

## SASSANID ARMOR: BACKGROUND, DEVELOPMENT AND TECHNOLOGY

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### ABSTRACT

The aim of this article is to study the Sassanid armor types and their construction methods based on Sassanid rock reliefs, surviving fragments, armor depicted on Sassanid dishes and stone statues in Iran. The article explains the construction methods of different armor types used by the Sassanids during their rule and how Sassanids influenced the development of armor technology and were influenced by other cultures. Different types of armor used by Sassanids such as mail armor, scale armor, laminated armor (vambraces and greaves), and lamellar armor and their origins are discussed in the article. Hand, arm and leg protection as well as different helmet types used by Sassanids are also analyzed. These include simple *bandhelm* type, four-part *bandhelm* type, *spangenhelm* (strap helmets) type and lamellar helmet type. Different types of shields used by Sassanids are also discussed in the article. Next to archaeological finds, stone and rock reliefs as well as Sassanid iconography are analyzed to describe different types of armor used by Sassanids.

### KEY WORDS:

*Sassanids armor; mail armor; scale armor; lamellar armor; helmet.*

### الملخص

تهدف هذه الورقة البحثية دراسة أنواع الدروع الساسانية وطرق صنعها، بناءً على رسوم الدروع المصورة على النقوش الصخرية الساسانية، والشقاقات الباقية، والدروع المصورة على الأطباق الساسانية والتماثيل الحجرية في إيران. ويتناول المقال بالشرح طرق صناعة أنواع الدروع المختلفة التي استخدمها الساسانيون خلال فترة حكمهم، وكيف أثر الساسانيون على تطور تكنولوجيا الدروع على الثقافات الأخرى كما تأثروا بها كذلك.

استخدم الساسانيون أنواع مختلفة من الدروع مثل الدرع الزرد، والشباك؛ الدرع المثبت بها صفائح، الدرع المصفحة (*vambraces and greaves*)، والدرع المسرودة (أو المسردة)؛ الدروع ذات الرقائق المثبتة. وناقشت الورقة البحثية أصول هذه الأنواع من الدروع وأصولها. كما تم تحليل أدوات حماية اليد والذراع والساق، وكذلك أنواع الخوذات المختلفة التي استخدمها الساسانيون. وتشمل الأدوات نوع حزام النطاق البسيط، ونوع الحزام الناري المكون من أربعة أجزاء، ونوع الخوذة ذات الشرائح (الخوذات الشريطية)، ونوع الخوذة ذات الرقائق المجمععة. كما تناول المقال فضلاً عما سبق مناقشة أنواع أخرى مختلفة من الدروع التي استخدمها الساسانيون. وتم مناقشتها في ضوء الاكتشافات الأثرية جنباً إلى جنب مع النقوش الحجرية والصخرية، والموضوعات التصويرية الساسانية التي تتضمن أنواع مختلفة من الجنن الواقية التي استخدمها الساسانيون.

### الكلمات الدالة:

الدروع الساسانية؛ الزرد؛ الشباك؛ المسرودة (المسرودة)؛ الخوذة.

## INTRODUCTION

The Sassanid Empire covered a vast geographical area and a very long time span. Lasting from 205 CE to about 651 CE and covering a geographic area from present day Iraq in the west to Afghanistan in the east and from southern Georgia to parts of the Yemen in the south at times, it was a significant cultural crossroads, both influencing surrounding cultures and being influenced by them. In the field of arms and armor, Iran has had a high reputation for centuries and during the Sassanid period many forms of armor were developed, sometimes from local ideas and sometimes with the refinement of imported technologies.

A strong tradition of metalworking, both in the western and eastern provinces meant that effective metal armor had been made for centuries before the founding of the Sassanid state. The surviving pieces from the Achaemenid and Parthian periods are usually from scale armors, but the Sassanid period sees mail armor very prominent in the dynasty's rock art. Later, lamellar armor starts to appear both in art and in archaeological finds. This suggests a dynamic process throughout the dynasty of innovation and adoption. In the West, the Sassanids are largely perceived through their interactions with the Roman Empire and its successor the Byzantines. However, there were also massive interactions on the Eastern frontier with a succession of powerful states, many of nomadic origin. The northern and north eastern borders were also militarily very active and left their impressions on the Sassanid military structure. An important internal source of ideas was from the previous Parthian dynasty's long interaction with Hellenistic rulers producing many typically Parthian features that are affected by Hellenistic influence. This meant that the Sasanian state could take advantage of many sophisticated technologies that were already absorbed and acclimatized into Iranian culture.

Sassanid armor was a blend of native innovation and tradition with dynamic reaction to their many enemies and their varied technologies. This paper examines Sassanid armor technology by the analysis of available artistic representations, archaeological data, primary as well as secondary sources.

## PERIOD SOURCES AND ARCHAEOLOGICAL FINDS OF SASSANID ARMOR

Period sources on Sassanid arms and armor seem to be scant. There are some extant pieces of Sassanid arms and armor which are kept in Iranian museums,<sup>1</sup> European museums (Archäologisches Museum in Mainz, Germany; British Museum, London) and American museums (MET NY, USA). One can also find some pieces of Sassanid arms and armor in private collections. Besides some excavated swords from Iranian museums,<sup>2</sup> sadly most of them were purchased on the art market. Given the paucity of Pahlavi sources due to loss and/or destruction over time, the authors have focused on the primary sources of the Sassanians' adversaries, the Romans and the Arabs. Armor

<sup>1</sup> Moshtagh Khorasani, 2006, pp. 416-423, cat. 61-67; 2010, pp. 483-486, cat.4-7; 2013, p. 306, cat.1.

<sup>2</sup> Moshtagh Khorasani, 2006, pp. 416-417. cat. 61-63.

seems to have been made for both cavalry and infantry among the Sassanids according to Ammianus Marcellinus,<sup>3</sup> the late Roman author (330-395 C.E.). It did not restrict freedom of movement, an important feature during battle.<sup>4</sup> Ammianus Marcellinus states that the Sassanid armor perfectly covered the body and was an effective protection. The statements of Ammianus Marcellinus seem relevant as far as they describe that Sassanids completely covered their body with armor, but this armor did not restrict their movements.



◀ Fig.no.1: Metalwork dish depicting Sassanid King hunting lions (late 3<sup>rd</sup> -4<sup>th</sup> Century CE), Sari, northern Iran (Iran Bastan Museum).

While scholarship has debated the impartiality of Marcellinus,<sup>5</sup> the objectivity of Marcellinus's descriptions of Sassanid armor as covering the whole body appears reliable and factual.<sup>6</sup>

<sup>3</sup> Amm. Marc. XIX. 1. 2; XXIV. 2. 10; XXV. 1. 12.

<sup>4</sup> Dmitriev, *Всадники в сверкающей броне*.

<sup>5</sup> The early English historian Edward Gibbon considered Ammianus Marcellinus an accurate and faithful guide, who wrote about the history of his own times without prejudices and passions; however, Kagan<sup>5</sup> criticizes Ammianus Marcellinus for his emphasizing the experience of the soldiers but ignoring the bigger picture. As a critic of Ammianus Marcellinus' works, Blockey investigates the objectivity and partisanship of Ammianus Marcellinus in relation to his former commander and friend Ursicinus, regarding the 359 CE invasion by Persia of the border areas of the Roman Empire. In a sense it was the rivalry between his friend and commander, Ursicinus, and another, Sabinianus. In the work of Ammianus Marcellinus, the former is lauded and the latter is derided. This impacts on Ammianus Marcellinus' assessment of events where he has a direct interest, sometime ones in which he was a participant. Maenchen-Helfen notes that Ammianus Marcellinus was heavily influenced by Classical tropes in his writing on foreign cultures. In case of the Huns this was exemplified by using descriptions that can be traced all the way back to Herotodus regarding nomads. This could also be the case when he describes the Sassanid Persians and their armor, where there was an even greater supply of quotations and literary references. However, in spite of these shortcomings, describing the armor of Sassanids as covering the whole body could be a reliable fact as the Achaemenids did not have such body armor and this could be considered as a further development.

<sup>6</sup> The analysis of Blockey suggests that there is sufficient detail in Ammianus Marcellinus which provides us with some evidence. Blockey concludes that Ammianus Marcellinus exculpates himself



◀ Fig.no.2 Coronation of Bahram I (273–276 C.E.) by Ahura Mazda from Bishapur (Tang-e Chogan).

Contemporary ancient written sources refer to the defensive armor of the Sassanid heavy cavalry, who they referred to as cataphracts (Greek *κατάφρακτοι*) and who were considered to be the most significant part of Iranian military organization. The horsemen were members of lesser aristocracy and also belonged to the privileged social stratum of warriors who were called the *azādān* (mid. - Pers. “noblemen”). They received lands from either the king or the high aristocracy in return for serving as heavy cavalry in the military campaigns of the Sassanids. The *Mādayān ī Hazār Dādestān* (or *A Thousand Judgements*, sometimes called the Sassanid Law Book) prescribes that these lands were given to provide for expensive arms and primarily defensive armor. Only after the military reform of Khosrow I (r. 531-579 CE) did those horsemen in need have their horses and equipment supplied by the state.<sup>7</sup>



◀ Fig.no.3: A Sassanian rock relief from Bishapur (Tang-e Chogan)..

The finds in Dura-Europos are used as a possible source for the identification of Sassanid armor. Depictions and archaeological remains there point out the usage of the following types of armor: laminated armor (vambraces and greaves of graffito

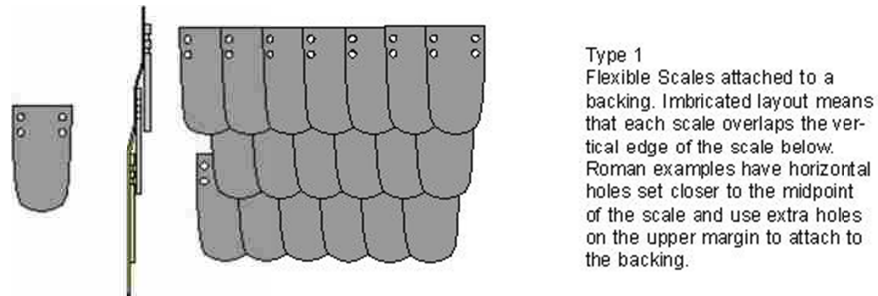
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and his commander, but supplies enough detail that it is clear that at least Ursicinus was severely mistaken in his initial estimate of the direction and intensity of the invasion, while Sabinianus was ineffective. To quote Blockey, “*If the analysis above has merit, why was Ammianus at such pains to defend Ursicinus, from whose blunders he suffered in Amida? Ammianus was a member of Ursicinus' headquarters staff which was responsible for helping its commander to form strategy. Thus, if Ursicinus was in error so was Ammianus Marcellinus.*”

<sup>7</sup> Corcoran, *Observations on the Sasanian Law-Book*.

horseman); splint armor (body armor of graffito horseman); scale armor (numerous iron scales found on site, three housings found in Tower 19, upper chest armor of graffito horseman and his horse's trapper); and mail armor (corselet found on site). But there is a controversy regarding the source of these pieces of arms and armor. All the surviving metal scale armor has been identified as Roman by James. James identifies only the mail corselet as Sassanid on the basis of decoration, peculiarities of construction, and find site.<sup>8</sup>

**Drawing 1:** Type 1 – Flexible scales attached to a backing



The depiction of the overthrow of Ardavān V by Ardašīr I, near Fīrūzābād (ca. 225 CE) shows a distinction between the Parthian and the Sassanid sets of armor.<sup>9</sup> Allan is of the opinion that the Parthians wore laminated and scale armor in contradistinction to the Sassanids, who wore mail body armor and vambraces, laminated greaves, and in one case a breastplate. The Firuzabad reliefs show the Sassanids wearing long sleeved mail shirts that reach to the wrists and to mid-thigh and laminated leg protection. Some form of cuirass or garment covers the body from neck to waist but not the arms<sup>10</sup>. This could be a form of cuirass consisting of a back plate and breast plate like the Classical muscled cuirass or it could be a padded over garment as used in the later Middle Ages in Europe to trap armor-piercing arrowheads. It is not possible, even in Ghirshman's large reproduction, to determine which was intended by the artist. In the following, different pieces of Sassanid armor will be explained.

### MAIL ARMOR

Some researchers, such as Dmitriev, assume that Sassanid armor consisted of a long-sleeved mail tunic protecting the body almost to the knees which is seen on the relief possibly representing Khosrou II from Taq-e Bostan. Dmitriev provides some details on the Sassanid body armor in his book *Riders in Gleaming Armor: The Warfare of Sassanid Iran and the History of the Roman-Persian Wars*.<sup>11</sup> He bases his research on iconographic and written sources to study mail armor and concludes that the Sassanid mail armor protected the warrior's body up to the knees. Thus, Dmitriev concludes that Sassanid armor covered the rider down to the thighs. However, this is

<sup>8</sup> James, *Evidence from Dura Europos for the Origin of Late Roman Helmets*.

<sup>9</sup> Allan, *Armor*; Russell Robinson, *The Armour of Imperial Rome*.

<sup>10</sup> Ghirshman, *Iran Parthians and Sassanids*.

<sup>11</sup> Dmitriev, *Всадники в сверкающей броне*.

contradicted at the beginning of the dynasty at Firuzabad, as described above, where the armor ends mid-thigh and likewise in Taq-e Bostan where the armor also ends partway down the thigh, at least a hands breadth above the knee. The mail shirt at Dura Europos,<sup>12</sup> which is generally thought to be Sassanid is at the most 70 cm long and so would not reach the knees on a medium sized man. Sassanid mail armor covers the neck and most of the face by means of the aventail of the helmet. The Firuzabad reliefs do not show helmets with aventails in use, but the heroic nature of the sculptures of the king and his son defeating their more armored opponents may have been exaggerated to show the power and majesty of the Sassanid dynasty.

