم‌افزارهای (قدیمی) دفاعی و تهاجمی ایرانی درمیان مورخان، متخصصان رزم‌های کهن‌سال، علاقمندان به بازسازی این‌دست آثار تا به علاقمندان به میراث‌فرهنگی شرق، رشد فوق‌العاده‌ای داشته است. باوجود این، تغییر در الگوهای رزم‌افزارهای دفاعی غرب آسیا (یک ربع فرجامین سدهٔ ۱۵م. تا به نخستین ربع از سدهٔ ۱۶م.) به‌خوبی موردمطالعه واقع نشده است. بازسازی جنگ‌افزار معروف به «زره فلزی» مربوط به ۱۵۴۰ تا ۱۶۵۰م. بسی چالش برانگیز است؛ زیرا در موزه‌ها تا به‌حال و نیز در مجموعه‌های شخصی نمونهٔ کاملی از آن گزارش نشده است. از این‌روی، بر پایهٔ رزم‌افزار معروف به «جوشن» و دیگر موارد فنی درهم‌تنیده با طراحی این گونه رزم‌افزار، پژوهش حاضر به موضوع بازسازی جوشن می‌پردازد که روزگاری بر تن جنگجویان ایرانی بوده است. به‌همین دلیل، به بازسازی یک زره فلزی ایرانی بر پایهٔ همین رزم‌افزار از دورهٔ زمانی ۱۵۴۰-۱۶۵۰م. براساس اندازهٔ واقعی، طرح اصلی و تمامی ویژگی‌های واقعی آن اقدام شده است. در این نوشتار بر پایهٔ دیدگاه‌های موجود (نظری) و نیز تحقیقات عملی به طراحی و بازسازی این رزم‌افزار اقدام شده است. استادان زره‌کار (سازنده) همواره به‌دنبال بهترین ترکیب و نسبت صفحات و زره حلقهٔ فلزی در ساخت این‌دست آثار بوده‌اند. آن‌ها همواره از موضوع آزمایش شکل‌ها، اندازه‌های صفحات، تعداد سوراخ‌ها، قطر، هندسه و روش اتصال حلقه‌ها غافل نبودند. از مهم‌ترین مشخصات زره‌های دورهٔ زمانی یادشده، بهره‌گیری از صفحات نسبتاً بزرگ و تعداد کمی از ردیف‌های آن‌ها (۳-۵ ردیف روی سینه / پشت)، هم‌پوشانی کوچک صفحات در یک ردیف است.

کلیدواژگان: بازسازی زره، بختر، جوشن، زره فلزی.

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مقدمه

در سال‌های گذشته، علاقهٔ فزاینده و روزافزون مورخان، متخصصان جنگ‌های تاریخی، علاقمندان به بازسازی (جنگ‌ها)، علاقه‌مندان به فرهنگ شرق و هم‌چنین به سلاح‌های تهاجمی و دفاعی ایرانی بهانهٔ دسترسی به اطلاعات و داده‌های بیشتری در این‌زمینه شده است. باوجود این، تغییر در الگوی تسلیحات دفاعی در سراسر آسیای غربی (ربع آخر قرن پانزدهم تا ربع اول قرن شانزدهم میلادی) هنوز به‌طور کامل بررسی نشده است.

