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Military Architecture and the Four-*Spāhbed* System for Defense of the Sasanian Empire (224-651 CE)

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Abstract: *This article examines Sasanian military architecture with respect to its integration with the four-region Spāhbed system (Ādurbādagān-Spāhbed, Xwarāsān-Spāhbed, Xwarbārān-Spāhbed and Nēmrōz-Spāhbed) for defending the empire. Following an overview of Sasanian military architecture within Iran, the article examines the Darband wall of the Caucasus in the context of the office of the Ādurbādagān-Spāhbed facing the empire's north and northwest (Ādurbādagān, Media Atropatene corresponding with the historical Azerbaijan in Iran's northwest), the Tammisha and Gorgan wall systems of the Xwarāsān-Spāhbed facing the nomadic warrior peoples of the Central Asia, the military architecture of the Xwarbārān-Spāhbed facing the western (Romano-Byzantine) frontiers, and the Khandaq-e Shapur of the Nēmrōz-Spāhbed facing the southwest, notably raiders from the Arabian Peninsula threatening the empire's southwest marches.*

Key words: Iran; Sasanian Empire; army; system for defense; military architecture; *Spāhbed*

Sasanian Military Architecture and the Four-region *Spāhbed* Doctrine

The Sasanian Empire wielded a powerful military machine which was in large part buttressed by an extensive system of military architecture, featuring formidable wall defense and fortress systems, fortified frontier cities, as well as the *Khandaq* trench works. Sasanian military architecture was heir to (1) the long-standing process of evolution of this domain within the Iranian plateau since (pre Indo-European) Elamite times and also to (2) Parthian military architecture which also bore Hellenic influences, notably in northeast Iran and the (Parthian-ruled) Central Asian regions.[1]

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[1] JAKUBIAK, 2006: 127-150.

The resilience and efficacy of the Sasanian system of frontier defense works was to be adopted as the *Ribat* by the succeeding caliphates after the fall of the Sasanians in the 7th century CE.[2]

Military architecture was integral in two ways with respect to the Spah's management of the military threats posed against the empire. The first role of military architecture was to contain raids, attacks as well as invasions propelled towards the western (Mesopotamia-Anatolia), northwestern (Caucasus), northeastern (Central Asia) and south-southwestern (Arabia facing southern Mesopotamia). The second role of Sasanian military architecture was essentially tied to the first: to tie down and/or weaken enemy attacks as the Spah deployed its forces as rapidly as possible to launch its counterattacks into the threatened sectors aimed at expelling enemy forces from Sasanian territory. It was in this capacity where the Sasanian empire's frontier cities as well as other defensive structures such as walls and integrated fortresses, proved vital in the dual role of military defense and attack (or counterattack). In the defensive role, military units stationed in frontier cities (and other defensive systems such as frontier walls), were first tasked with repelling enemy attempts at overcoming and capturing their defensive positions. Placed in the strategic defense, Sasanian troops in the frontier garrisons would essentially be tying down the enemy until the arrival of reinforcements and supplies as dispatched by the Spah high command. A successful defense was vital as this would prevent the invasion force from fanning out deeper into Sasanian territory. In the second role of offense, frontier cities and military defense structures such as the walls of Gorgan and Tammisha acted as the Spah's assembly areas. There were two scenarios in this regard. The first pertained to invasion scenarios in which a beleaguered garrison was relieved by reinforcements. These could confront the besieging invasion force in the field to then endeavor to defeat this in a set piece battle. Following the defeat of the invading forces, the fortress, fortified structure and/or city would act as a staging post to prepare for deployment against enemy forces still at large in Sasanian territory. The Spah high command and the *Shāhānshāh* (king of kings) would then consult as to the most adaptive military options with respect to expanding their offensive or counteroffensive into the enemy's home territory.[3]

One of major consequences of the military reforms of the 6th century CE was the elimination of the office of the *Ērān-Spāhbed* in favor of four generals or *Spāhbed*s[4] in command of the western, northern-northwestern, northeastern and south-

[2] KRAMERS, 1936: 618.

[3] For more information with respect to the consequences of the decisions of the Sasanian war council and Khosrow I (r. 531-579) see for example the case of the Yemenite war of c.528-598 (FARROKH, 2017: 142-144) and the Hephthalite war of 557-560 (FARROKH, 2017: 212).

[4] CHRISTENSEN, 1368/1989: 370. It is possible however that some sort of supervisory office for the four regional commands was also in place as possibly indicated in the Bundahishn's reference to the *Spāhbedan-Spāhbed* (general of generals) (as cited from TAFAŻŻOLI, 2000: 8).

southwestern regions of the empire.[5] More specifically, the four *Spāhbed*s in command of the four-zone system are identified as the *Xwarbārān-Spāhbed* (general of the West), *Ādurbādagān-Spāhbed* (general of the North),[6] *Xwarāsān-Spāhbed* (general of the East) and *Nēmrōz-Spāhbed* (general of the South).[7] In practice, the offices of the *Xwarbārān-Spāhbed* and the *Xwarāsān-Spāhbed* were often the most critical given that these often confronted the armies of the Romano-Byzantines and the nomads of Central Asia (notably Turkic and Hephthalite invaders) respectively.[8] The offices of the *Ādurbādagān-Spāhbed* and *Nēmrōz-Spāhbed* were also critical. The *Ādurbādagān-Spāhbed* was responsible for the security of the Caucasian marches to the north of *Ādurbādagān* (historical Azerbaijan in northwest Iran).[9] The *Ādurbādagān-Spāhbed* was also responsible for the defense of the empire's northwest from (mainly Romano-Byzantine) attacks emanating from eastern Anatolia as well as northwest Mesopotamia. In this case there was no actual wall as the Sasanian Spah could deploy into the southern Caucasus to combat against Romano-Byzantine incursions. The *Nēmrōz-Spāhbed* was entrusted with the defense of the southern and Persian Gulf regions.[10]

The four-*Spāhbed* military doctrine was largely integrated into the military architectural system of the Sasanian empire which (much like its Romano-Byzantine rivals to the west[11]) invested consistently in the construction, maintenance and improvement of these works. This was due to the necessity of consistently stationing

[5] Ṭabarī, I 489. Prior to the rationalization of the empire's defense into a four-zone system, the organizational system was based on a large number of local regional commands each of which required its own administration. The merging of all of these local military zones into four large regional military commands was more efficient economically and resulted in a significantly better organized system of military defense. To further increase efficiency, each of the four regional *Spāhbed*s was supported by their respective Marzban commander (NAFISI, 1331/1952: 249) as well as a Paygospan (possibly a viceroy-type office; FARROKH, 2017: 14-15).

[6] As noted by GYSELEN (2005:) "… the term abāxtar 'north' was generally avoided because of its negative connotation, the north being considered the territory of demons".

[7] TAFAŻŻOLI, 2000, p.8.

[8] FRYE, 1985: 154.

[9] Two other terms can be identified with respect to the *Ādurbādagān-Spāhbed*: the Spahsalar (Khosrow I's designation for the commander of the critical Ādurbādagān-Caucasian front (CHRISTENSEN, 1368/1989: 375) as well as the *Ādurbādagān-Spāhbed* after Iran's Ādurbādagān region in northwest Iran (TAFAŻŻOLI, 2000: 8).

[10] The *Nēmrōz Spāhbed* was often faced with two types of threats from Arabia: (1) The first was the prospect of raiders from northern Arabia attacking southern Mesopotamia and southwest Iran and (2) the threat of Arabian raiders landing with their vessels along Iran's southern coastline as well as the Sasanian empire's islands in the Persian Gulf.

[11] The Romans had initiated the construction of their Limes in Syria during the reign of Emperor Vespasian (r. 69-79) during the Parthian era. Emperor Trajan (r. 98-117) continued the construction projects and also extended these in preparation for his invasion of the Parthian empire. Roman fortifications had become established in both the Caucasus and Mesopotamian region by the time Trajan had attacked the Parthians in 115 (DIGNAS & WINTER, 2007: 14). Construction of Roman fortifications were to continue into the reign of Diocletian (r. 284-305), however the Roman defense system in the Near East fell into decline after his reign (FRYE, 1977: 7) but were to be again improved, notably by the later Romano-Byzantines.

powerful military bases in order to support the Spah's capabilities of confronting threats posed along the empire's multiple fronts. This system of military architecture necessitated the organization and management of a permanent logistics system capable of providing (in a timely fashion) military equipment, foodstuffs, fodder and other types of necessary equipment to sector(s) threatened by invasion(s). The logistics system was concordant with the system of military architecture of the fortresses which, in addition to barracks, also had storage areas and other support facilities. In this endeavor the Sasanian empire organized a series of *Ambaragh* (magazines) and *Ganz* (arsenals)[12] which were critical to the Spah's military preparations and subsequent prosecution of wars. Under the *Eiran-Ambaraghbad*'s supervision the *Ambaragh-Ganz* networks were to be in a state of continuous preparation by having readily available stocks of weapons and equipment in storage. This was necessary in order for the Spah to rapidly and proficiently deliver these to military personnel mobilized for war.