There are different opinions concerning the birthplace of mail armor. In general, mail armor does not appear to be a Sassanid invention. Wojcikowski concludes that the mail armor was known in Iran already during the Parthian period but it gained wider popularity during the Sassanid period.<sup>13</sup> Khazanov describes the images of mail armor on Sassanid reliefs concluding that the birthplace of mail armor could be Iran or Hellenistic East which later influenced the arms of other nations, including the Romans.<sup>14</sup> Whereas Allan is of a different opinion stating that mail must have been introduced (from Rome) prior to 225 CE and it became more and more popular after that period amongst the Sassanid cavalry.<sup>15</sup> Cultural exchanges happen a lot and cultures learn from each other. The question of which nation developed a technology is important where the technology was developed first and it does not mean that any nation which adopted a new technology was not capable to further develop a technology and bring it to a perfection. In this context, one can think how the Japanese learned the sword making techniques from the Chinese and brought it to perfection.<sup>16</sup> In the following, some suggestions for the origin of the mail armor or its first appearance are presented:

### Scythian origin

Some researchers assume that mail armor was found in some early Scythian tombs and most likely the Parthians adopted the mail armor from the steppe tribes.<sup>17</sup> The implication is that the mail armor was imported in Iran. However, the original excavation was done in 1890 CE and would hardly be of the quality of modern Ukrainian archaeology. But it could be that mail armor was even introduced earlier, possibly by the Seleucids after their war with the Galatians.<sup>18</sup> Due to the heterogeneous nature of the Parthian kingdom, it is quite possible that mail armor was in use in Fars and other areas with some independence from the central authority. The rise of the Sassanids suggests that arms manufacturing was strong and independent in Fars and the Tang-e Sarvak relief shows yet another tradition, probably closer to an

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<sup>12</sup> James, *Evidence from Dura Europos for the Origin of Late Roman Helmets*.

<sup>13</sup> Wójcikowski, *The Graffito from Dura Europos*.

<sup>14</sup> Khazanov, *Катафрактарии и их роль в истории военного искусства*.

<sup>15</sup> Allan, *Armor*.

<sup>16</sup> For this development see Kapp, et al.

<sup>17</sup> Russell Robinson, *Oriental Armour*; Symonenko, *Sarmatskie vsadniki Severnogo Prichernomor'ya*.

<sup>18</sup> Tarn, *The First Syrian War*.

earlier Parthian style in nearby Elymaeus.<sup>19</sup> It is interesting that the Parthians at Firuzabad wear scale tunics under a padded surcoat or cuirass and laminated arm and leg armor. Their helmets have scale aventails as well.<sup>20</sup> This might mean that the equivalent Sassanid equipment would have included a helmet with a mail aventail like the later sculpture at Taq-e Bostan, but maybe the helmet did not cover the face. Fragments of mail armor dating to the fifth century BCE were found in the archaeological site at Zarovka in Ukraine. Robinson makes the point that this armor “could not have been made by those nomadic people.”<sup>21</sup> This statement suggests that the Celts were making or transporting armor to the area of the modern state of Ukraine. The Celts were expanding east at about this time though they were noticed by the Greeks when they started to move into Thrace in the 3<sup>rd</sup> century BCE.<sup>22</sup> If Zhurovka is the town in Ukraine, location 47°24'00.0"N 30°30'00.0"E, then it is south western Ukraine which is well within reach of Celtic (specifically La Tène) influence. In Symonenko in Romanian, it is written as Žurovka.

It could be assumed that those scholars who originally quoted the Scythian origin of mail armor had not read carefully their sources because otherwise they would have noticed the possibility of a Celtic connection and the imprecision of the sources. Wojcikowski's thesis that mail armor was a steppe invention ignores the fact that there are many Celtic burials in western Ukraine and even some in eastern Ukraine. There are traces of the La Tène burials in modern day Bulgaria that chart the movement of Celts and the cultural assemblages they brought with them on the way to Greece and Anatolia. Their burials often include horse bits of a type totally foreign to the steppe peoples like the Scythians and the Sarmatians. In the monuments of Pergamon in Bithynia, mail armors are shown among the spoils of war after the conflicts with the Galatians (another name for the Celts) and others. These date to the 2<sup>nd</sup> century BCE, considerably earlier than anything in Iran proper. Since the Seleucid king, Antiochus I, had also previously defeated the Galatians,<sup>23</sup> it is reasonable to assume that, like the Bithynians, he would have taken Celtic mail armor as booty back to Babylon and his eastern provinces. Undoubtedly, the craftsmen in Mesopotamia and Iran would have had little difficulty in duplicating the technology. With the Parthian overthrow of the Seleucids, they would have brought their own equipment and would have been unlikely to adopt the weapons and armor of their defeated enemies. The large predominance of scale armor in Scythian and Sarmatian burials suggests that mail armor was rare on the steppe. It is notable that one of Mithradates VI Eupator's sons, also Mithradates, whose mother was a Galatian princess ended up ruling in the Bosporian kingdom in the Crimea. Mithridates VI of Pontus controlled a kingdom of the Northern Black Sea coast in an area called the Cimmerian Bosphorus. He had a son, also called Mithridates by a Galatian princess,

<sup>19</sup> Ghirshman, *Iran Parthians and Sassanids*.

<sup>20</sup> Karamian & Farrokh, *Graves, Crypts and Parthian Weapons excavated from the Gravesites of Vestimin*.

<sup>21</sup> Russell Robinson, *The Armour of Imperial Rome*.

<sup>22</sup> Bivar, *Cavalry Equipment and Tactics on the Euphrates Frontier*.

<sup>23</sup> Coşkun, *Deconstructing a Myth of Seleucid History*.

Adobogiona daughter of the Galatian tetrarch Deiotarus. This Mithridates assisted Julius Caesar during the siege in Alexandria and was rewarded by the Bosphoran throne. After Caesar's death, Augustus reinstated the previous ruler. This shows that the Celts, in the person of the Galatians, had contacts with the steppe even after they had settled in Anatolia through the contacts they had with the kings of Pontus. Thus, there is also a direct pathway back into the steppe after the Celts had left the area hundreds of years before for mail armor to be reintroduced. Since mail was generally made of iron, the ability to draw iron wire was a critical skill on its manufacture.

### Iran/Persia

Khazanov assumes Iran to be the birthplace of mail armor, but the mail armor was known earlier in Europe than the Sassanid reliefs.<sup>24</sup> One could argue that the armor in the upper part of the so-called "Parthian" grafitto in Dura Europos could be mail armor instead of scale armor as it is usually reconstructed as mail armor in modern drawings. However, since the level of detail of the drawing is not precise enough, it is not possible to be able to tell one from the other. The Dura Europos' mail shirt, often assumed to be Sassanid (which it is on the balance of probabilities), has features that are not common in Roman mail armor. It has a slit neck opening, which suggests that it has been modeled on some garment with that feature. When the Romans adopted mail armor, they first constructed the shirt as a copy of a scale or linen cuirass. Only later did they copy the pattern of a short tunic.<sup>25</sup> James believes the Dura Europos' shirt had long sleeves and he suggests that 105 mm slits in each side might indicate it was cut like a Parthian caftan.<sup>26</sup> However, it really appears more like a Sassanid *qamīs*,<sup>27</sup> except for the neck opening which is not seen in later Sassanid art.

### Rom

Allan suggests (Allan, 1986, p. Para. 5) that mail armor was introduced to Iran from Rome prior to 225 CE.<sup>28</sup> However, if one accepts the argument that Rome copied the idea of mail armor from the Celts, there was an easier way for the Iranians, particularly the Parthians and even the preceding Seleucids, because both came into contact with the Galatians. Brennus, the Galatian leader, invaded Greece in 281 BCE. An offshoot of that invasion crossed into Anatolia in 278-277 BCE. The three tribes, *Trocmi*, *Tolistobogii* and *Tectosages*, were defeated by the Seleucid king, Antiochus I, in Anatolia.<sup>29</sup>

In general, the history of mail armor can be very difficult to trace for several unrelated reasons. Jouttijärvi points out that "... *the oldest remains discovered (in Denmark) are from the Hjortespring find on the island of Als, dated to around 350 BC.*"<sup>30</sup> This find was excavated by Gustav Rosenberg in 1921-22 and today, there is almost

<sup>24</sup> Khazanov, *Избранные научные труды. Очерки военного дела Сарматов*.

<sup>25</sup> Jouttijärvi, *The manufacture of Chain-mail*.

<sup>26</sup> James, *The Arms and Armour and other Military Equipment*.

<sup>27</sup> Fluck & Vogelsang-Eastwood, *Riding Costume in Egypt: Origin and Appearance*.

<sup>28</sup> Allan, *Armor*.

<sup>29</sup> Coşkun, *Deconstructing a Myth of Seleucid History*.

<sup>30</sup> Jouttijärvi, *The manufacture of Chain-mail*.



nothing remaining of the material deemed to be mail armor. Rosenberg describes several square meters covered with heavily corroded material. But there is doubt as to whether this was mail armor, or a layer of natural iron separation formed around plant roots, the occurrence of which can often be in the form of rings.

### SCALE AND LAMELLAR ARMOR

It seems that two systems of armor entered Iran at different times. The earlier style is represented by two thigh guards found at Dura Europos. However, there are no scales found in Iran and no representation of this type of armor can be seen in Sassanid art. It is assumed that the armor from Dura Europos was Persian though there is no proof. The decoration, the method of lacing, and the fact that it was leather point to a far eastern source since all three features are well known there. How this type of armor arrived in Dura Europos is a mystery. The assumption that it was a typical Persian armor is unlikely, just as is a Roman origin. The armor may have travelled with eastern steppe warriors who were employed by the Sassanid Shah, but that is entirely a speculation.

#### Scale armor

Scale armor was in use as early as in the Late Bronze Age in the Near East,<sup>31</sup> in the 7<sup>th</sup> century BCE on the Great Steppe and China<sup>32</sup> and in Iran scale armor was already known in the 5th century as evidenced by the findings of bronze and iron plates in Persepolis.<sup>33</sup> But Wojcikowski, stresses that most probably, scale armor was already an archaic armor in Iran in the third century CE but it was still used by the heavy cavalry. Therefore, there is no consensus regarding the determination of the type of cuirass of the horseman on the graffito of Dura Europos. To make comparisons one should note that Sarmatians used large scales fixed to a leather or cloth backing.<sup>34</sup> But there are also scholars who claim that the upper parts of the body of the horseman can also be covered by small scales.<sup>35</sup> But Wojcikowski observes that there are some arguments that suggest that the warrior shown in Dura Europos is indeed wearing mail armor and not small-scale armor as there is no evidence of the usage of small scales by Parthio-Sassanids as used by Sarmatians.<sup>36</sup> However, this argument is in contradiction with the depiction of the aventails of the Parthians at Firuzabad. Since no Sassanid helmets are shown, it is not possible to say if they had scale or mail aventails, but it might be suspected that mail cuirasses imply mail aventails. The Parthians have scale aventails and scale cuirasses peeking out from underneath their surcoats. The scales at Naqsh-e Rostam may be an artistic convention or an accurate,

<sup>31</sup> Hulit, *Late Bronze Age scale armour in the Near East*.

<sup>32</sup> von Gall, *Das Reiterkampfbild in der iranischen und iranisch-beeinflussten Kunst parthischer und sasanidischer Zeit*.

<sup>33</sup> Schmidt, *Persepolis I: Structures, Reliefs, Inscriptions*.

<sup>34</sup> Wojcikowski, *The Graffito from Dura Europos*.

<sup>35</sup> Gorelik, *Warriors from Eurasia from the VIII Century BC to XII Century AD: Symonenko, Sarmatskie vsadniki Severnogo Prichernomor'ia*,

<sup>36</sup> Wojcikowski, *The Graffito from Dura Europos*.

though late, depiction of real scale armor. There is a possibility that the scales were an attempt to copy the stylized mail armor at Firuzabad.

Wojcikowski adds that the scales used on armor in Iran are depicted in Naqsh-e Rostam relief. These scales have a fishbone in the middle and a spun top.<sup>37</sup> There are also archaeological finds of this type of scale.<sup>38</sup> Wojcikowski adds that the usage of scale armor at Naqsh-e Rostam might be due to its symbolic value as scales represent the feathers of legendary creatures in Iranian mythology: a griffin (Waranga/Warang) or a phoenix (Simurgh).<sup>39</sup> This is a much more believable when applied to the interpretation of the scabbards and helmets. The main question which can be raised here is why would some reliefs be accurate representations and others merely symbolic ones? The swords with this pattern are much later than the rock cut reliefs. This might suggest that the pattern of fish scale like ridges was a late introduction and that helmets with this pattern reflect that introduction. Helmets were produced over a long period and, though there were variations in their construction, it would not be unlikely that a pattern with symbolic meaning could be introduced and then spread to other equipment. This could be purely internally generated as in representing Simurgh feathers or external from some other source.

Thus it is not clear whether Wojcikowski is referring to the Tag-e Bostan figure,<sup>40</sup> as the only scale armor known to the authors of the present article can be found at Firuzabad where the scale armor is worn by the Parthians, either in aventails or at the waist (probably the lower part of a scale cuirass). In these cases, the scales are squarish with no curves or ridges. The Naqsh-e Rostam “scales” may be an inaccurate copy of the large Firuzabad mail rings. If Wojcikowski is talking about Taq-e Bostan relief, this is a clear misunderstanding of what is being depicted. The scales at that site are shown with vertical lacing (perhaps the fish bone in the middle) and rounded tops (maybe the “spun top”). However, the patterns on helmets and sword hilts and matching scabbards are clearly a feather or fish scale pattern. It is perhaps a stretch to associate it with something as specific as the Simurgh. In general, Symonenko, who Wójcikowski relies on for some of his ideas, has created a largely fantasy figure in his reconstruction of a “Sarmatian combined armor of the 1st–2nd century AD.”<sup>41</sup> As mentioned above, the feather pattern can be seen on the handle and scabbard of late Sassanid swords and helmets as well. The Tang-e Ab relief shows soldiers clad in mail armor and lamellar armor rather than scale armor. This is also the case of Tang-e Sarvak III dated to the late Parthian period, which shows lamellar and laminated armor.

### Lamellar armor

The second style of armor namely lamellar armor is later in date. It is found in

<sup>37</sup> Wójcikowski, *The Graffito from Dura Europos*.