برای مدت کوتاهی «جوشن فولادی» که ترکیبی از ورق‌های پولادی و زره حلقه‌ای بود، به‌عنوان تجهیزات جنگجویان، جایگاهی مهم به‌دست آورد و تقریباً به‌طور کامل جایگزین انواع دیگر رزم‌افزارها شدند. این روند، با روی‌کار آمدن دودمان صفوی در ایران، در کل منطقه سرعت گرفت. لشکرکشی‌های موفقیت‌آمیز و رشد قدرت دولت ایران، موقعیت اشراف (نجیب‌زادگان) نظامی را تقویت کرد. این موضوع موجب انقلابی در گسترش طراحی زره در تمام منطقهٔ شرق شد. باوجود این، چگونگی بازسازی زره‌های فلزی مربوط به دورهٔ ۱۵۴۰-۱۶۵۰م. برای بیشتر موزه‌ها یا مجموعه‌های خصوصی بزرگ، که از آن مجموعهٔ درستی ندارند، چالش‌برانگیزترین بوده است. پژوهش حاضر تلاش دارد تا براساس مطالعات دقیق موجود دربارهٔ ساخت بختر که نوعی از «جوشن» پولادی بوده و فرضیات فنی مرتبط با طراحی این نوع زره، به بازسازی کامل این زره حفاظتی بپردازد، که روزگاری بر تن یک رزمندهٔ اصیل ایرانی بوده است.

«بخترسی» یا «بختر» یکی از انواع زره‌های با صفحهٔ پولادی است که در سده‌های ۱۵-۱۷م. (حتی پس از این دوره) در قلمرو وسیعی از لهستان تا هند، روایی داشته است. بخترها دارای صفحات چهارگوش افقی کوچکی بوده که در ردیف‌های عمودی و بدون درز بر روی‌هم قرار گرفته‌اند و یک‌دیگر را از طرف بالا و پایین می‌پوشانند. علاوه‌بر این، صفحات به‌وسیلهٔ حلقه‌های زره از طرف چپ و راست به‌هم وصل می‌شد و در زره حلقه‌ای جاسازی می‌شدند. معمولاً زره شامل تعداد زیادی از صفحه‌های کوچک بود که اغلب این صفحات مستطیلی‌شکل بودند، که به‌صورت هم‌پوشانی دوتایی (هم‌پوشانی یک صفحه تا نصف سطح صفحهٔ بعدی می‌رسید) با حلقه‌های چندگانه، سه‌تایی یا بیشتر، به همدیگر متصل می‌شدند؛ این ردیف‌ها برروی سینه و پشت به پنج ردیف یا بیشتر نیز می‌رسید. با توجه به جغرافیای گستردهٔ استفاده از بختر، جای تعجب نیست که برخی عناصر بومی مناطق در آن به‌کار رفته است. به‌عبارتی در برخی بخترهای ایرانی شاهد عناصر بومی و حتی محلی دیگر مناطق هستیم.

بحث و تحلیل

هرچند منابع روسی بیان می‌دارند که بختر یک واژهٔ اصیل فارسی است و این نوع رزم‌افزار برای نخستین‌بار از ایران به روسیه وارد شد، اما در زبان فارسی واژهٔ معادل برای بختر در منابع (فارسی) نمی‌توان یافت. با وجود این، منابع فارسی از واژگان baqaltāq «بغلطاق» baqaltāq «بغلتاق»، نوع ناشناخته‌ای از زره، اشاره دارند (قس. سعدی، مبارک‌شاه فخر مدبر، مولوی). براساس منابع تصویری و مینیاتورهای قرن ۱۵ تا ۱۶م.، می‌توان به طیف گسترده‌ای از جوشن

فولادی مرکب از ورق‌های پولادی و زره حلقه‌ای اشاره کرد که رزمندگان ایرانی و حتی دشمنان آن‌ها به تن می‌کردند؛ هرچند مدل‌های اصلی بختر، به اواخر قرن ۱۵-۱۶م. شکل‌گرفت، اما سپسین‌تر ازسوی پژوهشگران این حوزه به‌عنوان زره «کلاسیک» این دوره معرفی شد.

نگارنده در این پژوهش تلاش نموده تا به بازسازی یک بختر براساس نمونهٔ قدیمی سال ۱۵۴۰-۱۵۷۵م. (موزهٔ مسکو) بپردازد. برای بازسازی این زره، از ترکیب قطعات یک صفحهٔ فلزی با زره حلقه‌ای به‌عنوان عنصر اصلی بهره برده است. اساس این طراحی و بازسازی یک بختر موجود در موزهٔ منطقه ای «ورونژ» (فدراسیون روسیه) است؛ تاریخ این بختر به اواسط سدهٔ شانزدهم میلادی برمی‌گردد.