Military bases, cities and defensive walls were often constructed along important routes of transportation and communications such as roads, seaports, and rivers, which were critical for the Sasanian economy and especially at wartime.[13] An effective system of military architecture ensured the safety of vital (land and water) routes which were used for the deployment of troops, logistics-transportation and military communications. All of this translated into the primary intention of the Sasanian empire's defense wall and city-fortress systems: these were ultimately responsible for the security of the empire's urban, agricultural, economic and communications infrastructure.

The four-*Spāhbed* system and the Sasanian military architecture system was essentially designed to hold multiple threats at bay, especially if forces had to be relocated from one sector to other threatened sectors.[14] Whether the Sasanian empire intended to engage in defense-only and/or attack/counterattack into enemy territory, or to stage an invasion of its own, the military architecture system along the empire's vast frontiers were complemented by fortresses within Iran.

Overview of Fortresses, Tal Khandaq and Moats within Sasanian Iran

Fortresses within Iran facilitated the mobilization and shuttling of armies and logistics between the Sasanian empire's different regions to the west, northeast/east, north and south/southwest. Archaeological studies on Sasanian fortresses within Iran to date are indicative of their efficacy with respect to military engineering.[15] In practice, the military architecture of Iran can be traced as far back as the Elamite era, where

[12] CHRISTENSEN, 1368/1989: 213.
[13] HOWARD-JOHNSTON, 1995: 185.
[14] This is not unlike the intent of Roman military architecture, notably as implemented by the reforms of Septimius Severus in the late 2nd and early 3rd centuries CE (SMITH, 1972: 481-482).
[15] LABBAF-KHANIKI, 2020.

archeological evidence for these works have been dated to c. 3000-4000 years ago[16] long before the arrival of proto-Iranian peoples and notably the Medes and Persians onto the Iranian plateau by c.900-800 BCE.[17] The evolution of military fortresses within Iran were adapted to two types of terrain: (1) flat type regions lacking hills, mountains, etc. and (2) mountainous regions. Local geography was the main determinant with respect to materials utilized for the construction of fortifications. As a result, a fortress design plan would be constructed of different materials (brick versus stone for example) depending on the local geographical terrain. Fortresses located in northern and northwest Iran as well as the Caucasus (e.g. wall of Derbent) tended to utilize materials such as various limestones, different varieties of stones, different chalk types, etc. Construction materials such as hardened bricks and/or hardened plaster would be more typical of fortresses in the terrain of the Iranian plateau region.

The primary design of Sasanian cities was predominantly in two segments. The first was the civilian (or residential) section known as the *Shahristan* with the second section designed for regal, military and administrative personnel. The military architecture for the defense of these types of cities was often based on two rationales: defensive walls and moats (or ditches). The latter would become integral to defenses in the southwest facing the northwest of the Arabian Peninsula (see *Khandaq* later in discussion). Sasanian walls were formidable, often constructed of baked and unbaked bricks, mortar as well as stones,[18] with the proportion of the cited materials varying in accordance with local geography. Sasanian walls were formidable with the Dastegerd fortress for example having had walls measuring at a thickness of 16.6 meters.[19] Wall designs were not just confined for fortresses but also for 'Maginot' type defensive walls such as those in Derbent in the Caucasus and the Gorgan-Tammisha system facing Central Asia discussed later in this article. Sasanian walls were also sophisticated in design with features such as stepped niches, narrow rooms and vaulted corridors.[20]

Sasanian fortifications also had sophisticated systems with respect to semicircular towers, ramparts and bastions, numbers of which featured prominent extensions. Gates could also be constructed between bastions. Vertical shafts could also be placed for connecting the gate chamber with the defense platform situated atop. Ramparts were often of mud-brick construction as seen with the fortifications of Ctesiphon, the Sasanian capital.[21] The palace of Ayvan-e Karkheh, notable for its long corridors, apparently contained a rampart section constructed of an intricate

[16] MATUFI, 1378/1999: 240.
[17] GELB et al., 1998: 115, 321.
[18] Like their Sasanian counterparts, the Roman also utilized stones, baked and unbaked bricks (CURATOLA & SCARCIA, 2007: 92).
[19] SARRE & HERZFELD, 1920: 76.
[20] CURATOLA & SCARCIA, 2007: 93.
[21] NEGROPONZI & CAVALLERO, 1967: 41.

configuration of bricks. Semicircular towers could also be integrated with ramparts. Examples of this include the semicircular towers of Dastegerd which featured a unique inter-connected pattern through a series of narrow corridors[22] as well as at Bishapur where the rampart system is integrated with semicircular bastions separated by 40cm intervals.[23] Fortresses along the Romano-Byzantine frontier in particular were also designed to accommodate counter siege engines. This was of course a necessary design feature as the Romano-Byzantines (like the Sasanians) were especially adept at siege warfare, a martial skill that surpassed the nomadic warriors who often threatened the northeastern and northern frontiers of the Sasanian empire. Another defensive feature of Sasanian fortifications was their use of arrow slits. One effective form of these was windows with arrow slits (with horizontal or triangular coverings) featuring small niches; these were built into the frontages of Sasanian military wall systems.[24] While these types of windows could appear decorative, their purpose was clearly military: these were structures to allow archers to launch their arrows with relative impunity against besieging enemy counter archers.

Sasanian fortresses systems may be broadly classified into circular-polygon, square-rectangle and oval, when in practice plenty of exceptions existed such as fortresses designed for mountain locales as well fortresses with 'de-humidifier' technology. A synopsis of these is expostulated below.

Circular, polygon and oval systems

The earliest possible origins of the circular defence system may be traced to the circular nomadic tents and camps of the steppes of Central Asia where raids by enemy nomadic horsemen were a constant threat. The circular type of land-based fortress may in fact be traced to the Indo-European (more specifically proto-Iranian) arrivals into the Iranian plateau (9th century BCE) notably the Persians and the Medes. Following these arrivals, circular type fortresses and metropolitan centers began to appear on the Iranian realms of the Near East, which was contrary to the military architectural systems of the Greeks and Romans.[25] The circular and subsequent polygon and oval design systems as applied to military architecture, were especially adaptive with respect to defending against flanking attacks.[26] The Parthian predecessors of the Sasanians are known to have had circular as well as polygon and oval systems which were also well-designed for defense against flanking attacks. Interestingly the circular-polygon fortress concept was to appear centuries later

[22] SARRE & HERZFELD, 1920: 76.
[23] SARFARAZ, 1348/1969: 27.
[24] CURATOLA & SCARCIA, 2007: 93.
[25] GHASEMI, 2012: 249.
[26] COLLEDGE, 1967: 116; KĪĀNĪ, 1374/1995: 237; GHASEMI, 2012: 249.

in Europe during the medieval era.[27] Circular fortress-cities of Iranian design often had lanes or streets, characteristic of cities in classical times.[28]

An early Sassanian city of (Parthian-based) circular design was that of Firuzabad's *Ardashir Khurra* (Ardashir's Glory) built in the 3rd century CE.[29] The city's urban design had twenty subdividing lines radiating outwards from the central tower, which in turn segmented the fortress into twenty primary sectors.[30] The city was in turn divided into four quadrants (each with its own gate) by two perpendicular lines.[31] The high standard of Ardashir Khurra's engineering accuracy led to Ibn-Balkhi's (850-934) observation centuries later (in the Islamic era) that the city's layout appeared "as though drawn by compasses".[32] The city had bastions built into its architecture with a wall defending the center of the city.[33] The central tower or *tirbal* was situated in the exact center of the city, from which all of the segmenting lines radiated from. The location of the tirbal was ideal for serving both as a signal post as well as a lookout tower.[34] Access to the tower was provided with a (2 meter-depth; 13/30 cm gradient) staircase.[35] A massive ditch and earthern ramparts formed a perfect circle protecting the city.[36]