<sup>38</sup> Russell Robinson, *Oriental Armour*; Symonenko, *Sarmatian Riders of North Pontic Region*.

<sup>39</sup> Wójcikowski, *The Graffito from Dura Europos*.

<sup>40</sup> Wójcikowski, *The Graffito from Dura Europos*.

<sup>41</sup> Wójcikowski, *The Graffito from Dura Europos*, Fig. 3.

Byzantine sites<sup>42</sup> and in Fars.<sup>43</sup> There was none found in the Dura Europos excavations since the site predated its appearance either in Iran or Byzantium. The exception to this is the leather lamellar cuisses which James reverses and has the vertical lacing on the inside.<sup>44</sup> Regarding the reversed hypothesis by James, this type of armor was found in western China in complete cuirasses and has strong visual links with Qin and Han armor. In these cases, the vertical lacing is always on the outside. By overlapping the upper edges of the scales, it provides a smoother surface which prevents weapons and other equipment from catching on the rows. The lamellar armor is clearly shown as horse armor on the famous Sassanid sculpture of Khosrow Parviz at Taq-e Bostan. It also appears in some steppe excavations and some of this armor might be returning home with Varangians on their retirement. It is not fully articulated since the lower suspension hole for the vertical lacing is at the bottom of the lamellae, which does not allow much vertical movement though it can hinge at the lacing. Modern reconstructions are quite flexible, but that can be accounted for by the loose lacing. Old lamellar armor found with its lacing intact is invariably tightly laced horizontally and is more springy than flexible. It is significant that the figure of Khosrow does not wear lamellar on his body, but wears the traditional Sassanid mail corselet seen in bas-reliefs as far back as the time of Ardeshir.

There are several artistic depictions that might suggest a form of lamellar armor was used in Iran. They fall into two main groups. The first is basically a graffiti found in Dura Europos which is mostly attributed to the Parthian era. This best-known graffiti at Dura Europos depicts a heavy cavalryman and provides some information on the armor used in the period. He seems to be wearing a corselet. However, as mentioned before, the degree of draftsmanship of the artist is not sufficient for accurate identification whether the corselet is made of lamellar armor. Wojcikowski assumes that initially this graffiti was dated to the late Parthian period (from the 2nd century to the early 3rd century CE)<sup>45</sup> but these days it is dated to the early Sassanid period and was executed between 232-233 to 256 CE. However, this conclusion does not take into account that there are several graffiti that are clearly of Sassanid warriors that do not match the equipment of this figure<sup>46</sup>. The figure is not a great source of precise information because it is so badly drawn: “The best known of these is the 'charging clibanarius' (Fig. 12). These are usually thought to depict Parthian or Persian cataphracts, but the fact that horse armour was employed by the Roman defenders of the city must make this uncertain. These illustrations, which are quite crudely executed, may suggest helmets with composite bowls, and perhaps face-masks.<sup>44</sup> However, their crudeness, and the uncertainty of their identification as Persian makes their value very limited.”<sup>47</sup> What is missing is the characteristic Sassanid quiver which is shown on all the armored riders at Firuzabad and the other

<sup>42</sup> Vizcaíno Sánchez, *Early Byzantine Lamellar Armour from Carthago Spartaria, plate V.*

<sup>43</sup> Whitcomb, *Before the Roses and Nightingales.*

<sup>44</sup> James, *The Arms and Armour and other Military Equipment.*

<sup>45</sup> Wójcikowski, *The Graffiti from Dura Europos.*

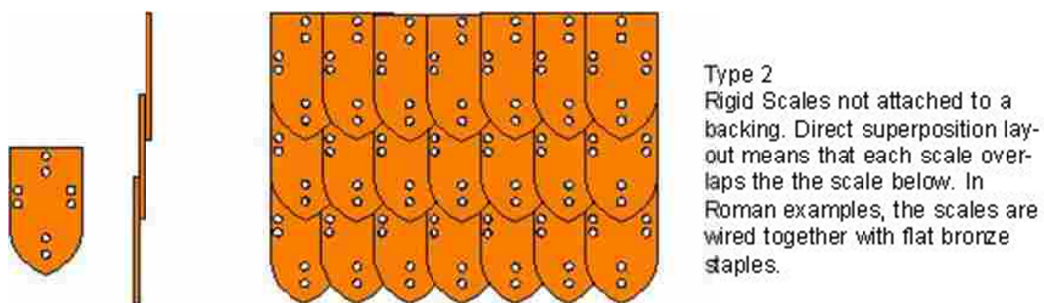
<sup>46</sup> See James, *The Arms and Armour and other Military Equipment.*

<sup>47</sup> See James, *The Arms and Armour and other Military Equipment.*

clearly depicted Sassanid graffiti at Dura Europos.<sup>48</sup> To establish whether this graffiti is Parthian or not, one should note that helmets with multiple segments horizontally are found on the arch of Galerius and Trajan's Column and are rare or non-existent in the Parthian context. Tall conical helmets are depicted on armored cavalry assumed to be Alanic allies of the Dacians on Trajan's Column.<sup>49</sup> Further, the barding on the horse looks more like the Roman ones found in Dura Europos, too; however, the neck covering is unusual for a Roman piece. The rider depicted in the graffiti shows clear Parthian armor aspects which are the laminated arm and leg armors. On the other hand, the barding and the angle in the reins indicate a Hellenistic curb bit. These are also found in Iran.<sup>50</sup> Additionally, the helmet and the underhand lance grip could be Hellenistic or Roman as opposed to the Parthian and Sassanid two handed grip.

To understand the nature of the armor of the period as represented on the graffiti, one needs to analyze the heavy rider depicted there. There seems to be an agreement that the rider is wearing a short-sleeved but long mail armor hauberk or small scales reaching down to his knees.<sup>51</sup> As far as the armor around his waist is concerned, there seems to be different descriptions. It is described as a lamellar cuirass<sup>52</sup> or an armor composed of two rows of metal lames [plates], which are vertically arranged [hence a banded armor]. Whereas, the latter description can also be understood as lamellar armor. It seems that the horseman is using a hybrid armor: a combination of mail and lamellar or laminated armor.<sup>53</sup> However, it may be a form of splint armor or similar to the contemporary Han Chinese armor that is made of long scales laced to each other semi-rigidly. A Han Dynasty surviving armor from Inner Mongolia has long scales in the same place as the graffiti.<sup>54</sup> The rest are largely post-Sassanid from the Central Asian kingdoms of Soghdians and Turks. Early wall paintings from Kyzyl Kum and other sites show similar armor. It is clearly of far eastern influence since the further east one looks, the earlier are the remains and depictions.

**Drawing 2:** Type 2 – Rigid scales not attached to a backing



<sup>48</sup> James, *The Arms and Armour and other Military Equipment*. Fig. 17 items E F I; 42 Fig. 22.

<sup>49</sup> Grancsay, *A Sasanian Chieftain's Helmet*.

<sup>50</sup> Whitcomb, *Before the Roses and Nightingales Excavations at Qasr-i Abu Nasr*, Fig. 60 y.

<sup>51</sup> Nicolle, *Sassanid Armies: The Iranian Empire Early 3rd to Mid-7th Centuries AD*; Wójcikowski, *The Graffito from Dura Europos*.

<sup>52</sup> Nicolle, *Sassanid Armies: The Iranian Empire Early 3rd to Mid-7th Centuries AD*.

<sup>53</sup> Wójcikowski, *The Graffito from Dura Europos*.

<sup>54</sup> Hong, *Weapons in Ancient China*. Figs. 310-311.

The continuous referencing to drawings of this graffito has led to things being seen that are not in the original. For instance, in Wojcikowski's own drawing (drawing after Rostovtzeff 1933, Pl. XXII.2) it shows a bare face, no clear aventail and possibly long hair. There is no face mask and no scale or mail aventail. Even if there is insufficient detail in this little scratched figure to show it, it could also be possibly assumed that the figure is likely meant to be a Roman auxiliary cavalryman. The real problem with this graffito is the body armor which appears to be splinted in combination with mail or scale. The closest piece of armor set to this piece is Han Dynasty cuirasses that appear on pottery figures in tombs and of which there are two actual surviving examples. The body scales were 23.4 by 4.4 cm<sup>55</sup> and could reasonably be looked upon as being the basis of this kind of armor. Dura Europos was founded in 300 BCE and the Ershijazi armors are dated to the Western Han Dynasty (206 BCE – 9 CE) so it is possible that the ideas could have travelled to Parthia in that time, but it is more likely that they had travelled to the Steppe and had been adopted by the Romans among their auxiliary cavalry as well. The Trajan's Column depiction of Sarmatians/Alans is clearly not accurate, because it is simply used as a scale overlay on the bodies of the men and the horses with no attempt to show real structure, so the makeup of their scale armor was probably more heterogeneous than it appears in that art work. However, this is very speculative and is another reason why the graffito is so ambiguous.

As far back as the Achaemenid period, both types of body armor, scale armor and lamellar armor were known and both remained popular during the Parthian and Sassanid periods.<sup>56</sup> Scale armor was a type of armor consisting of scales attached to a fabric or leather backing<sup>57</sup> and its usage goes back as early as in the 2nd millennium BCE.<sup>58</sup> Herodotus<sup>59</sup> talks explicitly about scale armor used by Achaemenid armies under Xerxes I.<sup>60</sup> Herodotus mentions explicitly the golden colored scale armor of Masistus worn at the Battle of Plataea.<sup>61</sup> This type of armor as Dr. Dmitriev has shown was mentioned by a number of authors such as Libanius (c. 314-393 CE), Theophylactus Simocatta (7th century CE) and Ammianus Marcellinus. Ammianus Marcellinus described Sassanid armor as consisting of small plates sewn on a textile base, which he compared with a bird's coat of feathers and also stressed its hardness.<sup>62</sup> Libanius states that the some types of this armor, considered to be aristocratic, "were richly ornamented with gold."<sup>63</sup>

One argument made for Sassanid lamellar was that it was a native development of the Near East going at least back to the Assyrians. This is based mainly on the bas-reliefs

<sup>55</sup> Hong, *Weapons in Ancient China*.

<sup>56</sup> Wojcikowski, *The Graffito from Dura Europos*.

<sup>57</sup> Symonenko, *Sarmatian Riders of North Pontic Region*.

<sup>58</sup> Russell Robinson, *Oriental Armour*.

<sup>59</sup> Herodotus, *The History*.

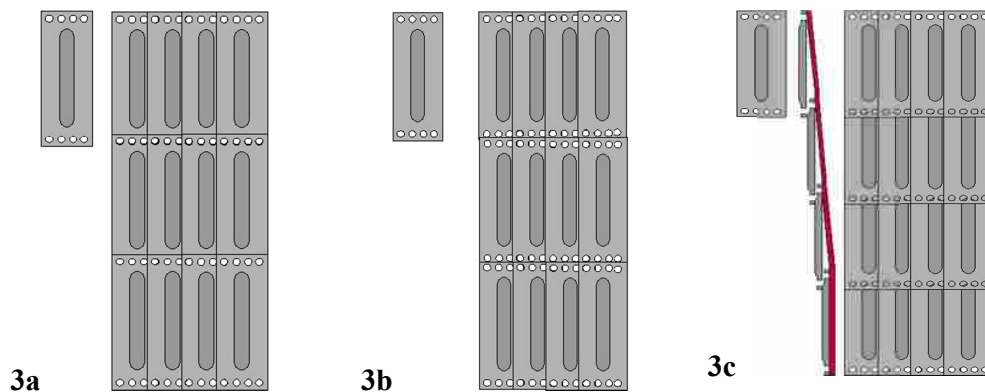
<sup>60</sup> Wojcikowski, *The Graffito from Dura Europos*.

<sup>61</sup> Herodotus, *Book IX*.

<sup>62</sup> Marcellinus, *Ammianus, Ammiani Marcellini Rerum gestarum libri qui supersunt*.

<sup>63</sup> Libanius, *Libanii Opera*; Dmitriev, *K voprosu ob "Achemenidskih traditsijah" v voennom dele Sasanidskogo Irana*.

from Nineveh and Asshur, particularly the palace of Ashurbanipal (r. 668 BCE to c. 627 BCE). The problem with this argument is that there are quite a few original scales in museums and their perforations are not similar to lamellar plates.<sup>64</sup> The Metropolitan Museum of Art has various types of ancient armor scales such as an Assyrian armor plate with a rectangular, centrally ribbed, iron plate with holes at the corners from late 8th–late 7th century B.C.<sup>65</sup> They are usually rectangular and have up to five holes at each short side. They represent a development of scale armor that laces to itself to form semi-flexible sections. In all probability it had an integral backing since this would make it easier to construct. This appears to be a natural development of the earlier Bronze Age scale armors. The Assyrians clearly used scale armor at the same time of the more regular kind. The examples from the Metropolitan Museum of Art show later Iron Age examples of the kind of hole pattern and structure going back to the Bronze Age.<sup>66</sup> There is also a rectangular plate with three holes on each short side and a prominent embossed rib, which may be the origin of the design on the bas-reliefs that are often interpreted as lamellar armor.<sup>67</sup> This rectangular scale disappears after the Achaemenid conquest. Regular scale continued to be used for many centuries.



**Drawing 3a-3c: Rectangular Assyrian iron scales**

This is why it is necessary to redefine scale and lamellar. There are at least two classes between basic scale and fully flexible lamellar not to mention variations like laminated armor and reused lamellar bands in other armors. Some laminated armor is clearly a copy in solid metal of rows of scales which are then laced together (Jap. kitsuke kozane). On the other hand, the portions of lamellar armor recovered from the battle of Wisby site have been riveted to a fabric or leather support to create a brigandine from old armor pieces,<sup>68</sup> where “The armour has on some later occasion been remade to appear externally like a coat of plates, by detaching rows of lamellae

<sup>64</sup> See Curtis, *An Examination of Late Assyrian Metalwork with special reference to Nineveh*.

<sup>65</sup> For a more complete typology of armor plates excavated from Nimrud see Curtis, *An Examination of Late Assyrian Metalwork with special reference to Nineveh*.

<sup>66</sup> MMA #1, *Armor plate*.

<sup>67</sup> MMA #2, *Armor plate*.