برای این‌کار، از یک صفحهٔ فلزی با اندازهٔ ۵۰×۳۰ میلی‌متر با ضخامت یک میلی‌متر استفاده شده است؛ هشت سوراخ (چهار سوراخ در هر طرف صفحه) ایجاد شد؛ ضخامت هر یک حدود یک میلی‌متر است. صفحات پروفیل به هم‌دیگر پیوست شده دارای برجستگی با عمق حدود ۲ میلی‌متر انتخاب شد. صفحهٔ فلزی روی و زیرین از راه همان سوراخ‌های حاشیه به‌هم محکم (متصل) شد.

هدف اصلی، ایجاد یک زره بختر براساس الگوهای تاریخی و منابع تصویری بود؛ از همین روی، در فرآیند طراحی زره بختر، اولویت به زره‌ای با ایجاد برش محوری (پیچش) برروی سینه بود. در اندازهٔ طراحی شدهٔ محصول، موارد زیر درنظر گرفته شد:

- زره بر روی سینه دارای شش ردیف از ۱۹ ورق فولادی خواهد بود.
- پشت (کمر) دارای هفت ردیف از ۲۵ ورق فولادی.
- هر طرف (پهلو) دارای سه ردیف از ۱۲ صفحهٔ فولادی.
- محافظ ران دارای ۱۶ ردیف از ۱۰ صفحهٔ فولادی.
- ردیف مرکزی پشت و ردیف‌های مرکزی دو پهلو اسکنه‌شکل هستند؛ بنابراین، تعداد صفحات پایه در ساخت این زره ۴۷۲ قطعه یا ۹۰٪ از تمام صفحات زره را شامل می‌شود.

کل فرآیند تحقیقات و مراحل تولید این زره حدود پنج سال و با کار فشرده به درازا کشید. در طول این مدت، زره براساس یافته‌های تحقیقاتی به‌روز شده، چندین‌بار تغییر و اصلاح شد تا در نتیجهٔ این پروژه به فرجام رسید. وزن نمونهٔ ساخته شدهٔ زره بختر ۱۴ کیلوگرم است. اندازه (سایز) آن ۵۲-۵۴ و برای یک فرد با قد ۱۸۰ سانتی‌متر مناسب است. فن‌آوری‌های تولید مورد مطالعه قرار گرفت و تمام مراحل طراحی کار شد. با کارهای مطالعاتی، به‌ویژه براساس ساق‌بند و زانوبند برای محافظت از پاها و زانوها، از الگوی همین رزم‌افزار عثمانی سدهٔ ۱۵ تا آغاز سدهٔ ۱۶م. استفاده شد.

نتیجه گیری

براساس یک مطالعهٔ جامع تصمیم گرفته شد تا در یک کار پژوهشی، نسخه‌ای از تقویت شدهٔ زره بختر ایرانی براساس الگوی آن مربوط به سال‌های ۱۵۴۰-۱۶۵۰م. بازسازی شود. در این فرآیند، براساس بختر قدیمی، چفت و بست لازم به‌درستی انجام‌گرفت؛ هرچند با فراموشی بختر ایرانی، تصور بازسازی آن سخت بود، اما بررسی‌های متن شناسی اولیه، بهره‌گیری از

نمونه‌های همانند موجود، فضای بازسازی نمونهٔ ایرانی را ایجاد کرد. بختر، یکی از مهم‌ترین زره‌های دفاعی به‌شکل پوشش بر تن رزمندگان ایرانی در جنگ‌ها بوده است که سپسین‌تر، موردتوجه و الگوسازی قرار گرفت. صفحات فلزی محکم، اتصالات قوی لایهٔ رویی به زیر از روی سینه تا به نوع ساق‌بندها، بدین زره جایگاهی مهم در نبردهای رزمندگان ایرانی با دشمنان خود داده بود.