Square-Rectangular and blended fortress systems

This system was based on square or rectangular designs which usually featured a tower at each of the four corners. The military function of towers in general were gate-keeping, guard/watchtower duties, and combat defense in case of enemy siege actions. Typical Sasanian square-rectangle structures are seen at Harsin and Qasr-e Shirin. A prominent coastal defense fortress is that of Siraf in modern-day Bushehr province situated along Iran's Persian Gulf coastline. The Siraf fortress may possibly be traced to the campaigns of Shapur II (r. 309-379) who established this installation in the aftermath of his successful campaign of ejecting Arab raiders who had been attacking the territories of the Sasanian empire in southern Mesopotamia and southern Iran. Excavations which began in the early 1970s revealed that the Siraf fortress was of the traditional square type and was over one kilometer across.[37] There was a rectangular entrance protected by semicircular towers on the south side of

[27] GHIRSHMAN, 1964: 35.
[28] MATUFI, 1378/1999: 240.
[29] MATHESON, 2001: 138.
[30] CURATOLA & SCARCIA, 2007: 92.
[31] HUFF, 2008: 45.
[32] Ibn Balkhī, 45.
[33] HUFF, 2008: 44.
[34] HUFF, 2008: 49.
[35] Pieces of stucco are still evident along the tirbal's entrance.
[36] MATHESON, 2001: 138.
[37] See for example the full report by WHITEHOUSE & WILLIAMSON, 1973: 33-35.

the fortress.[38] A series of barrack-type chambers have been identified within the fortress, some of which may have also served as magazines. There also was a combat platform behind the outer walls. For defense, a series of towers at intervals had also been constructed. Siraf was apparently a settled town with a number of narrow streets having also been identified. It is possible that Siraf had been constructed by Roman prisoners of war captured by the Sasanian Spah. As first noted by Whitehouse and Williamson, there are a number of notable architectural details at Siraf reflective of Roman engineering methods as seen with the Roman fortress at Singara. Both the latter and Siraf feature (1) semi-circular towers and (2) arrow slits at the ground level standing at shoulder height or slightly higher.[39]

While much more research is required in the domain of Sasanian military settlements in the Persian Gulf area, notably the islands of the waterway and within the Arabian peninsula, a notable archaeological expedition in 2018 led by Al-Jahwari, Kennet, Priestman and Sauer discovered a Sasanian fort at Fulayj close to Suhar, along Oman's Batinah Coast.[40] The researchers note of the high quality of construction and meticulous planning of the site. The Fulayj fortress is essentially a conventional Sasanian (square) design built from local materials. Lime mortar was used to bind together the larger blocks and smaller stones. The site is a near-exact square fort of stone (30x30 meters) with walls of approximately 2.65 meters of thickness. Its corners feature four robust and U-shaped towers with a single ingress just 1.62 width on the east – this is bordered on each side with a rounded reinforcement tower. The architects of the forts carefully selected stones with flat surfaces with fine jointing. The purpose of the Fulayj fortress was certainly military given the thickness of its walls and its towers, clearly designed to resist attacks.

The Sasanians also constructed fortresses that blended square-rectangular and circular systems in accordance with the maximization of the fortress' defenses as dictated by local terrain. Three typical examples of the blended design include the *Atashgah* (Fire locale/temple) of Isfahan,[41] Bishapur, and Turang Tepe.[42] A fourth example is Firuzabad which is an early Sasanian prototype of combined circular and square-rectangle systems: at one end of the fortress is a circular design which is integrated into long curtain-style walls of rectangular dimensions.

[38] There was another circular tower which served to reinforce the structure's south-east angle.
[39] WHITEHOUSE & WILLIAMSON, 1973, pp.33-35.
[40] AL-JAHWARI et al., 2018: 724-741.
[41] SIROUX, 1965: 39.
[42] BOUCHARLAT, 1977: 329.

Mountain fortresses: example of Bazz castle

Fortresses built upon mountain areas were especially effective as many of the local geographical features could be integrated into the fortresses' architecture. Bazz castle in Iranian Azerbaijan would be a typical example of such designs. The original foundations of this fortress had been constructed during the Parthian era, with the Sasanians having further fortified and improved the site. Constructed at an elevation of 2500 meters, Bazz castle was bordered by deep (approximately 300 meters in depth) and narrow clefts.[43] The latter were in turn flanked by solid walls of rock, making attacks against the fortress an especially dangerous endeavor. Those narrow passes that led to Bazz castle significantly reduced the amount of troops that could be mobilized in order to attack the fortress. This was because the passes forced (or channeled) any attacking troops into predictable lanes, making them easy targets for archers or counterattacking troops from the castle. Those attacking troops who managed to survive would still have to cross a winding pass to then enter a very tight defile that was just wide enough for one person. The narrow passes in combination with the steep angle of the castle effectively canceled the possibility of deploying cavalry against it. The rough local terrain and elevation of Bazz also largely negated the efficacy of siege engines. This Partho-Sasanian design was especially cost-effective as it could be manned by a relatively small number of troops against vastly superior numbers of besieging enemy personnel.

The efficacy of Bazz was to be demonstrated long after the fall of the Sasanians. It was from Bazz where the two-decade (816-837) Iranian anti-Caliphate rebellion led by Babak Khorramdin (795-838) was to be waged. A major reason for the duration of the rebellion against the numerically superior forces of the caliphate was due to the efficacy of the military architecture of Bazz castle.[44]

Maintaining structural integrity across time: the example of de-humidifier systems

One key challenge for Sasanian engineers was to build structures that would prove resilient across time. Resilient structures were cost-effective for the empire as this would reduce costs of constant repairs for the maintenance of the fortified structures. The case of *Dezh-e Shapur Khwast* is one example of how Sasanian engineers addressed the issue of the deterioration of construction materials due to weathering, erosion and time. Located in the city of Khorramabad in Iran's Luristan province, Dezh-e Shapur Khwast[45] had been constructed with a de-humidifier

[43] See discussion by KAMBAKSH-FARD, 1345/1966: 2-6.
[44] See MADELUNG (2009: 53-65), NAJMI (1368/1989) and NAFISI (1382/2003) texts outlining events and primary sources narrating the Babak rebellion and the role of the castle of Bazz.
[45] The castle is known as Falak ol Aflak to the local residents of Khorramabad.

technology system. Sasanian engineers had utilized mud and mud-fired bricks, stones, woods and mortar in the construction of the fortress which originally featured a two-layered rampart. There originally was a total of twelve towers constructed at the fortress of which only two remain standing today.

A primary challenge for Sasanian (and modern-day) builders at Khorramabad is the humidity of region, both due to the local climate as well as the humidity emanating from the local underground water upon which Dezh-e Shapur Khwast was built. This exposes construction materials such as wood, bricks and stones to more rapid erosion, thus significantly weakening the foundational structure of the fortress over a shorter time period. To solve this problem Sasanian builders applied a de-humidifier canal system. In order to maximize this system, the fortress was built upon the highest possible elevation. The basement area of the structure which stood at over one meter, was constructed of canals which served as humidifiers. As the fortress had been built upon a hill, this allowed for wind to consistently flow into the basement's dehumidifier system. This system virtually eliminated any dangers of humidity compromising the structural integrity (especially bricks, stones, wood, mortar, etc.) of the fortress. The Sasanians (much like the Romans) were cognizant that the building of powerful fortresses had to be constructed in such a way as to make these resilient across the passages of time and weathering.

More recent archaeological surveys have discovered that the water system of Dezh-e Shapur Khwast served more than just a dehumidifier system. A series of archaeological surveys of Dezh-e Shapur Khwast by Gholamreza Karamian conducted in 2000-2018 has revealed more information about this fortress, especially with respect to its military characteristics. Of note is Karamian's 2003 archaeological studies at the site after construction activities in the environs of the fortress had accidentally discovered a hidden door that had not been detected by previous surveys. The door is situated inside one of the rooms in the second courtyard of the Shapur Khwast Fortress complex. As noted by Karamian[46]:

> I inspected the hidden door (designed in the floor section) with the permission of Lorestan Cultural Heritage Organization. From here was a secret passage or road connected to more than two kilometers of canals, which passed under the hill where the castle is located and also under the city of Shapur Khwast. I believe that this was an emergency exit, in case the Sassanid troops of the garrison and the local populace could easily evacuate if the castle were conquered.