<sup>68</sup> Thordeman, *The Armour from the Battle of Wisby*.

from each other and riveting them to the inside of a leather covering.” The current typology groups together scales and plates that have no structural similarity. It could be said that some types cannot be definitely classed in any groups when found isolated because there are so many possible ways of assembling them.

Armor types respond to the weapons they are meant to defend against. No one uses armors that are more expensive, if cheaper ones will do the same job, except the rich maintaining some noble style (Japanese armor of some types falls into this category). The Byzantines and the late Sassanids definitely felt the need to beef up their armor. On the Byzantine side, it might coincide with the advent of the Avars and their heavier bows and larger arrows on the steppes north of the Black Sea and their invasion of the Carpathian Basin (567 CE). The Avar migration may have occurred as a result of the founding of the first Turkish Empire in Mongolia. These same Turks were fighting the Sassanids and allied with the Byzantines. The expansion of the Turks involved a conquest of the western part of Central Asia and penetration of the steppes as far as the Crimean Peninsula. Rather than the defeated remnants of an empire fleeing its conquerors, this was a fully-fledged empire expanding into the west. The Blue Turks had fully flexible lamellar, stirrups and the thumb draw judging from archaeological finds. Personal experience of one of the authors of the present article suggests that lamellar is an effective armor on horseback, providing you have stirrups to help you mount. Otherwise the upward pointing scales tend to catch on your saddle and make mounting difficult. This might explain why some types of early lamellar armor in China and elsewhere had the vertical lacing running over the tops of the scales in the row below rather than under them as in most later lamellar armor.

More discoveries in Iran could make a big difference to these opinions. In the popular literature (e.g. Osprey Books etc.), the Byzantine or Wisby pattern of scale has become the de facto type for lamellar. This is unfortunate because it was not known in the Far East at all. It is unlikely to have been common outside of Europe and the Near East. It is not that common on the western steppe either so it is quite strange that it has such significance in popular literature. This is not to say that lamellar was never produced in Persia. It is clearly represented in Taq-e Bostan mounted warrior and sections of lamellar were found in the Sassanid layers at Qasr Abu Nasr. The reliefs from Khalchayan supposedly showing armored Parthian horseman, show armor made of rectangular metal plates of a size compatible to lamellar armor plates.<sup>69</sup> In the east in Central Asia, the belt buckle from the Orlat necropolis shows warriors in lamellar armor using Sassanid style bows and what may be the Sassanid draw.

From the technical point of view, Persians were completely capable of making metal lamellae and assembling them in complex ways to produce armor for man and horse. It is possible that the idea of using cloth strips rather than lacing was invented in Iran in the 14th century and transmitted back to China with Mongols and their Persian craftsmen. There is a problem in associating a particular type of armor with the

<sup>69</sup> Olbrycht, *Arsacid Iran and the Nomads of Central Asia – Ways of Cultural Transfer some Preliminaries*.

Parthians. From the Sassanid monumental sculptures of the overthrow of Ardavan, it is not possible to identify the body armor of Ardavan. The armor around his arms and legs is clearly a form of laminated armor made of curved strips of metal riveted to straps on the inside. This is popular in Hellenistic contexts. It may have been developed by the Achaemenids towards the end of the empire or brought in by the Parthians themselves. Although Greek and Roman specialists might claim the Greeks invented it; it is more probable that it was either invented in Iran or imported from Central Asia from people such as the Massagetae. Some authors<sup>70</sup> referencing Pugachenkova<sup>71</sup> claim the Massagetae learned the use of armor from Alexander, but the Macedonians knew only Greek armor in his time and more sophisticated types only appear after the conquest of Iran. Laminated arm guards do appear in later Hellenistic art.

The major nexus of the archaeology of these things is Dura Europos, which was successively Greco-Roman and Parthian/Persian. It is arguable if any of the armor found there was actually Persian, but a shirt of mail found on a skeleton may be Sassanid and there was a Sassanid style helmet nearby. The two complete horse armors are of scale construction in the Roman manner, but there is no reason to assume only the Romans used such designs. The leather lamellar cuisses found there are in the Chinese/Central Asian style. This style of lamellar persisted in Yunnan and parts of China into the fifteenth century and later.<sup>72</sup> The similarity of the scale pattern and the lacing is not coincidental.

A conservative view based on contemporary information is that, based on the Qasr Abu Nasr lamellar and the sculpture at Taq-e Bostan, the Sassanids produced lamellar armor. At the present we can definitely associate the Sassanid lamellar armor with horse armor. In the Byzantine world, the same kind of lamellar was used for armor for soldiers as well (i.e. armor with lamellae with exactly the same hole pattern). Roman and Byzantine authors write of the Persians looking like statues made of shining steel. If the Khalchayan reliefs are relevant to the Parthians, it is possible that they arrived in western Iran equipped in a mixture of lamellar armor and laminated leg and arm defenses. At some stage the production of mail in western Iran started make inroads on both scale and lamellar armor (remember the Achaemenids were very good at making scale armor as attested by Herodotus and scales found in Egypt from the time of the Persian occupation). The great Parthian families that survived the Sassanid revolt probably still had contacts in eastern Iran and the regions beyond which could have served to introduce innovations in lamellar design from the East. During the Sassanid period, the Kushans were an intrusion of the Far Eastern Steppe<sup>73</sup> and probably bought contemporary lamellar armor with them. Khorasan and Khwarezm had sophisticated industries capable of supporting arms production.

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<sup>70</sup> See Potts, *Cataphractus and kamāndār*.

<sup>71</sup> Pugachenkova, *The Body Armour of Parthian and Bactrian Warriors*.

<sup>72</sup> MMA, *Leather Lamellar Armor*.

<sup>73</sup> Liu, *Migration and Settlement of the Yuezhi-Kushan*.



There was probably a dynamic exchange of ideas between the west and the east of Iran, but at the same time they had distinct traditions. Our knowledge is limited at the moment and will be expanded by Iranian archaeologists finding more archaeological sites. Nevertheless, the overall view of Sassanid armor has to be divided into regions. In the West and South West, the mail armor predominated. The lamellar armor from Qasr-e Abu Nasr is probably horse armor only and may even be Byzantine influenced though the Parthian era bas relief of Tang-Sarvak indicates otherwise. Using different forms of armor for horse and man is consistent with the discoveries at Dura Europos where the men wear mail and the horses wear scale. The lamellar from Dura Europos is so different in construction and material that it must be a Central Asian import. The North and the North East are a different realm in terms of technology and influence. The steppe tribes and the city states of Central Asia had a strong connection and they had a profound effect on Eastern Iran. The problem documenting this is the lack of Sassanid sources and excavations in Eastern Iran available in the west. The Afrasiab and Panjikent paintings are helpful and they cover several centuries. So are the Kizil paintings from further East. A problem is that modern boundaries do not accurately represent both the extent of the Sassanid kingdom and the deep influence it exerted on the cultures to the East. What is surprising is the consistency evident between these resources and the later Il-Khanid period. There may have been a technology and doctrine of the use of armor originating from the cross-fertilization of the Iranian traditions and the Central Asian and North Chinese / Mongolian culture area (this is a geographic description, not a cultural one). At the time of the Sassanids, the dominance of Iranian speaking nomads in the steppe areas was being challenged by Turkic nomads adopting the former's lifestyle and technologies. This had been taking place for a thousand years north of China, which gradually resulted in the reduction of Indo-European speakers to small oasis cultures while Turkic speakers gradually became the dominant nomad groups. The complexity of these interactions makes it difficult to speculate which parts came from where.

There are sculptural representations of Sassanid warriors in western Iran. They are shown wearing mail armor and some kind of chest covering over it. In the earlier ones, laminated leg defenses are common, where strips of metal are riveted to underlying leather straps. In the famous statue of Khosrow, his horse is wearing lamellar armor. In the east of the Iranian culture area, there are representations of armor made of banded strips in metal plates and further east there are wall paintings of similar armor (Piandjikent).<sup>74</sup> The other is that there are actual sections of lamellar armor found in excavations in western Iran and some lamellar cuisses found in Dura Europos which may be Sassanid or Roman copies of Sassanid originals. However, there are several problems in generalizing these examples. The lamellar found in Iran is made from scales that are similar to those represented in archaeological finds in Byzantine settings as far west as Spain.<sup>75</sup> These are seven-hole scales that are laced in a manner that restricts the ability of the rows of the armor to move over each other.

<sup>74</sup> Karimova, *Restoration of Murals of the National Museum of Antiquities of Tajikistan*.

<sup>75</sup> Vizcaíno, *Early Byzantine Lamellar Armour from Carthago Spartaria*.

They are suitable for semi-rigid cuirasses and horse armor. The cuisses from Dura Europos are in the Han Chinese style and are fully flexible where the rows can move over each other.

Their style completely misled Simon James<sup>76</sup> when he wrote the last volume of the Dura Europo's excavations. He reconstructed them backwards because he was either unaware of the Chinese parallel or discounted it because there was a similarity between the leather lamellae and the hole pattern in some Roman metal scales. Previous Parthian graffiti show armors which may be lamellar, but on the evidence of comparable contemporary Han examples are probably elongated scales overlapping from top to bottom. The Parthians and the Sassanids had strong contacts through the Silk Road with Central Asia and China on one hand and the steppes on the other. In the absence of actual surviving armor (which may be corrected at any time by excavations in Iran), it may be asserted that the Sassanids employed scale in body armor with high probability. They knew about a western form of lamellar armor that was common with the steppes and the later Roman Empire. In the late period, they used it for horse armor. They also, by inference from the Dura Europos' finds, knew about flexible laced lamellar of the Han Chinese type. In eastern Iran, possibly under the influence of the early Turks expanding from Mongolia in the sixth century, they were exposed to the later form of lamellar that had longer narrower lamellae with longer suspension laces used in armors that were like long coats rather than the previous cuirass type. The Persians were known to be excellent metal workers and quite capable of taking an idea and improving it. The military establishment was large and well organized (see the discussion of the scope of the Sassanid military establishment in Rekavandi, et al.).<sup>77</sup>

In the east, land holders provided cavalry for the empire as they later provided it for the Caliphate. They could have also provided new armor from both captured equipment (lamellar coat armor is basically one size fits all) and adapted designs of their own. Additionally, there were foreign forces used by the Sassanids and they had borders to the north which gave them access to the steppe, though mediated by mountain ranges and deserts.

Without accurately dated finds, it is hard to say whether a particular form of lamellar armor was invented in Iran and then diffused outwards or if influences coming in from the west, that is to say through the Caucasus, through Khorezm, and Central Asia and were then adapted by Persian armorers. It is likely both effects happened and that things may have left and re-entered Iran on different occasions. As with archery, when reconstructing armor, one must decide what the purpose it had. It may be to look impressive, it may be to fight hand to hand in, it maybe to ride and shoot in.

Bugarski suggests that the earliest occurrence of lamellar armor possibly dates back to Assyrian reliefs from the 9th-7th centuries BCE and by one burial find from that

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<sup>76</sup> James, *The Arms and Armour and other Military Equipment*.

<sup>77</sup> Rekavandi, et al., *An Imperial Frontier of the Sasanian Empire: Further Fieldwork at the Great Wall of Gorgan*.

area.<sup>78</sup> Later this type of armor spread fast to Iran, and remained in use there at the time of the Achaemenids and in the Seleucid period, and the Central Asian steppes. Evidence for the usage of lamellar armor can be seen on a votive relief in Palmyra from the 1st century CE and two centuries later in reliefs from Dura Europos. This assertion is based on a very wide definition of lamellar armor where scale shape is more important than construction. The Romans made a scale armor of eight holed scales where the rows were made of scales overlapping side to side. Four of the eight holes were used for this purpose. The rows were then overlapping by the upper and lower pairs of holes. Because the Romans used metal staples rather than lacing, sections of this armor have been found intact. It does not require a backing to because it is self-supporting, but it has little or no flexibility. Rectangular Assyrian scales having three or four holes on each of the two short sides can be laced together in a similar manner though not needing holes in the long sides of the scales.

Wojcikowski stresses that both scale and lamellar armor worked very well against bladed and blunt weapons and even arrows.<sup>79</sup> Their compact structure, especially in case of lamellar armor made them an effective defense against the lance attacks, the basic offensive weapon of heavily armored horseman during the Parthian-Sassanid periods. Wojcikowski adds that although mail armor proved a more effective defense against bladed weapons compared to scale and lamellar armor and had the advantage of having more flexibility and airiness, it was less effective against arrows, blunt weapons such as maces and long spears and lances (pole arms). Wojcikowski is of the opinion that this is the reason why it took a long time for the mail armor to spread in the Middle East and it became more popular again in the late 4th century. The two Sassanid warriors from Kulagysh/ Koulagī (Perm, Russia; Sassanid Khorasan) depicted on a silver plate from 7th or 8th centuries CE are wearing a lamellar cuirass (armor). The lamellar armors have short sleeves as depicted on the gilded silver plate. But as Nicolle clearly indicates this is impossible to make lamellar sleeves flexible enough to protect the armpits, these are more likely lamellar shoulder flaps similar to those used during the Mongol period.<sup>80</sup> The lamellar cuirass seems to open in the middle in front of the body. Beneath their lamellar armor, both warriors are wearing a short-sleeved mail hauberk. Wojcikowski claims that the very existence of lamellar armor during the later period of the Sassanids suggests that this type of armor was used throughout the times of the Sassanids and in later periods.<sup>81</sup> However, this argument is weak. Firstly, because the armor depicted may not be lamellar at all but a form of scale surviving is some Tibetan armor.<sup>82</sup> Secondly, to argue from a late occurrence that lamellar armor can be retroactively assigned to earlier periods is not defensible. The Sassanid empire lasted four centuries and major military reforms are recorded. Lamellar armor does not appear in Sassanid art until the Taq-e Bostan cavalryman, right at the end of the period. Judging from the form of armor in the

<sup>78</sup> Burgarski, *A Contribution to the Study of Lamellar Armours*.

<sup>79</sup> Wojcikowski, *The Graffito from Dura Europos*.

<sup>80</sup> Nicolle, *Sassanid Armies*.

<sup>81</sup> Wojcikowski, *The Graffito from Dura Europos*.

<sup>82</sup> LaRocca, *Warriors of the Himalayas*.

silver plate from the Hermitage Museum, the figures are Soghdian not Sassanid and, if not very late Sassanid, then post Sassanid. Mail armor on the other hand is present in the earliest Sassanid art at Firuzabad and the latest Naqsh-e Rostam.



◀ Fig.no.4  
▶ Fig.no.5  
Soghdian  
warriors  
with  
lamellar  
armor



Dmitriev states that Persian lamellar armor of infantry and cavalryman of this period was made of small iron plates, sewn on a fabric basis.<sup>83</sup> But as we know the lamellar armor plates are connected to each other via cords and only scale armor is attached to a fabric base. This illustrates the problem of nomenclature that causes many misunderstandings between scholars writing in different languages. Each author assumes that there is a universal definition when different definitions occur in different disciplines. This replicates a problem in the realm of archery studies where “compound bow” originally meant a bow made from laminated wood or bamboo, but was also used indiscriminately for a “composite bow” which was made from diverse materials like horn wood and sinew. A non-specialist scholar could be forgiven for mixing up the terminology.

### ARMOR FOR PROTECTING ARMS AND LEGS

The following chapter deals with types of armor which Sassanid warriors used to protect their arms and legs on the battlefield. Protecting arms and legs is of significant importance during the battle.

#### Arm and hand protection

The arm and hand protection for the arms in the graffito from Dura Europos could not be identified clearly. Nicolle states that they could be laminated armor for the limbs as seen in the arts of Transoxania a few centuries later.<sup>84</sup> Wojcikowski describes this type of arm protection as segmented, laminar armor as seen on seen on the relief of Ardashir I in Tang-e Ab where the attendants of Ardavan IV use such an armor.<sup>85</sup> Also, the reliefs in Naqsh-e Rostam show the use of such an armor. The standard bearer on Sassanid rock relief of Hormizd II from Naqsh-e Rostam and his standard bearer from the early 4th century CE show long sleeves with similar parallel lines

<sup>83</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>84</sup> Nicolle, *Sassanid Armies*.

<sup>85</sup> Wójcikowski, *The Graffito from Dura Europos*.

possibly indicating laminated armor. The arms of Hormizd II are depicted in the same way.<sup>86</sup> Two Sassanid warriors from Kulagysh (found in Perm near the Ural Mountains) from 7th or 8th centuries CE have extended flaps protecting the back of their hand.<sup>87</sup> The extended flap looks similar to the big plate protecting the back of the hand of an iron/steel gauntlet, which is kept in Römisch-Germanisches Museum in Mainz (Germany).

### Leg armor

The leg armor of the warriors in the graffiti from Dura Europos could also not be identified clearly. Nicolle states that either they could be typical baggy pants or they could be laminated armor for the limbs as seen in the arts of Transoxania a few centuries later.<sup>88</sup> However, Wojcikowski describes them as segmented, laminar armor similar to the arm protections.<sup>89</sup> It is not clear what kind of leg protection is used by the two warriors from the Kulagysh plate from 7th or 8th centuries CE. Nicolle is of the opinion that these could either be laminated leg armor of bronze or hardened leather strips or they can be interpreted as padded or quilted leggings. He adds that although laminated leg armor can be seen on the 7th to 8th century art from nearby Transoxania, this type of armor never extends above the knees or over the feet.<sup>90</sup>

### HELMETS

An essential element of Sassanid armor was the helmet, which Dmitriev describes as having high dome and flat sides.<sup>91</sup> It generally resembled the Parthian helmet which was inspired by a headgear of Parthian kings.<sup>92</sup> Dmitriev also stresses that Persian helmets from this period have a uniform design and derived from the Parthian samples.<sup>93</sup> In the article “On the Parthian heritage in Sassanid Iran: warfare”, Nikonorov focuses on the Sassanid helmets and states that Sassanid warriors inherited several types of metal armor from the Parthians, especially helmets with a crown flattened from sides.<sup>94</sup> The author mentions finds from Dura-Europos<sup>95</sup> and matrix for terracotta statuettes from Central Amurdarya. Later Sassanid helmets of the same shape but different construction derived from Nineveh (before 2 CE). All these helmets clearly imitated the form of hats, known from the famous portraits of Parthian kings Vologases III (105-147 CE) and Vologases IV (147-191 CE). We should note that multi-part helmets are ancient in the Near East. Iron Assyrian helmets in the British Museum and a helmet of a later date found at Sardis in Lydia dating to the Persian conquest show the earlier style with internal ribs rather than the later *spangen* of the *spangenhelme* type. James asserts the Persian helmet at Dura Europos was the

<sup>86</sup> Nicolle, *Sassanid Armies*.

<sup>87</sup> Nicolle, *Sassanid Armies*.

<sup>88</sup> Nicolle, *Sassanid Armies*.

<sup>89</sup> Wojcikowski, *The Graffiti from Dura Europos*.

<sup>90</sup> Nicolle, *Sassanid Armies*.

<sup>91</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>92</sup> Nikonorov, *K voprosu o parfjanskom nasledii v sasanidskom Irane*.

<sup>93</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>94</sup> Nikonorov, *K voprosu o parfjanskom nasledii v sasanidskom Irane*.

<sup>95</sup> See James, *The Arms and Armour and other Military Equipment*.

prototype of some later Roman helmets.<sup>96</sup> Helmets of noble warriors were decorated with plumes, ridges, gold and silver parts, engraving, polished bronze rivets and thin bronze sheets. Some were equipped with a battle mask that protected the upper part of the face and nose of the warrior. The face masks were often fastened to the base of the helmet.<sup>97</sup> Dmitriev also writes about battle masks that protect the entire face and even the whole head of the warrior.

The typical Sassanid helmet had a quite rigid form thanks to two iron shell-shaped plates fixed on a narrow base-plate and fastened together with an extra narrow vertical ridge which concealed the place of connection.<sup>98</sup>

Additionally, the helmet was strengthened with a third plate put on its cross cut.<sup>99</sup> Helmets belonging to the aristocracy were additionally decorated with feathers, gold and silver decorations, engraving, polished bronze rivets or thin applied plates put on the sides fixed under the connecting plates. Regarding these latter, Dmitriev explains that the bronze plates protected the iron helmets from corrosion.<sup>100</sup>

The helmets were sometimes supplied with a protective armored mask attached to the rim of the helmet. These masks protected the upper part of warrior's face and his nose. This mask can be seen on the relief of Taq-e Bostan.<sup>101</sup> Dmitriev points that Ammianus Marcellinus also describes the mask as a protecting piece saying that it was put close on the face and arrows could enter only through the narrow eye- and nose-openings.<sup>102</sup> Dmitriev also concludes that according to the Roman historian the Persians had masks that protected the entire face. He further states that the problems of the exposed areas of face defense were additionally solved by the mail fastened to the helmet base and lower part of the mask.<sup>103</sup>

Evidence of segmented helmet in *Spangenhelm* construction can be seen already in a late Parthian or Early Sassanid graffito from Dura Europos in today's northeastern Syria from the 3rd century CE. The same graffito shows a mail aventail covering the rider's face.<sup>104</sup> Finds of early Sassanid helmets from Dura-Europos consist of two halves riveted to two bars with a pointed apex and a mail piece was attached to its lower edge.<sup>105</sup> Wojcikowski suggests that this high helmet might be a ridge helmet and adds that during the excavation works in Dura Europos under the debris of Tower 19, the archaeologists found an Iranian helmet with a bell consisting of two parts

<sup>96</sup> See James, *The Arms and Armour and other Military Equipment*.

<sup>97</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>98</sup> Grancsay, *A Sasanian Chieftain's Helmet*; Some of the comments on armor made there predated discoveries in Ukraine made during and after the Soviet period and therefore are now outdated

<sup>99</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>100</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>101</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>102</sup> Marcellinus, *Ammiani Marcellini Rerum gestarum libri qui supersunt* ; Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>103</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>104</sup> See Nicolle, *Sassanid Armies*.

<sup>105</sup> Litvinsky, *The Helmet in Pre-Islamic Iran*.

[ridge helmet].<sup>106</sup> The helmet dates back to the period of Shapur I.<sup>107</sup> Ridge helmets had an exceptionally sturdy structure but of simple construction and were later adopted by neighboring people and countries of Iran. Most scholars are of the opinion that ridge helmets have Parthian origins.<sup>108</sup> But as mentioned before, there is no compelling evidence that it is of a Sassanid horseman. The helmet bears more relation to the helmets on the Arch of Galerius at Thessalonika and to some extent the archers on Trajan's Column.



◀ Fig.no.6: Shapur II (r. 309-379 CE) hunting lions with the Parthian shot (Hermitage Museum, St.Petersburg, Inv.S-253)

▶ Fig.no.7: Plate depicting King Pirouz (r. 459-484 CE) in a hunting area, discovered in the town of Tcherdynein the Perm region (item dated to 460-480 CE) (Hermitage, Inv.S-216)



The Sassanid rock relief of Hormizd II and his standard bearer from Naqsh-e Rostam is from the early 4th century CE. The relief shows Hormizd II overthrowing a rebel. The standard bearer is wearing a helmet with a mail or scale aventail.<sup>109</sup> The greater ayvān of Tāq-e Bostān attributed to Khosrow II (591-628) shows a “segmented” or “four-barred helmet” [*Spangenhelme*].<sup>110</sup> Different types of Sassanid *Spangehelme* exist. Segmented helmets are divided into several types depending on their methods of construction. The Sassanid helmet falls into several typologies though mainly they are either *Bandehelme* or *Spangenhelme*. The earliest ones are made with two iron segments joined by a fore to aft arch all mounted on circular band.<sup>111</sup> Later helmets had four segments connected by one side to side arch and a fore to aft band connected to the circular base band. The true *Spangenhelm* has four under segments with four to eight inverted “T” shaped “*Spangen*” riveted to them. The cross pieces of the “T” form the base band. A separate disc or dome-shaped piece is riveted on the crown where all the pieces meet. Another type of segmented helmet is the so-called “lamellar helmet”, where the dome of the helmet is made from long strips of metal

<sup>106</sup> Wójcikowski, *The Graffito from Dura Europos*.

<sup>107</sup> James, *The Arms and Armour and other Military Equipment*.; Khorasani, *Arms and Armor from Iran: The Bronze Age to the End of the Qajar Period*.

<sup>108</sup> Alföldi, *Eine spätrömische Helmform*, *Acta Archeologica* 5.; Grancsay, *A Sasanian Chieftain's Helmet*; Grancsay, *A Barbarian Chieftain's Helmet*.; Overlaet, *Contribution to Sasanian Armament in Connection with a Decorated Helmet*.; Werner, *Zur Herkunft der frühmittelalterlichen Spangenhelme*.

<sup>109</sup> Nicolle, *Sassanid Armies*.

<sup>110</sup> Litvinsky, *The Helmet in Pre-Islamic Iran*.

<sup>111</sup> James, *The Arms and Armour and other Military Equipment*.

which taper from the base to the top. They can be laced or riveted together. Usually there is a top piece to cover where the narrow ends converge. In Japan, the riveted helmets have a base band, but in many other areas the base is just the bottoms of the lamellae wrapped in leather.

Generally, *Spanghelme* have the shape of egg consisting of four vertical iron segments attached at the bottom to a horizontal bronze rim. Then two wide bronze bands are riveted to these segments crossing at the top. Then the iron segments are covered with thin, silver leaves for ornamental reasons. The helmet rim has holes for mounting a piece of mail armor covering the neck and the face only leaving the eyes open.<sup>112</sup> However, it should be noted that most Sassanid helmets have the holes too far apart to make reliable attachment for a mail aventail. It is more likely that the mail or scale was attached to a leather band that was stitched to the helmet. Alternately the holes were actually for the helmet lining and the aventail was attached some other method. For a detailed discussion about the origin and typology of Sassanid helmets.<sup>113</sup>

Overlaet offers a description of a Sassanid *Spangenhelm* helmet that is kept in Musées Royaux d'Art et d'Histoire (Royal Museum of Art and History) in Brussels and explains that this helmet is 21.7 cm in height, 22.5 cm in length, and 19.5 cm in width.<sup>114</sup> Overlaet explains that this helmet is made of four iron bands that are overlaid with bronze sheets plied around the iron band. Globular-headed bronze rivets further secure the bronze sheets to the iron bands and, at the same time, connect the separate parts of the helmet. According to Overlaet, one band is in the shape of a parabolic ridge and runs from front to back, and two shorter *Spangen* extend from the top to the encircling browband. Overlaet classifies this helmet as a four-*Spangen* type, pointing out the presence of four intermediate segments in spite of the fact that front and back *Spangen* are made in one piece. At the same time, Overlaet stresses that a helmet of four-*Spangen* type should be distinguished from helmets where four or six *Spangen* of equal length are riveted to form an apical plate.<sup>115</sup>

Thus, the free-standing rock relief of Khosrow II as a Sassanid heavy cavalryman from Taq-e Bostan grotto from the 7th century shows him wearing a low-domed segmented *Spangenhelm*. The helmet has a large face-covering mail aventail attached to its rim. The helmet has also decorative eyebrows and the eye openings are carved in a plate. According to Nicolle, this might be an indication of the existence of rigid visor below the face-covering mail.<sup>116</sup> However, it must be pointed out that similar looking helmets from Vendel in Sweden have the mail attached to the spectacle-like eye pieces with no underlying visor. The Khosrow sculpture shows the impression of

<sup>112</sup> Grancsay, *A Sasanian Chieftain's Helmet.*; Harper, *The Royal Hunter.*; Overlaet, *Contribution to Sasanian Armament in Connection with a Decorated Helmet.*

<sup>113</sup> See von Gall, *Das Reiterkampfbild in der iranischen und iranisch-beeinflussten Kunst parthischer und sasanidischer Zeit.*

<sup>114</sup> Overlaet, *Contribution to Sasanian Armament in Connection with a Decorated Helmet.*

<sup>115</sup> Overlaet, *Contribution to Sasanian Armament in Connection with a Decorated Helmet.*

<sup>116</sup> Nicolle, *Sassanid Armies.*



the eye pieces under the mail and no suggestion that it extends under more than a few rows of rings. Below that plate and around the helmet's rim the mail aventail and face covering are attached. The helmet has a large pompom on top, which may be a representation of the royal korymbos which distinguished Sassanid kings. Below that there is a crown-like fringe with knotted wide ribbons. Two armored warriors from Kulagysh, Perm Governorate, Russia, from 7th or 8th centuries CE, [possibly Soghdians] depicted on a silver plate show the two warriors in full gear. Both are wearing a special three-pointed headgear and according to Nicolle this type of headgear can also be found in 9th or 10th CE century ceramics from the Islamic period Khorasan.<sup>117</sup> Although Nicolle is of the opinion that this type of headgear can only have a symbolic rather than functional meaning, he adds that the rest of the armor is represented authentically. We are of a different opinion. The headgear can clearly be a long cone-shaped (oval) shaped helmet with a crown-like fringe but with artistic exaggerations. The helmets have also a large mail aventail protecting the neck and the shoulders.