Karamian's survey also confirmed that the water well of the aqueduct system had been built by bricks and had been designed on the second floor-level of

[46] KARAMIAN & FARROKH, manuscript under preparation.

the fortress. Another key observation by Karamian's survey was that the water spring was connected to the city of Khorramabad. The base of the hill features the Golestan Springs which is one of the most abundant water springs of Khorramabad. These not only supply water for the Dezh-e Shapur Khwast but also provide fresh drinking water to a large section of the city to the present day. Sasanian engineers had designed the water system in order to ensure that precious water supplies remained flowing in order to sustain the local troops (including the horses of the cavalry) as well as the local populace in case the fortress and locale were to be besieged by enemy troops.

Sasanian Khandaq and moat systems within Iran

Ghasemi who has conducted archaeological expeditions of sites in the region of Fars province situated between Firuzabad, Borazjan and Bishapur defines the Khandaq or Tal-e Khandaq as structures that are "circular or tetrahedral artificial ramparts of varying diameter and size but invariably surrounded by a deep, wide moat"[47], "The tal-e khandaghs in the ancient Fars were forts or military garrisons built by the Sasanian army to maintain security in these plains[48]". The Sasanians and their Parthian predecessors designed moats for defending military installations (camps, fortresses, citadels, etc.), as well as towns, cities and villages.[49] While the types of moats could vary in accordance with the structures they enclosed, moats for Sasanian fortifications spanned an average width of circa 20 meters. Sasanian engineers were also cognizant of reutilizing the soil that had been unearthed for the construction of moats. The extracted soil was often used for further strengthening the fortification's defenses. One utilitarian method was to build dense and compact bulwarks for reinforcing the walls of the fortress. One example of this is found at the Khandaq or Tal-e Khandaq at the site of Sar Mashad where within the rampart wall are the clear remnants of an actual circular wall constructed of plaster and stone.[50] Often filled with water, Sasanian moats were regularly constructed with dangerous (and strategically placed) traps such as spears, arrows and sharp spiked wooden and iron beams.[51] Camouflage such as foliage and shrubbery were also utilized to cover the moats' surfaces. The moat's trap-camouflage system was essentially designed to repel against possible enemy siege activity.[52] The Khandaq system was essentially both a system for defensive and offensive warfare. With respect to the latter scenario, the Khandaq was one of the military engineering methods utilized by the Spah when engaged in siege warfare for capturing enemy fortresses and metropolitan centers.[53]

[47] GHASEMI, 2012: 240.
[48] GHASEMI, 2012: 249.
[49] DEHKHODA, 1377/1998: 9983.
[50] GHASEMI, 2012: 243.
[51] GHASEMI, 2012: 249.
[52] PAZOKI, 1373/1994: 24.
[53] FARROKH, MAKSYMIUK & SÁNCHEZ-GRACIA, 2018: 57.

The Caucasus and Central Asia: Sasanian Wall-Systems of the *Ādurbādagān-Spāhbed* and *Xwarāsān-Spāhbed*

Sasanian military architecture was not confined to fortresses, (fortified) frontier cities and military bases but also upon several massive construction projects such as wall systems along dangerous frontiers. As noted by Daryaee, the Sasanian empire was to construct four distinct walls at Darband (Derbent), Tammisha, and Gorgan as well as the wall of the Arabs.[54] The construction of walls for defense was evident in the military architecture of the ancient Near East long before the Sasanians. Reference is made by Xenophon for example to a "Median wall" built by the Babylonians to protect them against a potential Mede invasion from the (Babylonian) north.[55] The later Sasanians certainly invested heavily in their own frontier defense systems up to the final years of their empire in the 7th century CE.[56]

The defense of empire's Caucasian (or northern) and Central Asian (or northeast/east) frontiers (under the regional commands of the *Ādurbādagān-Spāhbed* and *Xwarāsān-Spāhbed* respectively) was entrusted to powerful 'Maginot'-type fortified defense walls. These were strategically constructed to guard the empire along its penetrable locations,[57] notably those regions lacking in natural geographic obstacles (such as mountain ranges, etc.) that could potentially serve as protective barriers. The northern Caucasian marches were defended by the wall of Derbent located in the modern-day Daghestan region of the Caucasus. The Derbent wall was tasked with guarding the empire against potential threats (especially the Khazars) from southern Russia. The northeast/eastern marches facing Central Asia were defended by the walls of Gorgan and Tammisha. As discussed further below, construction of the Derbent wall appears to have commenced before the implementation of the 6th century CE reforms with structural aspects of the walls facing Central Asia having already been in place before the Sasanians. The reforms of the 6th century CE led to new construction projects (as well as repairs-strengthening upon existing structures) with respect to the empire's defense walls. These wall systems were supported by a series of fortified structures as well as barracks, watchtowers, fortresses, and fortified gates.[58] The limitations of the Spah's available trained military manpower base meant that these wall systems and supporting fortresses, etc. could not be permanently stationed with a full or maximum troop complement. Troop levels garrisoning a wall system could be increased when hostilities were imminent in that particular sector or when an actual invasion of Sasanian territory was in progress.

[54] DARYAEE, 2016: 80.
[55] Xenophon, *Anabasis*, I, 7, 15.
[56] FRYE, 1977: 7.
[57] LABBAF-KHANIKI, 2018: 115.
[58] FARROKH, 2017: 229-238.

Howard-Johnson,[59] Frye[60] and Labbaf-Khaniki[61] have provided respective hypothesis with respect to the function and utility of the Sasanian wall systems.

Howard-Johnston identifies Sasanian wall systems as having served four primary functions.[62] The first pertains to the economic utility of this type of military architecture which explains the willingness of the state to invest prodigious amounts from the treasury to build, maintain and continuously improve such systems. Had walls not been in place in the Caucasus and Central Asia, nomadic invaders would have ripped into the empire's interior regions several times. With each attack nomadic invaders would be wreaking economic havoc and manpower devastation in the Iranian Plateau and possibly even into the Mesopotamian heartland. The walls served to hold such incursions at bay and provide time for the Spah to counterattack against the intruders. As noted by Payne, Sasanian successes in the building of effective systems of irrigation precipitated a population explosion in the empire.[63] Wall systems were part of the Sasanian military doctrine of protecting the economic and demographic base of the empire. Second, Sasanian engineers factored in both the local terrain as well as the military tactics and temperament of their respective nomadic enemies. In this endeavor walls would be built to the maximum resilience possible by utilizing the most effective construction materials (e.g. stones, hardened mud-bricks, etc.) available in the local terrain of the Caucasus and Central Asia. As seen further below, Sasanian engineers would also utilize local geographical features in order to further enhance the defensive capabilities of their defensive walls. Howard-Johnston's third observation pertains to the proficiency of the Sasanian empire's robust state machinery in the implementation of planning, design, funding and organization of these vast military engineering works. This made the Sasanians the equal of the Romans with respect to the manner in which the latter generated their own fortification systems along their own frontiers. This leads to Howard-Johnston's fourth point that the Sasanians were equal to the Romans with respect to high standards of military engineering.

Frye has proposed that the defensive wall systems of the Spah served two fundamental functions: military and geographic.[64] The military function of the empire's walls was simple: repelling nomadic incursions into the empire. This was a logical solution as unlike the Romano-Byzantines, nomadic invaders such as the Khazars or Turco-Hephthalities lacked the military doctrines and equipment necessary for siege warfare required for the overpowering of Sasanian walls systems which were often integrated with built-in fortresses. The second (geographical) role of the empire's

[59] HOWARD-JOHNSTON, 1995: 193.
[60] FRYE, 1977: 7-15.
[61] LABBAF-KHANIKI, 2018: 113-120.
[62] HOWARD-JOHNSTON, 1995: 193.
[63] PAYNE, 2014: 1.
[64] FRYE, 1977: 7-15.

defensive walls was, according to Frye, to keep the elements of the steppe and desert landscape (environment) at bay. This was essential given the vast investment and expenditures of the Sasanians in the agricultural sector which in turn was vital for the sustaining of the empire's urban network. The empire's commercial power was in turn dependent on the sustaining of its urban networks. The wall systems protected the agricultural systems from being overrun by desert and steppe type terrains.

A more recent hypothesis proposed by Labbaf-Khaniki expostulates upon the factors of 'Northern invaders' versus 'Southern settlements' dynamics in the development of Sasanian wall systems.[65] In this hypothesis the (southern) fertile regions of Iran and Mesopotamia constituted regions suitable for agriculture, livestock husbandry and urban settlements allowing for the rise of commerce and strong economies. In contrast the (northern) regions of Asia are often featured by vast steppes and often rainless desert terrain making the populations of these regions vulnerable to famines. As a result of this dynamic, the northern populations were often compelled to invade their economically more prosperous neighbours to the south in order to secure wealth and even secure food supplies. The rise of walls systems were the military response of the (more economically prosperous) southern regions against the constant threat of nomadic invaders from the northern regions of the steppes and Asia.