In the 3<sup>rd</sup> century novel, *Aethiopica*, Heliodorus writes that Persian heavy cavalry wore a one-piece masked helmet completely covering the head except for the eyes. This is also confirmed in the writings of Ammianus Marcellinus in the 4th century, where it is written that Sassanid cavalry wore helmets with face masks skillfully fitted to their head. Wilcox also confirms that the Sassanid helmets were equipped with a face mask covering the whole face.<sup>118</sup> The Romans were familiar with face covering visors since they used them in their cavalry exercises and several have survived.

Khazanov states that cataphracts wore conical helmets in the first centuries CE and the helmets often had a metal battle mask which protected the face of the warrior.<sup>119</sup> Many figures represented on Sassanid rock reliefs of the 3rd-4th centuries C.E. wear hemispherical helmets with neckpieces and bindings along the base. On Naqš-e Rostam No. 5, the cap is ornamented and has a knob on the top, while a mail piece is attached to the lower edge.<sup>120</sup> The earliest form of this helmet has the typical, ancient Assyrian form with additional mail connected to its lower edge. The Sassanids learned sophisticated helmet construction techniques, such as the *Spangenhelme* from Iranian peoples (such as the Sarmatians).<sup>121</sup> The Sassanid helmets were made of four to six parts (iron segments) and metallic bands joined together with bronze rivets and were around 22–24 cm in height and about 20 cm in width.<sup>122</sup>

According to Farrokh, early Sassanid reliefs led some scholars to believe wrongly that the early Sassanids did not know of or use *Spangenhelm*. Farrokh rejects this assumption by saying that the early technology did not allow mass production of one-piece helmets, for the *Spangenhelm* construction was devised to manufacture helmets

<sup>117</sup> Nicolle, *Sassanid Armies*.

<sup>118</sup> Wilcox, *Rome's Enemies: Parthians and Sassanid Persians*.

<sup>119</sup> Khazanov, *Избранные научные труды. Очерки военного дела Сарматов*.

<sup>120</sup> Hermann, *The Iranian Revival*.

<sup>121</sup> Farrokh, *Sassanid Elite Cavalry AD 224-642*.

<sup>122</sup> Farrokh, *Sassanid Elite Cavalry AD 224-642*.

for large numbers of soldiers. Therefore, Farrokh suggests that the helmet shown on the rock relief in Dura Europos of a Sassanid trooper is of a two-piece type, known as the ridge helmet. Farrokh explains that the two half-skull pieces of a Sassanid ridge helmet were joined together by two riveted iron bands, and mail hung down from the lower edge. Some Sassanid *Spangenhelm* helmets were decorated and had overlaid silver or gold sheets on the four iron segments of the helmet (0.1–0.2 mm thickness). Farrokh adds that the Sassanid *Spangenhelm* helmets usually were also decorated with Varagn (griffin) or Simorgh (phoenix) feather designs. Further, Farrokh states that the latest model of a Sassanid *Spangenhelm* helmet can be seen on the stone relief of Tagh-e-Bostan, where the heavy cavalryman (Khosrou II) is wearing a helmet with eye slits with metal eyebrows. One of the unique features of this type of *Spangenhelm* helmet is that, in contrast to the early Sassanid helmet found at Dura Europos, mail not only protects the neck extending to the shoulders but also the face. Farrokh also adds that the helmet seems to be more hemispherical than conical.<sup>123</sup>

## SHIELDS

An important defensive weapon of the Sassanid warrior was the shield. Dmitriev points that of two types of shields were used by the Sassanid army in the Roman-Byzantine written sources.<sup>124</sup> The first one was a large shield used by infantrymen. Some historians believe that the infantry was an under-resourced part of the Sassanid army, and hence used shields for extra protection both as individual warriors and as a military formation facing the enemy.<sup>125</sup> However, this view is challenged in recent publications as Daylamites provided well-protected professional infantry units.<sup>126</sup> Such shields were made of osier twigs or reeds covered with rawhide. The shields dating to the middle of the 3<sup>rd</sup> century that were excavated in Dura Europos were also made of vertically arranged reeds inserted through a sheet of rawhide through multiple slits arranged in patterns. The handle fixed on the back was also made of reed. Dmitriev points these shields were very light, easily constructed and cheap. They could be given to the infantrymen in an unlimited quantity to provide defense for the heavy horsemen who were the most important part of Sassanid army.<sup>127</sup> Nefjodkin considers these rectangular shields to be the representation of a direct continuity of the military tradition between the Achaemenids and the Sassanids.<sup>128</sup> However, it must be pointed out that the most similar shields from the reliefs at Persepolis are circular and show more resemblance to the much later *kalkan* shields of the fifteenth century and later. They are also very deep in cross section rather than flat. Regarding the rectangular shields, Dmitriev states that their usage was

<sup>123</sup> Farrokh, *Sassanid Elite Cavalry AD 224-642*.

<sup>124</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*; Marcellinus, Ammianus, *Ammiani Marcellini Rerum gestarum libri qui supersunt.*; Procopius, *Procopii De bellis libri I—VIII*.

<sup>125</sup> Nikonorov *K voprosu o parfjanskom nasledii v sasanidskom Irane.*; Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>126</sup> Farrokh & Khorasani, *Die sassanidische Infanterie*.

<sup>127</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>128</sup> Nefjodkin, *Traditsii voennogo dela epohi Ahemenidov v Sasanidskom Irane*.

widely practiced in the ancient world. He adds that the shields of the second type were made of metal alluded to indirectly in the Roman-Byzantine descriptions.<sup>129</sup> There is an early version of a metal shield face with the name of the Pontic King, Pharnaces I (r. c. 189-169 BCE).<sup>130</sup> Because the Pontic kings had strong Iranian connections. Regarding the metal shields, Dmitriev mentions that Libanius described the Persian “glittering shields” presuming the ones covered with metal<sup>131</sup> while Agathias Scholasticus speaks about the battle of Fasis as a very noisy one because of clang of evidently metal shields.<sup>132</sup> Agathias also mentioned presumably metal shields among the costly trophies looted by the Romans.<sup>133</sup>

### HORSE ARMOR

Some scholars believe that Dura-Europos offers some valuable information on Parthian armor which can be considered as a predecessor of the Sassanid armor in many ways as the former influenced the latter in many ways. However, James (2004) believes that the scales on the horse armors from Dura-Europos are typical Roman scales and are joined together in a fashion rarely seen outside the Roman Empire.<sup>134</sup> The rows of scales are made up of individual scales connected by copper alloy staples. Then, whole rows are sewn to the backing. This is extremely strong and capable of resisting cuts and missile fire. However, it is heavier than scales laced together with leather thongs.

Parthian cataphracts fought on horseback, protected by metal horse armor, known from the iconographic and archaeological evidence. Parthian era cataphract armor is shown in detail in the relief from Tang-i Sarvak. It has many of the characteristics of later Sassanid armor seen at Naqsh-e Rostam (for a photograph see Ghirshman.<sup>135</sup> There could be some debate about whether this is a local development. The Elymaeans or the Persians of Fars province could have been the originators of this style. However, it is more likely that this is a local adaption of Parthian equipment and the basic structure has been conserved.

The same type of armor was used by the Sassanid cavalry which used leather horse armor, including reinforced head-covering metal chamfron.<sup>136</sup> Dmitriev also states that the Roman written sources remark that the Sassanid horses were protected too with specially made leather<sup>137</sup> or metal<sup>138</sup> armor which looked like a long horsecloth

<sup>129</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>130</sup> See Melikian-Chirvani, *The Iranian Sun Shield*.

<sup>131</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*; Libanius *Libanii Opera*.

<sup>132</sup> Agathias, *Agathiae Myrinaei Historiarum libri quinque*.

<sup>133</sup> Agathias, *Agathiae Myrinaei Historiarum libri quinque*.

<sup>134</sup> James, *Evidence from Dura Europos for the Origin of Late Roman Helmets, Syria*.

<sup>135</sup> Ghirshman, *Iran Parthians and Sassanids*.

<sup>136</sup> Nikonorov *K voprosu o parffjanskom nasledii v sasanidskom Irane.*; Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran*.

<sup>137</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*; Marcellinus, *Ammiani Marcellini Rerum gestarum libri qui supersunt*.

<sup>138</sup> Herodotus, *The History*.

covering the entire horse's body often including its neck and head. The metal horse armor was made of plates sewn on a linen cloth.

Horse armor was a traditional armor equipage in Iran and was well known not only in the Sassanid era but also in the previous Parthian period, where there was also metal horse bardings evidenced by archaeological and illustrative sources. The Parthian influence on Sassanid armor is a widely discussed question currently. According to Nikonorov,<sup>139</sup> this influence is caused by two variables: first the Parthian aristocracy with their armies changed sides over to the Sassanid army after the Sassanid victory over Parthians; second, the Parthian military organization of the society was preserved in the Sassanid state.

The origin of the combined defensive armor for the Persian rider and his horse is still being debated, due to the lack of informative sources.<sup>140</sup> Some scholars believe that this harness could have been invented by the sedentary peoples of Central Asia for protection from the horse-riding nomads of the steppe. Others think that they were primarily used by the nomads of the Middle East. A third position presumes the heavy horsemen first appeared in the Northern Caucasus and the northern side of the Black sea, while the rest trace their origin from the lands of Bactria and Parthia.<sup>141</sup> Nikonorov introduces two inscriptions from Bactria – a region occupied in early Parthian period by the nomads from Central Asian steppes. One of these inscriptions, in Bactrian script written on a gem seal, stems from the mid-4<sup>th</sup> century.<sup>142</sup> It is preserved in the State Hermitage Museum and reads “horsemen chief” - *ΑΣΒΑΡΟΒΙΔΙΟ*. The second inscription made about 3<sup>rd</sup> to the beginning of the 4<sup>th</sup> century with Kharoshthi script on a fragment of a ceramic vessel from Kara-Tepe contains the *status constructus* of the word *asvavhara-* (lit. ‘horseman’). Based on these inscriptions, Nikonorov presumes that the “horseman” stratum to have appeared already in the Kushan state especially in region of Bactria due to the social experience of its founders who were of nomadic origin.<sup>143</sup> There is a problem with this statement as Herodotus reports that the Bactrians already supplied cavalry forces to the Achaemenid army in the time of Xerxes (reg. 486-489 BCE).<sup>144</sup> Further, the *Kushana* are believed to be a group from the tribes the Chinese called the *Yuezhi*. They may have been an Indo-European speaking group. However, it should be pointed out that the discovery of these two inscriptions might not be significant. For example, there

<sup>139</sup> Nikonorov *K voprosu o parfjanskom nasledii v sasanidskom Irane.*; Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*

<sup>140</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*

<sup>141</sup> Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*

<sup>142</sup> <sup>142</sup> Nikonorov *K voprosu o parfjanskom nasledii v sasanidskom Irane.*; Dmitriev, *The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran.*

<sup>143</sup> *Ibid*; The *Kushana* are believed to be a group from the tribes the Chinese called the *Yuezhi*. They may have been an Indo-European speaking group. However, it should be pointed out that the discovery of these two inscriptions might not be significant. For example, there are Republican Roman inscriptions referring to *equites*, a social group who supplied cavalry to the Roman army, but it does not imply that the Romans were either led by a cavalry aristocracy or that their armies were dominated by their cavalry component.

<sup>144</sup> Herodotus. *The History.*

are Republican Roman inscriptions referring to *equites*, a social group who supplied cavalry to the Roman army, but it does not imply that the Romans were either led by a cavalry aristocracy or that their armies were dominated by their cavalry component.

Vdovin and Nikanorov analyze three iron fragments of a lamellar type cuirass found at an ancient site (now Togolok-depe in Ashkhabad region).<sup>145</sup> Based on stratigraphic data these fragments are dated to the 7<sup>th</sup> century CE. However, based on material and iconographic data (such as comparisons to a piece of armor from Qasr-e Abu Nasr and the famous sculpture of the Sassanid king Khosrow Parwiz II in Taq-e Bostan), this piece should be a lamellar plate of a horse armor of the late Sassanid heavy armed cavalryman. The authors note the unusual small number of mounting holes on lamellar plates (only one near each of the short sides) and analyzed methods of their. However, this poses a problem in identifying the plates as part of a lamellar armor. Two lateral holes suggest a laminated armor where the plates are sewn to a backing along their short edges. By overlapping the stitching of each row, a strong semi-rigid structure could be made. Using a more elaborate structure, the plates could be sewn to strips of cloth or leather and the upper edge of the strips could be sewn to the backing underneath the row above. This would give a heavier, but much more flexible armor for the body.