The *Ādurbādagān-Spāhbed*: the Caucasian passes and the Darband Wall

The Sasanian empire's Caucasian passes were vulnerable to attacks by nomadic warriors, notably the Khazars. This led to the construction of a formidable Sasanian wall defense system in the region known as the Wall of *Darband* (Persian: closed gate).[66] In the overall sense, this wall system spanned the distance from the Caucasian mountains to the western coastline of the Caspian Sea.[67] This wall system was specifically constructed to defend those routes that led into Daghestan and further into the southern Caucasus towards Armenia and Albania,[68] and from there south of the Araxes River into historical Azerbaijan located in northwest Iran. While the initial layouts of the Darband wall may be traced to Yazdegird II (r. 438-457), the origins of the wall's construction appear to have begun during the reign of Kavad I (r. 488-496, 498-530). The latter had engaged on a successful military campaign in 489-490 to expel the Khazars from the Caucasus, as these had erupted into Armenia and Albania and even crossed the Araxes River in the southern Caucasus into

[65] LABBAF-KHANIKI, 2018: 113-114, 116-117. Note that the author also discusses the wider domain of Chinese (113-117) and Romano-Byzantine wall systems (114-115) as well.
[66] Also known as Darband, as well as the 'Great Wall of the Caucasus'. The local Lezgian populace refers to the structure as Krevar.
[67] LABBAF-KHANIKI, 2018: 115.
[68] Caucasian Albania, known as Arran and the Khanates by the early 20th century has been referred to as the Republic of Azerbaijan since May 1918, a tern which was applied to the historical Azerbaijan area situated in the northwest of Iran.

Iran's historical Azerbaijan region.[69] With the conclusion of the Spah's campaigns in the Caucasus, Kavad issued an order for the building of a comprehensive wall of bricks for guarding the Caucasian passes against future nomadic incursions. In practice as the wall grew in size and sophistication other types of construction materials were to be used, such as limestones and other types of stones. Interestingly Kavad was to also revive the urban character of the Darband site by revitalizing and repopulating the settlement which was henceforth to be known as 'Darband' to the Sasanians. Khosrow I was to continue construction of the Darband wall[70] which was settled by large numbers of Persians in its garrisons[71] with Armenians also settled in the fortified areas.[72]

The Sasanian empire had implemented an effective military solution against nomadic invasions from Eastern Europe by finally blocking off the narrow land strip with a wall system. That land strip had allowed nomadic invaders from the northern Caucasus and southern Russia/Ukraine to strike into the Caucasian interior, Iran and Anatolia. The *Saka Paradraya* (Scythians) of the ancient south Ukraine-North Caucasus regions had taken advantage of this land ingress, allowing them to invade Urartu in the southern Caucasus and then northwest Iran in approximately 700-650s BCE.[73] It was also through these same passes where the Alans had attacked in 75 CE,[74] invading Armenia and Albania to then defeat the combined forces of the Parthians and Armenians;[75] the Alans then pushed further south into western Iran. Despite these devastating invasions, there is no evidence of military walls having been built by any Iranian dynasties prior to the Sasanian era.[76]

Spanning a distance of approximately seventy kilometers, the wall of Darband stretched from the Alan Gates (or modern-day Caucasian mountains) to the shores of the Caspian Sea.[77] One of the citadels of the wall remaining to the present day is the eight-acre fortress known as Narin Kala featuring walls up to around eighteen meters tall. Overlooking the Caspian Sea and the city of Darband, Narin Kala has remained extraordinarily solid despite the passage of over fifteen centuries. By the late 6th century CE, the Darband wall had become a substantial and forbidding defense system in which two of its major walls were connected eastwards to a fortified

[69] ZARRIN'KUB, 1381/2002: 223.
[70] KRAMERS, 1936: 613.
[71] An Islamic era source, Ibn al Fakih (as cited by KRAMERS, 1936: 616) stated that the Sasanian garrisons were Persians.
[72] BARKHUDARYAN (1969: 125-147) has researched the pattern of Armenian settlers and their families at Darband; mention must also be made with respect to Matthew of Odessa's Chronicle (151-152, 332, see esp. note 132a).
[73] FARROKH, 2017: 233.
[74] FARROKH, 2007: 153-154.
[75] Moses Khorenats'i (II 50, 85) narrates the events surrounding the Alan invasions of Armenia and Albania.
[76] FRYE, 1977: 11.
[77] POWELL, 2008.

waterfront on the Caspian Sea. These wall(s) were also connected westwards to a fortress terminus situated at the foot of the Caucasus mountains. From that fortress-terminus continued a wall of limestone (height: twenty feet) linking a succession of fortifications. By the 530s CE the total number of fortresses along the Darband wall stood at thirty, with these having possibly increased to forty by the late 590s CE. The stones used in the Sasanian military works at Darband closely resemble those used in the ancient site of Ādur-Gushnasp or Shiz (modern-day Takhte Suleiman) in Iran's northwest.[78] The wall system(s) at Darband was approximately eight meters in thickness, although this would vary at other points along the wall(s). According to Islamic historian Baladuri (d. 892) the Sasanian fortifications at Darband also had several gates to a number of mountain passages leading to its Islamic-era designation as *Bab al-Abwab* (Arabic: Gate of Gates).[79] It is also notable that there were also a number of fortifications within the Darial pass.[80] Much like the Darband Wall, the Darial Pass was also of vital importance as it guarded another critical ingress (via the Dariel Gorge) into the interior of the Caucasus. Mention may also be made of the architectural design of the archway at the ancient site of Ādur-Gushnasp or Shiz (modern-day Takhte Suleiman) which bears a very close resemblance to a similar structure remaining in the village of Kahib in Daghestan, raising questions as to possible architectural influences from Sasanian Iran upon the design.

In practice the wall of Darband was a 'multi-wall' system composed of possibly up to five walls, rather than one individual wall.[81] One example of these is a so-called 'northern wall' which roughly stretched for 34-35 kilometers, constructed over crests and mounts. Other examples include a 'southern wall' in the Apsheron territory as well as the fifth (or final) wall of 29-30 kilometers located just above the modern city of Derbent itself.[82] It is possible that the office of the *Ādurbādagān-Spāhbed* had developed a tactical doctrine of multi-layered defense in which each successive wall acted as a back-up system in case the one to its front had been overcome by nomadic invaders. Each back-up wall would function to bog down the enemy and sap the power of their attacks, which would grant time for the Spah to deploy its counterattacking forces into the Caucasus. This is indicative of the prime importance of the Darband wall to the office of the *Ādurbādagān-Spāhbed* as this was critical for guarding not just Armenia and Albania (modern-day Republic of Azerbaijan) in the southern Caucasus but also (across the Araxes River) northwest Iran's Ādurbādagān region (historical Azerbaijan in northwest Iran) and Ray (near modern Tehran). The primary function of the *Ādurbādagān-Spāhbed* was as noted previously, defense of the Sasanian empire's northern Caucasian marches against

[78] HAN-MAGOMEDOV, 1979.
[79] KETTENHOFEN, 1994.
[80] LABBAF-KHANIKI, 2018: 116.
[81] HOWARD-JOHNSTON, 1995: 192.
[82] TREVER, 1959: 268.

nomadic raiders based in the northern Caucasian and Ukraine/south Russia territories. Put simply, Darband was vital for the *Ādurbādagān-Spāhbed* command as failure to defend this sector would dangerously imperil the entire Caucasus as well as northwest, northern, and western Iran and possibly even the Iranian interior.

Another distinction of the Darband wall was that it also served to protect the Romano-Byzantine realms in Anatolia against nomadic raids emanating through the Caucasus.[83] Darband was considered vital to the interests of the Romano-Byzantines[84] leading them to often provide financial support for the maintenance of the Sasanian wall systems in the Caucasus.[85] This is perhaps highlighted in the example of Crispus in the 5th century CE who cites of an embassy dispatched by the Sasanian monarch demanding that the Romans contribute to the costs of upkeeping the Caucasian wall and even requested that Roman soldiers be sent to assist in its defense.[86]

The office of the *Ādurbādagān-Spāhbed* also combined its abilities in military architecture and formations (e.g. Savaran cavalry, Dailamite infantry, etc.) alongside pragmatic diplomacy to maintain the security of the empire's northern marches following attacks by nomadic warriors such as the Khazars in Eastern Europe. This is indicated in the following guidelines for defeating Khazar invasions as outlined in the *Sirat Anoushirvan.*[87]

1] The Spah (often with the accompaniment of the Sasanian *Shāhānshāh* [king of kings] and his elite guards) would deploy to the Caucasus. The military forces would first assemble in Hamedan and Azerbaijan province. These would then deploy across the Araxes River with the objective of reaching the Darband wall(s) and the municipality of Firouz Khosrow.
2] Fortresses and other military installations would also be inspected by the Spah along its path of advance in the Caucasus. Sasanian engineers would then effect maintenances and/or enhancements upon those military structures/ fortresses in need of repairs, etc.
3] Local military commanders and governors in service with the Sasanians would be re-assured of military and political support in times of crisis, especially if the *Shāhānshāh* was accompanying the Spah in person.
4] The Spah would then assign its forces to the endangered sectors of the Darband wall or to other fortresses and locales in the Caucasus where nomadic warriors such as the Khazars may have broken through.

[83] DARYAEE, 2016: 81.
[84] GREATREX, 1998: 14
[85] DIGNAS & WINTER, 2007: 38.
[86] DIGNAS & WINTER, 2007: 193.
[87] *Sirat Anoushirvan*, 237-378.

5] With the Spah's reinforcements in place, the Sasanian high command would deploy its forces in accordance with the tactical requirements of the theatre for defeating and expelling the invaders.
6] One of the subsequent possibilities could be that the nomadic invaders would opt to retreat instead of risking destruction at the hands of the counterattacking Spah.
7] Military action (as outlined in [5]) would not always prove necessary, as the arrival of the main body of the Spah (especially if accompanied by the person of the *Shāhānshāh*) could compel the invaders to consider diplomacy with the Spah and *Shāhānshāh*. In this scenario the invaders such as the Khazars could be recruited as auxiliaries and be assigned in this capacity to the various fortresses and wall sections as assigned by the Spah. In this scenario the newly assigned auxiliary units would be supervised by their respective *Sardars* (commanders) as appointed by the Spah.

Interestingly the office of the *Ādurbādagān-Spāhbed* could also be utilized for offensive military actions, as occurred during Khosrow I's military incursions towards Georgia in the Caucasus' northwest.[88] The Darband wall had been essential for Khosrow I's campaign as it helped shield the Spah's forces in the Caucasian theatre. The military security afforded by the Darband wall allowed Khosrow I's armies to seize the port at Petra.[89]

The *Xwarāsān-Spāhbed*: Walls of Tammisha and Gorgan facing Central Asia

The empire's northeast marches facing Central Asia posed serious challenges for the office of the *Xwarāsān-Spāhbed*. Highly adept in the arts of war, warriors from Central Asia could wreak havoc if they breached the empire's northeastern frontiers. A successful invasion from Central Asia would immediately place three regions at risk: (1) the Gorgan plains southeast of the Caspian Sea (2) Khorasan and (3) Afghanistan. Unlike the Caucasus, the frontiers facing Central Asia were often vast and flat. Somewhat like the *Ādurbādagān-Spāhbed's* Darband wall system, the office of the *Xwarāsān-Spāhbed* was to implement a multi-tiered system of defense, however this was to be done on a much larger scale. The walls systems facing Central Asia were to attain their engineering apogee by the late 690s.[90] Prior to the implementation of the four-*Spāhbed* system the Spah had been forced to fight on several occasions along the Central Asian frontier as exemplified by the campaigns of Shapur II in c.338-357 against the Chionites, Bahram Gor (r. 420-438) against the Hephthalites in 421 and Yazdegird II against the Kidarites in c.443-450.[91] It was against a subsequent

[88] KRAMERS, 1936: 613.
[89] FARROKH, 2017: 234.
[90] HOWARD-JOHNSTON, 1995: 191.
[91] FARROKH, 2017: 201-206.

Hephthalite threat in which Peroz (r. 459-484) was defeated in 475 and 477 followed by his defeat and death in 484.[92]

The Spah's military recovery in the northeast began sometime during the reign of Kavad and fully realized by Khosrow I, around the time of the implementation of comprehensive military reforms and the application of the four-*Spāhbed* system. With the establishment of the office of the *Xwarāsān-Spāhbed* Khosrow I led the Spah in alliance with the Gok Turk Khaganate to successfully destroy the Hephthalite kingdom in 557-560.[93] Despite this success the Spah high command remained aware of the ever-present threats posed by Central Asia against the region of the *Xwarāsān-Spāhbed*. The Sasanian alliance with the militarily adept Gok Turks soon dissolved which set the foundation for future conflicts. The Spah's long-term solution for its porous and volatile Central frontier was to rely on a system of two major (and distinct) barriers: the walls of Tammisha and Gorgan.[94] The terminus of these two wall systems was the city of Merv, the Spah's primary military base for greater Khorasan.[95] As noted by Coloru, Traina and Lycas "The walls of Marv [Merv] were built and further reinforced [by the Sasanians] along the lines of the pre-existing Greek and Parthian fortifications".[96] The Merv nexus made the region's entire architectural system a major lynchpin of the office of the *Xwarāsān-Spāhbed*'s defense of the northeast (and entire east in general). Merv was also essential for routes leading from northeast Iran and Afghanistan towards Transoxiana. It is notable that there were further walls guarding the Sasanian empire's northeastern marches such as the walls of Transoxiana (300 km kilometer along Khujand), the Iron Gate (Hashemgerd barrier) as well as a number of intermittent walls discovered in Northern Khorasan such as Kalat, Aq Darband and Mozduran.[97]

Originally constructed of bricks of large size[98] the wall of Tammisha and its fortifications were built from the mountains to the Caspian coast in order to seal the eastern approaches into Iran's Mazandaran province.[99] This was consistent with the primary function of the Tammisha wall which was to repulse Turkic and other nomadic warriors attacking from the eastern perimeters of the Caspian Sea in Central Asia into northern Iran.[100] More specifically, the Tammisha wall served to block the costal corridor at the southeast corner of the Caspian.[101] This function was duly

[92] Procopius, I 4; KURBANOV, 2010: 104, 166-167.
[93] FARROKH, 2017: 212-213. Following the destruction of the Hephthalite kingdom, the Sasanian absorbed the southern half of that kingdom with the Turks seizing the northern portion (MAKSYMIUK 2020).
[94] CHEGINI, 1996: 44-45.
[95] FRYE, 1977: 14.
[96] COLORU, TRAINA & LYCAS, 2016: 60.
[97] LABBAF-KHANIKI, 2018: 115.
[98] BIVAR & FEHÉRVÁRI, 1966: 30.
[99] CHEGINI, 1996: 44-56.
[100] MAHAMEDI, 2003: 146.
[101] LABBAF-KHANIKI, 2018: 116.

described by the Muslim historian and geographer Yaqut Ibn Abdullah al-Rumi al Hamavi (1179-1229) [102]:

> Tamisha is a city in the Tabaristan plain, at a distance of 16 Farsangs [possibly 99.68 to 160 km][103] from Sari…stands on the border between Tabaristan and the regions of Khurasan and Jurjan. At this place is a great portal…it extends from the mountains to the [Caspian] sea (it is made) of baked brick and gypsum. It was Kisra Anusirvan who built it as an obstacle against the Turks and their raids into Tabaristan.

Of note is Hamavi's allusion to a large portal which would suggest that Sasanian engineers had built some type of gate into the wall system. This gate would enable the office of the *Xwarāsān-Spāhbed* to control the entrance-exit nexus between the southeastern regions of the Caspian coastal regions in Central Asia and northern Iran. A second possible function of the Tammisha wall was to act as a back-up defence line for the Gorgan wall in case the latter failed to repel a nomadic invasion.[104]

The sturdy construction of the Tammisha wall enabled it to remain in use into post-Sasanian times. Of note is the role of the aforementioned anti-Caliphate Babak Khorramdin's fickle ally Isfahbod (*Spāhbed*) Mahziyar who reportedly destroyed major sections of the wall of Tammisha in 838, although the actual task befell upon the latter's brother Kuhyar.[105] Tabari however reports that the wall was essentially rebuilt by a person named Sarkhastan who established his troops in the city of Tammish[a] as well as constructing a large trench, towers and a powerful gate.[106] Interestingly the latter report of a strong gate remains consistent with the role of this structure in Sasanian times which would have enabled the *Xwarāsān-Spāhbed* to deploy Spah contingents into Central Asia (towards its eastern shores), often in retaliation for earlier attacks and raids. A final note with respect to the wall of Tammisha is that this is essentially joined with, as noted by Bivar and Fehérvári "the 'Long Wall' [of Gorgan] … which extends right across the coastal plain".[107]