Studies of horse-riding equipment show a similar pattern to what can be seen in armor distribution. Mediterranean and Hellenistic influence in Iran suppressed the native horse culture descended from Indo-European speaking tribes like the Medes and Persians had adapted from the Scythians and Sarmatians. It lasted in some ways but it was subverted by further incursions of Iranian tribes like the Dahae into Parthia (the Achaemanid/Seleucid province, not the later kingdom which they founded). In this sense Iran has always been a three-way bridge between the Mediterranean in the west, the steppes in the north, and Central Asia in the east. Unlike their influence on metallurgy, the Indians seem not to have contributed much to either horse riding or armor design. The Sassanids seemed to make the most of this, but cultural effects of the Eastern influence can be seen among the Sassanids by the gradual replacement of the Achaemanids in royal references and the adoption of a Kayanid genealogy. The carving of the armored horseman at Taq-e Bostan shows a new type of warrior compared to the much earlier reliefs of Ardashir and Shapur. The hunting scenes show a new sword suspension more like what was being used in Central Asia and that was starting to penetrate the steppes in the west. It is even possible that the posture of the horsemen reflects an exposure to stirrups.

What happened after the Arab invasion shows how quickly things could change. The real question is what was already there. Had the last century of the Sassanids been strongly influenced by their eastern wars? This is a question difficult to answer, though archaeologists in Iran will solve it soon.

<sup>145</sup> Vdovin, & Nikanorov, *Фрагменты панцирного доспеха позднесасанидского времени из Тоголок*.

Fig.no. 8: The Sassanian rock relief in Naqsh-e Rostam shows the victory of the Sassanian king Shapur I (241–272 C.E.) over the Roman emperor Valerian. Note Shapur I is carrying a sword hanging via a scabbard slide system.



### A NEW SASSANID STONE BUST from KERMANSHAH MUSEUM

In the following we will provide a new interpretation of Sassanid armor based on an exceptional find of a Sassanid stone statue kept in Kermanshah Stone Museum in Iran. This statue is described as Izad Bahrām that shows the complex nature of a hybrid Sassanid armor. In the following, we will describe individual parts.



◀ Fig.no.9: The bust of Izad Bahrām at Kermanshah Museum, Iran



▶ Fig.no.10: The helmet

#### Helmet

The helmet is clearly a multi-plate construction. It is unclear whether it is riveted together or laced like lamellar plates. The aventail may show traces of a padded lining that is folded over the edges to stop the mail catching on anything. It is unclear whether the aventail is meant to show an under-lap on the left side allowing it to be opened out for both putting on the helmet and taking it off. This was used in the European Middle Ages. It might also be a pair of mail ear protectors that reinforce the aventail. Only one side is visible so it is impossible to determine. Returning to the helmet, it is impossible to tell whether the helmet has a hole in the top to allow the hair to be pulled through or if there is an artificial *korymbos* to represent the ball of hair. The noble character of the ball of hair is seen throughout the Sasanian period.

#### Aventail

A mail aventail is directly connected to the helmet. It seems that a flap of mail with an edging folds up on the proper left side. This kind of closure is seen in mediaeval mail

aventails in Europe. It made it possible to get a closer fit. The edging implies the mail was lined.

### Chest Armor

The nature of this armor is hard to identify. Two solutions are possible. In one case, there is a collar covered in overlapping plates of the shape of a capital D. The curved side overlapped the adjacent scale's straight side. Holes in the straight side would allow the scales to be laced to a backing. This is suggested by the absence of any rivet heads or lacing shown in the carving. In the other case, the chest area is covered by two disks made of superimposed circles. This would be duplicated on the back. Chinese tomb figures contemporary with this object show these armor pieces superimposed on lamellar or scale cuirasses.



◀Fig.no.11:  
Aventail



▶Fig.no.12:  
Chest armor

### Body Armor

Above the left arm are some partial views of a different type of armor. It appears to be a laminated armor somewhat like a Roman *lorica segmentata*. However, the edges are bordered with what seem to be lines of rivets. There seems to be a vertical center line bordered by rivets on both sides visible between the thumb and index finger of the left hand. In the gap between the forearm and the lower edge of the cloak, some rivet bordered strips are partially visible. They overlap from the top down like the plates in the *lorica*, but the rivets imply that they are connected together or that they are not solid, but made of smaller rectangular plates. There is a type of later Japanese armor called a *nuinobe-do* (*Nuinobe-dô* 縫延). It was made of hoops of material laced firmly together through series of holes on their top and bottom edges.

### Mail Shirt

The mail shirt was probably very short sleeved unlike earlier Sasanian mail shirts from the time of Ardashir and Shapur. The shoulders probably supported *pteruges*. The lower part appears to be scalloped into semicircular projections. Bearing in mind the whole piece was probably the capital of a column, it was positioned high in a building and the large size of the mail rings was necessary to make them visible from the floor level. This is probably true for many Sasanian depictions of mail. The high position that some of the bas-reliefs occupied necessitated that the mail rings were made larger than the real ones in proportion. The smaller size of the rings in the equestrian figure of Khusrau II would then be because the figure was more accessible and the mail could be represented in more realistic proportions. The mail shirt appears

to four large scallops separated by for small ones on its bottom edge (assuming a regular an equal distribution of flaps). The way the edges of the mail are depicted is like the aventail and it might mean that the mail shirt was lined too. It covers a brocade caftan which would be torn apart from friction with the rings if there was no lining.

### Floral Border to Mail

This is a simple decoration along the bottom of the mail shirt. Flowers alternate with loops of vine. It is a design seen on fabrics and also architectural borders. Decorative metalwork attached to mail is not unknown.

### Upper Arm

The rectangular pieces on the upper arm of the figure look very much like stylised pteruges, leather straps popular on Hellenistic and Roman armor. Usually they protected the upper arms and were also worn around the waist. Their purpose was to give freedom of movement while supplying some protection from cuts. It is unlikely that these rectangles represent lamellar scales because there is no sign of lacing.



◀ Fig.no.13: Mail shirt

▶ Fig.no.14: Upper arm



### Other features

The belt of pearls and the pearl necklace with its elaborate pendant are signs of nobility or royalty in the Sasanian context. The ball of curls on top of the helmet represents a royal hairstyle often referred to as the *korymbos* (κόρυμβος) from the Greek word for a cluster of fruit or flowers. This is most commonly seen above crowns. In comparison, early Japanese helmets had a hole (*tehen*) on top for the hair to be pulled through. While it is more likely that the *korymbos* in this case was a decoration attached to the helmet, the other possibility exists.

### Further Thoughts

In preparing a drawing, we realized some other possible features of the armor depicted on the column capital. Maurice,<sup>146</sup> in the *Strategikon*, mentions that the

<sup>146</sup> Dennis, *Maurice's Strategikon: Handbook of Byzantine Military Strategy*.



Byzantines adopted a padded collar from the Avars. It is easy to see how this could be improved by sewing on scales. The fact that no lacing is visible is a strong indicator that the scales overlap the previous scale to protect the lacing of neighboring scales. With a *jawshan*-like cuirass, the upper body including the collar bones, shoulders and shoulder blades need protection. A collar armored with large scales provides the appropriate protection while still allowing movement. Though this is purely speculation, using extra armor over mail is quite common in most cultures that use mail and require extra protection from weapons developed specially to defeat mail.

If the depiction of the *jawshan* is accurate, it is probably overlapping from top to bottom. What requires interpretation is what kind of structure it represents. It could be solid lames laced together in a top down overlapping rigid structure. It could also be similar to a Roman *lorica segmentata* made of lames internally riveted to vertical supporting straps. This would give greater flexibility than the previous suggestion, but it does not explain of the “rivets” or lacing. It is possible that the lames were internally lined with leather which wrapped around to the front surface and was held in place by rivets. The vertical section could show an extra piece added to each row to allow for an overlap on a front-opening corselet. Alternately, it might represent rows of rectangular lamellae laced together at the bottom edge and sewn to a backing at the concealed top edge. However, the question remains of why are there no scale boundaries?

It must be mentioned that there is no lower body shown so it is impossible to describe the leg protection. Almost certainly it is not the much earlier laminated defense. The Sasanians were very confident in their mail. They might use lamellar to protect their horses, but defended themselves with mail shirts. From a practical point of view, it is more economical to use lamellar on horses because of its better coverage.

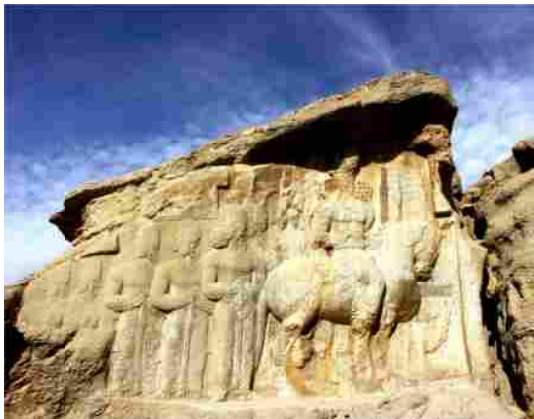


Fig.no. 15: The Sassanian rock relief in Naqsh-e Rajab showing the mounted Sassanian king Shapur I (241–272 C.E.) with infantry soldiers.



Fig.no.16: A Sassanian rock relief from Bishapur (Tang-e Chogan). Note the soldier in the middle carrying a sword hanging via scabbard slide system.

## CONCLUSION

Based on the sections presented before, the following conclusions can be made based on the depiction of armor in eastern Iran and Central Asia of the Sassanid period. It is clear that more than one type of armor is being shown on silver plates and Central Asian wall paintings. Surviving Tibetan horse armors have some very archaic constructions which give some insights into how this can be done. LaRocca provides many details of Tibetan armor pieces that have parallels in much earlier artistic representations<sup>147</sup>. The armor could be lamellar or long rows of narrow scales laced at the top and middle to a backing. There is another form where long scales are laced top and bottom to a backing which makes an exceptionally stiff armor panel. Some Tibetan horse armor is made from strips of leather laced or riveted to each other. All of these could be shown in the same manner in a painting. Therefore, it should be noted that many of the Tibetan horse armors that appear to be riveted are actually laced together. The “rivet heads” are metal hemispheres with metal cross pieces soldered inside to take a loop of the lace coming from beneath. Thus, the lacing is only visible on the under surface and a row of iron hemispheres appear along the joins between the sections. This seems to be used where larger pieces were joined together. This feature should be a caution to those whose rely on art work as a primary source for understanding a certain type of armor or for reconstructing it. The body armor seems to be mainly in the form of a long coat cinched in at the waist. The skirts of the coat are split in the front to the waist. They are probably, on the basis of later armors, tied to the thighs, in which case there would be a split at the back too or one on each rear quarter. This design removed the need for laminated leg armor as used by the Parthians and the early Sassanids. It seems that early armor for horsemen was basically for the upper body. Xenophon mentions the Persian cavalry had armor for their thighs attached to the saddle in the Achaemenid period. This is probably not a complete description. Regarding the Sassanid helmets, as a conclusion, it is possible to classify Sassanid helmets by constructional type:

- a) Simple *bandhelm* type made with two side segments joined by a fore and aft arch overlaying the side segments.
- b) Four-part *bandhelm* type made with four segments joined by crossed arches with the top one continuous.
- c) *Spangenhelm* (strap helmets) type with upside down “T” bands holding the underlying segments together.
- d) The so-called lamellar helmet type with vertical lamellae laced together or riveted in a similar layout.

In the 3<sup>rd</sup> century *Aethiopica*, Heliodorus writes that Persian heavy cavalry was encased fully in bronze or iron. Ammianus Marcellinus in the 4th century wrote that Sassanid cavalry covered their bodies with thick plates<sup>148</sup>.

<sup>147</sup> LaRocca, *Warriors of the Himalayas: Rediscovering the Arms and Armor of Tibet*.

<sup>148</sup> See Wilcox, *Rome's Enemies: Parthians and Sassanid Persians*.

In the article “Cataphracts and their Role in the History of Warfare”, Khazanov states that the main feature of Cataphracts was the presence of heavy defensive armor which consisted primarily of a metal lamellar armor or combined cuirass with mail armor<sup>149</sup>. In the first century CE, the cuirass was usually short up to the thighs. In the next centuries, another type of armor appeared reaching up to the knees. Later a combined armor became popular, which included metal or leather protections for hands, hips and legs. The tradition of using hybrid armor is set forth in later centuries, where mail armor was worn with a separated four-plate armor known as *Chahrayne* (four mirrors) during the Safavid period or even a combination of small plates with mail armor known as *joshan* in later centuries (see the entry *jošan* in Khorasani<sup>150</sup>). The early Safavid helmets and the way of using hybrid armor is reminiscent of the Sassanid armor as depicted in Taq-e Bostan. Regarding this point, Wojcikowski points out that as late as in the 16<sup>th</sup> and 17<sup>th</sup> centuries the heavily armored Turkish cavalry (*sipahis*) wore a type of body armor which consisted of mail and different types of small and bigger plates integrated into them especially at the breast and the lower torso<sup>151</sup>. The same combination of plate and mail is used to protect the arms and the legs. Wojcikowski points out to the similarity of some outstanding examples of the Turkish armor to the armor depicted in the graffito of Dura Europos and stresses that the fall of the Sassanid empire and the conquest of Iran by the Arabs did not mean the end of the Sassanid military influence over the neighboring countries and peoples. Wojcikowski writes: "*The Iranian art of war was so attractive that Sassanid inspiration can be traced in armor and weaponry used by various armies of Islamic countries, which extended their rule to the Eranshahr empire and those countries which were under its more or less direct influence. A Turkish helmet of the 16th century clearly bears some affinity to the helmet shown in the relief of Taq-e Bostan, dated to the sixth century A.D. By no means is the affinity accidental.*"<sup>152</sup>

<sup>149</sup> Khazanov, *Катафракты и их роль в истории военного искусства*.

<sup>150</sup> Khorasani, *Lexicon of Arms and Armor from Iran*.

<sup>151</sup> Wojcikowski, *The Graffito from Dura Europos*.