The Gorgan region [108] notably its plains, located in Iran's northeast has always been a strategic territory as from here any invading army from Central Asia would be

[102] As cited by MAHAMEDI, 2003: 147.
[103] The term Farsang (derived from old Iranian Parasang) has changed with time in the history of Iran – in the 19th century for example, the Farsang is defined as 6.23 km however the current definition of the Farsang (as defined in the 20th century) is 10 kilometers. No information is available as to the exact statistical characteristics of old Iranian Parasang.
[104] FRYE, 1977: 14.
[105] FARROKH, 2017: 236.
[106] Ṭabarī, III 1275.
[107] BIVAR & FEHÉRVÁRI, 1966: 39.
[108] The name of Gorgan (cognate of Gorg-an – New Persian: Wolves) is a linguistic derivation of Varkana (Old Iranian: Land of the Wolf). It is generally concurred that the Hyrcanians were Gorgan's original inhabitants.

able to strike further south into Khorasan and the Iranian Plateau or swing west into northern Iran. The Wall of Gorgan (New Persian: *Deevar-e Gorgan*[109]) had been specifically designed to protect against such a threat along the empire's northeast facing the Central Asian interior.[110] This wall stretched from the Caspian Sea to the western side of the Kopet Dagh mountain ranges.[111] The construction of the Gorgan wall was a significant feat of military engineering on par with the achievements of the Romans and the Chinese in antiquity. Measuring at a length of 155-200 km, the wall of Gorgan was the ancient world's largest defense wall, second only to the Great Wall of China. There was also a ditch 3 meters in depth running along the Gorgan wall.[112] The Chinese wall, much like its Iranian counterparts at Tammisha, Gorgan and Darband had also been built to withstand and repel the attacks of nomadic warriors. Beginning from the eastern Caspian coast, the Gorgan wall winds north of Gonbade Kavoos to then extend northwest and then reach to the back of Pishkamar.

Materials typically used in the construction of the wall structures and fortresses along the wall were fired and mud bricks, mortar as well as gypsum.[113] The dimensions of the standard bricks used are reported as 65x25x10 cm.[114] According to the 13th century Persian author Najib Bakran, each brick would have weighed in the range of 30-50 *man* (90-150 kg).[115] Castles or fortresses were constructed at regular intervals along the wall with the longest and shortest distances between them having been at 50 and 20 kilometers respectively. The fortresses of Gorgan feature five types of designs: square, rectangle, oval, polygon and circular.[116] In addition, the majority of the fortresses featured their own circuit wall, acropolis as well as moats which (architecturally) resemble the (Tal Khandaq) types described earlier in this article.[117] The actual width of the Gorgan wall ranged at 6-10 meters depending on the geomorphology of the terrain it was built upon. Interestingly forty castles of the Gorgan wall were built in accordance with the square design.[118] Each of these fortresses or castles were built to host large compliments of troops; more specifically

[109] Identified by Gorgan's locals by the various names of Sadd-e Firuz (New Persian: dam of Firuz), Sadd-e Anoushirvan (New Persian: dam of Anouhirvan), Sadd-e Iskander (New Persian: dam of Alexander), as well as Qizil-Yilan (Turkic: 'Red Snake').
[110] MAHAMEDI, 2003: 146.
[111] LABBAF-KHANIKI, 2018: 115.
[112] KLEISS, 2012.
[113] KĪĀNĪ, 2012: 148-151.
[114] ARNE, 1945: 9.
[115] As cited by FRYE, (1977: 13). It must be noted however that the contemporary modern-day "man" statistic in Iran is very different in weight (kg) and widely varies (from 3-50 kilograms) in accordance with Iran's diverse regions. Examples include Man Ray (or Ray) = 12 kg, Man Ahvaz = 50 kg, Man Tabriz = 3 kg, Man Luristan = 3 kg, Man Andika = 7 kg, Man Sang Shah Isfahan = 6 kilograms.
[116] GHASEMI, 2012: 249.
[117] As further averred by GHASEMI (2012: 249), examples of such fortresses at the Gorgan wall include the fortresses of Khandān, Soltān'ali, Kāfar, Tokhmagh and Yasaghi.
[118] Note that NOKANDEH et al. (2006: 121) had identified just 36 of these castles in with another four castles subsequently excavated by 2008. It is possible that more castles and structures could be uncovered in possible future excavations.

between 30-36,000 Savaran.[119] In practice the Spah's limitation of professional manpower would have prevented it from being able to permanently maintain such large numbers of troops in the Gorgan wall in support of the office of the *Xwarāsān-Spāhbed*. This would have dangerously denuded the critical *Xwarbārān-Spāhbed* region which was responsible for guarding the western frontier facing the Romano-Byzantines.

The first series of detailed excavations of the Gorgan wall took place in 1971 which led to the overall conclusion that the wall had its origins in the Parthian era.[120] Subsequent studies of the Gorgan and Tammisha walls by a British-Iranian archeological expedition in the 1990s (which continued until 2008) revised the origins of the walls to earlier than the Parthian era.[121] The 1990s-2008 archaeological studies affirm that that the wall of Gorgan had been considerably developed, reinforced and strengthened during the Sasanian era. Sasanian military engineering upon the Gorgan wall may be traced at least as far back to the reign of Yazdegird II when he constructed a series of forts in Gorgan as part of his campaigns to expel the invading Huns from that territory.[122] Construction activities on the Gorgan wall continued during the reign of Peroz I who during his battles against the Hephthalite Huns built a fortification in the district of Abivard known as *Shahram Peroz.*[123] Under Khosrow I the Spah had not only implemented further repairs of the Gorgan wall but also further strengthened this system.[124] Less than a decade after the passing of Khosrow I in 579, the office of the *Xwarāsān-Spāhbed* would soon be facing the combined forces of the Turco-Hephthalites in 588 and later in 619 during the reign of Khosrow II (r. 590, 591-628). The Gorgan wall was to play a critical role in the military operations which resulted in the defeats of these invasions.

As noted previously, the Spah had built a series of pre-stocked military depots (*Ambaragh* and *Ganz*) along the critical districts facing each of the four defensive zones. These same depots (in the four zones) also provided logistical support for troop mobilization in preparation for military offensives into enemy territory.[125] These types of offensives were especially critical for the Tammisha-Gorgan walls under the jurisdiction of the *Xwarāsān-Spāhbed*. As alluded to beforehand, the Gorgan wall in particular was already supported by a fortification network capable of hosting sizeable troop numbers, a vital feature necessary for coping with critical military threats emanating from Central Asia. Nev-Shapur was a highly important military base for the office of the *Xwarāsān-Spāhbed* – it was from this base where general Bahram

[119] FARROKH, 2017: 237.
[120] KĪĀNĪ, 1374/1995: 240-241.
[121] NOKANDEH et al., 2006: 121-173. The British-Iranian team continued their until the early part of 2008.
[122] CHRISTENSEN, 1368/1989: 287.
[123] FRYE, 1977: 13.
[124] CHEGINI, 1996: 44-45.
[125] JALALI, 1383/2004: 87.

Chobin led his successful military offensive in 588 against the Turco-Hepthalite armies of Central Asia.[126]

A final note with respect to the Gorgan wall system is that these were not designed to be strictly defensive in the 'Maginot Wall' sense, but also devised to function even if the enemy succeeded in breaking through into Sasanian territory. As noted by Howard-Johnston, the Spah's tactical acumen could even consider allowing the enemy to traverse through its first defensive tiers to then lead these into prepared 'kill zones' which were enclosed areas for trapping the enemy.[127] The *Xwarāsān-Spāhbed*, by now reinforced with elite Savaran cavalry contingents (and possibly Dailamite infantry) would then have the option of unleashing these forces upon the trapped enemy in order to destroy them. Another possibility was to have the Savaran advance towards the invading enemy to then feign a 'retreat' with the objective of baiting the invaders towards the *Xwarāsān-Spāhbed*'s pre-designated 'kill zones'. The invaders would then be trapped inside these 'kill zones' to now be destroyed by the 'retreating' Savaran. The latter could also possibly be joined with other Spah military personnel already stationed within the 'kill zone'(s), awaiting the arrival of the unsuspecting invaders.