<sup>152</sup> *Ibid.*

## REFERENCES

1. Agathias, *Agathiae Myrinaei Historiarum libri quinque* / Rec. R. Keydell. Berolini, 1967.
2. Alföldi, A., Eine spätrömische Helmform, *Acta Archeologica*, vol.5, 1934.
3. Allan, J., "Armor," *Encyclopædia Iranica*, Vol. II (1986), Fasc. 5, pp. 483-489.
4. Al-Tabari, B.C.E. *The History of al-Tabari (Ta'rikh al-rusul wa'l-mulük*, Vol.V, *The Sāsānids, the Byzantines, the Lakhmids, and Yemen*, B. C. E, Trans, Albany, 1999.
5. Bivar, A. D., *Cavalry Equipment and Tactics on the Euphrates Frontier*. Dumbarton Oaks Papers, 1972.
6. Blockley, R. C. Ammianus Marcellinus on the Persian Invasion of A. D. 359. *Phoenix*, vol.42, 1988.
7. Burgarski, I., *"A Contribution to the Study of Lamellar Armours"*, *Старинар*, 2005.
8. Corcoran, S., "Observations on the Sasanian Law-Book", in A. Rio (Ed.), *Law, Custom, and Justice in Late Antiquity and the Early Middle Ages*. Proceedings of the 2008 Byzantine Colloquium. London: Centre for Hellenic Studies Occasional Publications; King's College London, 2011, 77-113.
9. Coşkun, A., Deconstructing a Myth of Seleucid History: The so-called "Elephant Victory" Revisited, *Phoenix*, Vol. 66, No. 1/2 (Spring-Summer, 66(1/2 Spring Summer), 2012, 57-73.
10. Curtis, J., *An Examination of Late Assyrian Metalwork with special reference to Nineveh*, Oxford, 2013.
11. Dennis, G. T., *Maurice's Strategikon: Handbook of Byzantine Military Strategy*, (The Middle Ages Series), Philadelphia, 2001.
12. Dezsö, T. & Curtis, J., Assyrian Iron Helmets from Nimrud Now in the British Museum. *Iraq*, 53, (1991), 105-126.
13. Dmitriev A.V., "K voprosu ob "Ahemenidskih traditsijah" v voennom dele Sasanidskogo Irana" (The Problem of the — Achaemenid Traditions in Warfare of Sasanian Iran Revisited) / *Pskovskij istoričeskij vesnik*. №1. (2015), 34-41. <http://cyberleninka.ru/article/n/k-voprosu-ob-ahemenidskih-traditsiyah-v-voennom-dele-sasanidskogo-irana>
14. Dmitriev, A. V., "The Problem of the — Achaemenid Tradition in Warfare of Sasanian Iran Revisited". *Pskovskij istoričeskij vesnik*, (2008), 34-41. Retrieved from <http://cyberleninka.ru/article/n/k-voprosu-ob-ahemenidskih-traditsiyah-v-voennom-dele-sasanidskogo-irana>
15. Dmitriev, A.V., Дмитриев В. А., *Всадники в сверкающей броне: Военное дело сасанидского Ирана и история римско-персидских войн [Horsemen in Shining Armor: Military Affairs of Sassanian Iran and the History of the Roman-Persian Wars]*, Saint Petersburg, 2008
16. Farrokh, K. "Examination of Parthian and Sasanian Military Helmets", In K. & Maksymiuk (Ed.), *Crowns, Hats, Turbans and Helmets The Headgear in Iranian History*, Siedlce-Tehran, 2017.
17. Farrokh, Kaveh & Manouchehr Moshtagh Khorasni, *Die sassanidische Infanterie. Pallasch: Zeitschrift für Militärgeschichte*. Organ der österreichischen Gesellschaft für Heerskunde, 2020.
18. Farrokh, Kaveh, *Sassanid Elite Cavalry AD 224-642*, Oxford 2005..
19. Fluck, C., & Vogelsang-Eastwood, G. (Eds.), *Riding Costume in Egypt: Origin and Appearance (Studies in Textile and Costume History*, (Vol. 3), Leiden; Boston 2004.
20. Ghirshman, R., *Iran Parthians and Sassanids*, (G. Stuart, & J. Emmons, Trans.), Paris 1962.
21. Gibbon, E., *Decline and Fall of the Roman Empire*, Bury, J.B. (ed.). New York 1995.
22. Gorelik, M. V., *Warriors from Eurasia from the VIII Century BC to XII Century AD*, Stockport 1995.
23. Grancsay, S. V., "A Sasanian Chieftain's Helmet", *The Metropolitan Museum of Art BULLETIN*, XXI(5), 1963.

24. Grancsay, S.V., “A Barbarian Chieftain's Helmet”, *The Metropolitan Museum of Art Bulletin*, vol.7, (1948-1949).
25. Greenewalt, J. C., “A Helmet of the Sixth Century B. C. from Sardis”, *Bulletin of the American Schools of Oriental Research*, vol.285, 1992.
26. Harper, P. O., *The Royal Hunter. Art of the Sasanian Empire*, New York 1978.
27. Heliodorus, *Héliodore. Les Éthiopiennes (Théagène et Chariclée)*. T. III/Texte étab. par R. M. Rattenbury, T. W. Lumb et trad. par J. Maillon. Paris, 1943.
28. Heliodorus, *Héliodore. Les Éthiopiennes (Théagène et Chariclée)*. J. Maillon, Trans, Paris., 1945.
29. Hermann, G., *The Iranian Revival (The Making of the past)*, London - New York, 1977.
30. *Herodotus, The History*, n.d.
31. Hong, Y., *Weapons in Ancient China*, Beijing and New York 1992.
32. Hulit, T. D., “Late Bronze Age scale armour in the Near East : an experimental
33. Investigation”, 2003. Retrieved from Durham E-Theses Online: <http://etheses.dur.ac.uk/1006/>
34. James, S., “Evidence from Dura Europos for the Origin of Late Roman Helmets”, *Syria*, vol.63 (1/2),1986.
35. James, S., *The Arms and Armour and other Military Equipment (Excavations at Dura-Europos 1928-1937 Final Report VII)*, London 2004.
36. Jebrael Nokandeh, E. W., “Linear Barriers of Northern Iran: The Great Wall of Gorgan and the Wall of Tammishe”. *Iran*, vol.44, 2006.
37. Jouttijärvi, A., “The Manufacture of Chain-mail”, in *Early Iron, Netværk for tidlig jernteknologi 1*, 1996.
38. Kaegi, W. E., “The Contribution of Archery to the Turkish Conquest of Anatolia”, *Speculum*, vol.39.(1), 1964.
39. Kagan, K., *The Eye of Command*. Ann Arbor 2009.
40. Kainov, S. Y., “The Helmet from Krasnodar Territory”, in *Crowns, Hats, Turbans and Helmets: The Headgear in Iranian History*, Siedlce-Tehran 2017.
41. Kapp, Leop, Kapp, Hiroko, Yoshihara, Y., *The Craft of the Japanese Sword*, Tokyo 2012.
42. Karamian,G., Farrokh, K., & al., e. “Graves, Crypts and Parthian Weapons excavated from the Gravesites of Vestimin”, *HISTORIA I ŚWIAT*, vol.7,2018.
43. Karimova, R., “Restoration of Murals of the National Museum of Antiquities of Tajikistan. Retrieved from SHS Web of Conferences”, 2018.
44. Khazanov, A. M., “Избранные научные труды. Очерки военного дела Сарматов” “Essays on the Art of Warfare of the Sarmatians”, *СПб*, 2008.
45. Khazanov, A. M., “Катафрактарии и их роль в истории военного искусства”, “Cataphracts and their Role in the History of the Military Art”, 1968.
46. Khorasani, M., *Arms and Armor from Iran: The Bronze Age to the End of the Qajar Period*, Tübingen, 2006.
47. Khorasani, M., *Lexicon of Arms and Armor from Iran: A Study of Symbols and Terminology*, Tübingen, 2010.
48. Kiani, M. Y., Excavations on the Defensive Wall of the Gurgān Plain: A Preliminary Report, *Iran*, vol.20,1982.
49. Kubik, A., “Sasanian Lamellar Helmets”, in *Crowns, Hats, Turbans and Helmets The Headgear in Iranian History*, Siedlce-Tehran 2017..
50. LaRocca, D., *Warriors of the Himalayas: Rediscovering the Arms and Armor of Tibet*, New York, 2006.
51. Libanius, *Libanii Opera*, Ed. R. Foerster. Vol. II: Orationes XII—XXV. Lipsiae, 1904.
52. Litvinsky, B. A., “The Helmet in Pre-Islamic Iran”, *Iranica*, 2012.
53. Liu, X., Migration and Settlement of the Yuezhi-Kushan: Interaction and Interdependence of Nomadic and Sedentary Societies, *Journal of World History*, vol.12,2001.
54. Maenchen-Helfen, O. J., *The World of the Huns: Studies in Their History and Culture*, Oakland 1973.
55. Marcellinus, A, *Ammiani Marcellini Rerum gestarum libri qui supersunt*, ed. W. Seyfarth. Vol. I-II, Leipzig, 1978.

56. Melikian-Chirvani, A. S., “The Iranian Sun Shield”, *Bulletin of the Asia Institute*, vol.6, 1992.
57. Neffjodkin, A. K., “Traditsii voennogo dela epohi Ahemenidov v Sasanidskom Irane”, in *MNEMON. Investigations and Publications on the History of Ancient World*, vol.14, 2014.
58. Nicolle, D., *Sassanid Armies: The Iranian Empire Early 3rd to Mid-7th Centuries AD*. Stockport, 1996.
59. Nikonorov V.P. К вопросу о парфянском наследии в сасанидском Иране. On the Parthian Legacy in Sasanian Iran: the Case of Warfare/Central Asia from the Achaemenids to the Timurids. Archaeology, History, Ethnology, Culture. Materials of an International Scientific Conference dedicated to the Centenary of Aleksandr Markovich Belenitsky. St. Petersburg, November 2—5, 2004.
60. Nikonorov, V. P., “Central Asia from the Achaemenids to the Timurids”, *Archaeology, History, Ethnology, Culture. Materials of an International Scientific Conference dedicated to the Centenary of Aleksandr Markovich Belenitsky*, 2004.
61. Nikonorov, V.P. “К вопросу о парфянском наследии в Сасанидском Иране: военное дело // Центральная Азия от ахеменидов до тимуридов”, *археология, история, этнология, культура. Материалы международной научной конференции, посвященной 100-летию со дня рождения Александра Марковича Беленицкого* Санкт-Петербург, 2—5 (2005), 141-182, [Valery P. Nikonorov, V.P., “The question of Parthian Heritage in Sasanian Iran: Warfare, Central Asia from the Achaemenids to the Timurids”, *Archaeology, history, ethnology, culture. Materials of an International Scientific Conference*, November 2–5, 2005.
62. Olbrycht, M. . “Arsacid Iran and the Nomads of Central Asia – Ways of Cultural Transfer Some Preliminaries, In M. S. J. Bemmman (Ed.), *Complexity of Interaction along the Eurasian Steppe Zone in the First Millennium CE*, Bonn 2015.
63. Overlaet, B. J., “Contribution to Sasanian Armament in Connection with a Decorated Helmet,” *Iranica Antiqua*, vol.17, 1982.
64. Peck, E. H., “The Representation of Costumes in the Reliefs of Taq-i-Bustan”, *Artibus Asiae*, vol.31, 1969.
65. Potts, D., “Cataphractus and kamāndār: Some Thoughts on the Dynamic Evolution of Heavy Cavalry and Mounted Archers in Iran and Central Asia”, *Bulletin of the Asia Institute (New Series)*, vol.21, 2007.
66. Procopius, *Procopii De bellis libri I—VIII // Procopii Caesariensis Opera omnia*, vol. I-II /Rec. J.Haury, Lipsiae, 1962-1963.
67. Pugachenkova, G. A., “*The Body Armour of Parthian and Bactrian Warriors*”, *VDI*, 96(2), 1966.
68. Rekavandi, H. O., Sauer, E. W., Wilkinson, T., Tamak, E. S., Ainslie, R., Mahmoudi, M., Hoffmann, B., “An Imperial Frontier of the Sasanian Empire: Further Fieldwork at the Great Wall of Gorgan”, *Iran*, vol.45, 2007.
69. Rezakhani, K., *ReOrienting the Sasanians East Iran in Late Antiquity*. Edinburgh, 2017-2018.
70. Russell Robinson, H., *Oriental Armour*. London, 1974.
71. Russell Robinson, H., *The Armour of Imperial Rome*, London, 1976.
72. Schmidt, E. F., Persepolis I: Structures, Reliefs, Inscriptions”, *Oriental Institute Publications*, 1965.
73. Simocattus, T., *Theophylacti Simocattae Historiae*, Leipzig, 1887.
74. Symonenko, A. V., *Sarmatskie vsadniki Severnogo Prichernomor'ya [Alexander Symonenko. Sarmatian Riders of North Pontic Region]*, Sankt Petersburg, 2009.
75. Tamás, D., & Curtis, J., “Assyrian Iron Helmets from Nimrud Now in the British Museum”, *Iraq*, vol.53, 1991.
76. Tarn, W. W., “The First Syrian War”, *The Journal of Hellenic Studies*, vol.46, 1926.
77. Thordeman, B., *The Armour from the Battle of Wisby 1361*, Uppsala, 1939.
78. Tilke, M., *Costume Patterns and Designs*, New York, 1990.

79. Vdovin, V. Y., & Nikanorov, V. P., “Фрагменты панцирного доспеха позднесасанидского времени из Тоголок – дөпө”, *Известия Академии Наук Туркменской ССР*, 4, 1991.
80. Vizcaíno Sánchez, J., “Early Byzantine Lamellar Armour from Carthago Spartaria (Cartagena, Spain)”, *Gladius*, XXVIII, 2008.
81. Von Gall, H., *Das Reiterkampfbild in der iranischen und iranisch-beeinflussten Kunst parthischer und sasanidischer Zeit*, Teheranischer Forschungen, Bd. VI, Berlin 1990.
82. Werner, J., „Zur Herkunft der frühmittelalterlichen Spangenhelme“. *Praehistorische Zeitschrift*, vol.34-35, 1949/1950.
83. Whitcomb, D. S., *Before the Roses and Nightingales. Excavations at Qasr-i Abu Nasr, Old Shiraz*, New York, 1985.
84. Wilcox, P., *Rome's Enemies: Parthians and Sassanid Persians*, Oxford, 1986.
85. Wójcikowski, R. S., “The Graffito from Dura Europos: Hybrid Armor in Parthian-Sasanian Iran”, *Anabasis Studia Classica et Orientalia*, vol4, 2013.