The Spah's doctrine of supporting the defensive wall system with an effective logistics network empowered the *Xwarāsān-Spāhbed*'s military options in those scenarios when invaders from Central Asia succeeded in advancing further inside Khorasan in northeast Iran. This type of scenario befell the Turco-Hephthalite invasion forces of 619 which appeared successful at first but in practice was already trapped inside of Iran by the walls of the *Xwarāsān-Spāhbed* sector to its north and the counterattacking forces of the Spah central command stationed further west in Ctesiphon. Led by the Armenian general Smbat Bagratuni and his elite Naxarar cavalry forces, the Spah defeated and expelled the Turco-Hephthalites back into Central Asia. Continuing his offensive, Bagratuni engaged and defeated the Turco-Hephthalites in battle.

The *Xwarbārān-Spāhbed*: Frontier fortress-cities and Ctesiphon facing the Romano-Byzantine front

The military architecture of the western zone facing the Romano-Byzantine frontier under the jurisdiction of the *Xwarbārān-Spāhbed* was characterized by a series of city fortresses instead of a continuous 'Maginot wall' system as seen especially in the north and northeast. The western zone was critical as the Sasanian empire and Rome (later Byzantium) fought a number of wars in the 3rd to 7th centuries CE. It is notable that both the Sasanian and Romano-Byzantine empires were sensitive as to

[126] FARROKH, 2017: 206.
[127] HOWARD-JOHNSTON, 1995: 193.

each other's military intentions with respect to the construction of Maginot style walls along their common borders. This is demonstrated for example in the 562 peace treaty signed between Khosrow I and Emperor Justinian I in which was clearly specified that: "neither state should erect ...in the border areas...a wall so that this would not lead to accusations of trouble-making and cause a breach of the treaty".[128]

In practice building a Maginot style wall along the western frontiers was militarily impractical as the Romano-Byzantines had considerable knowledge, experience and the sophisticated equipment required for breaching and scaling defense walls.[129] This stood in stark contrast to opponents such as the Khazars or nomadic warriors from Central Asia who lacked the sophisticated tactics and equipment necessary for siege warfare.

Instead of a continuous wall, the Sasanians (and Romano-Byzantines) opted for the construction of a series of formidable fortresses.[130] Sasanian frontier metropolitan centres in particular often served a vital military role as "heavily fortified military bases".[131] This necessitated the garrisoning of these cities with professional troops such as the Savaran and other elite cavalry, Tirbad archer units as well as professional Dailamite and Paighan infantry.[132] These in turn needed to be supplied with the empire's aforementioned *Ambaragh-Ganz* military logistics system.[133] Sasanian frontier fortress-cities could also be used for the assembly of troops in preparation for attacks into the enemy's territories. Such a scenario occurred for example in 603 when the Spah used the fortress-city of Nisibis as its base for launching an all-out attack against the Byzantine Empire. The dangers of just such a Sasanian attack had been forecast by the Romano-Byzantines as indicated by Emperor Anastasius' decision to build Dara-Anastasioupolis. This action was met with the official protests of Ctesiphon given its relatively short distance of just twenty-eight stadia from (Sasanian held) Nisibis.[134]

The Sasanian offensive from Nisibis in 603 demonstrates that the Spah did not view fortresses and other frontier defenses such as walls, etc. as defense-only systems. In practice, fortresses could also be utilized as bases for raids and/or invasions of Romano-Byzantine territories to the west with 'Maginot' type walls serving the same potential functions for the Spah with respect to Central Asia.

[128] DIGNAS & WINTER, 2007: 142.
[129] FRYE, 1977: 8.
[130] Emperor Anastasius (r. 491-518) in particular was known for his construction of a number of strong fortresses along Romano-Byzantine empire's boundaries with the Sasanians (WHITBY, 1986: 717-735).
[131] HOWARD-JOHNSTON, 1995: 167.
[132] FARROKH, 2017: 229.
[133] FARROKH & KARAMIAN, 1395/2016: 332-339.
[134] DIGNAS & WINTER, 2007: 38.

Defending the Sasanian capital: the case of Ctesiphon in 363 CE

Emperor Julian (r. 361-363) invaded the Sasanian Empire in 363 CE. While most accounts and historiography concur with respect to Julian having failed to capture Ctesiphon, there is scant information with respect to the military aspects of Julian's invasion against the Sasanian capital. It may be surmised that Julian most likely had bought forward siege engines, as he would have anticipated the possibility of his forces advancing at least as far as Ctesiphon. The city is believed to have had a very formidable defence-fortifications system,[135] however much remains to be researched with respect to Ctesiphon's entire array of military architecture. Though relatively unknown as a source, except by scholars pertinent to the domain of study, Gregory Nazianzenus's *Oriationes* offers some possible information with respect to Ctesiphon's military architecture[136]:

> Ctesiphon is a strongly fortified town, hard to take, and very well secured by a wall of burnt brick, a deep ditch, and the swamp coming from the river. It is rendered by yet more secure by another strong place, the name of which is Coche, furnished with equal defenses as far as regards garrison and artificial protection, so closely united with it that they appeared to be one city, the river separating both between them. For it was neither possible to take the place by general assault, nor to reduce it by siege, nor even to force a way through by means of the fleet principally, for he [Emperor Julian] would run the risk of destruction; being exposed to missiles from higher ground on both sides… the danger that menaced him from the two garrisons

The reference to Coche (Veh-Ardashir) is of interest as this had been constructed in the 3rd century CE in order to supplant the Greco-Macedonian city of Seleucia.[137] Coche/Veh Ardashir/Seleucia was situated on the western side of the Tigris River with Ctesiphon city itself located on the river's eastern flank. Julian had constructed a fleet of ships to sail on the Tigris in order to accompany his invasion forces into the Sasanian Empire. As his forces reached Ctesiphon, he now had to consider his military options for attacking the metropolis. Nazianzenus makes clear that an assault by Julian's fleet on the Tigris would have been a dangerous maneuver as the Spah would have been able to direct the fire of missiles from both sides of the Tigris River, namely from Coche as well as Ctesiphon itself. In practice Ctesiphon and Coche would have most likely been equipped with missile-ballistae and other types of (counter) siege engines which would have posed a serious threat to Julian's

[135] MINORSKY (1943-6: 243-265) has noted of Emperor Heraclius' reluctance to storm Ctesiphon in the 7th century CE on account of its formidable defenses.
[136] Gregory Nazianzenus, V 10.
[137] DEN BOEFT, DRIJVERS & DEN HENGST, 2002: 102.

fleet, had it been ordered to sail between the cities. In practice, any type of attack (by waterway or land) and/or siege action by the Roman forces was fraught with great risk. An indication of this is provided by Ammianus Marcellinus who observed an "arrow shot from an engine on the walls" [138] of Ctesiphon against Julian as he was engaged in a reconnaissance foray of the Sasanian capital. No naval-type assault took place as Julian decided to torch his fleet. Any attempts at capturing Ctesiphon would now have to occur by either a land assault and/or siege.

The Nazianzenus account of Coche-Ctesiphon's defenses provide information on the Sasanian system of 'a deep ditch' surrounding it; note that the city was already bordered by the Tigris River along its western side. The exact dimensions of the Ctesiphon 'ditch' or moat cannot be ascertained however it is generally believed that the standard Sasanian ditch or moat was in the range of twenty meters. Ammianus Marcellinus describes Ctesiphon as having been defended with walls[139] with Nazianzenus citing a "wall of burnt brick" in his description of the materials used for the defenses. Bricks were often used in structures such as vaults and domes, but evidently these played a prominent role in the military architecture of Ctesiphon. The city's bricks were most likely very strongly reinforced and judging from Sasanian walls in general the walls themselves were most likely of significant thickness. Libianus does actually report of Ctesiphon's "thickness of wall"[140] contemporary to Julian, but he provides no further information with respect to the wall's specific dimensions. Bricks were of course used prominently by Sasanian architects as seen in sites such as Dastegerd, Ayvan-e Karkha, Shiz and of course Ctesiphon.

The *Nēmrōz Spāhbed*: defense of the South/Southeast and the *Khandaq Shapur*

The Sasanian empire's southwest as well as southern (and Persian Gulf coastline) was somewhat identical to the military paradigm it faced against the nomadic raids and attacks it faced to its north from Central Asia and the northern Caucasus. In this case the northern regions composed of the economically established, agriculturally developed and urbanized environments of Mesopotamia and southwest Iran faced the threat of potential Bedouin raiders ensconced in the less economically developed Arabian Peninsula. These could seriously threaten the security of the empire, notably the interior of the Mesopotamian plains (including Ctesiphon) as well as southwest Iran.

Prior to the establishment of the office of the *Nēmrōz-Spāhbed* in the 6th century CE, Arabian invaders had overrun much of the empire's southwest as well as territory along Iran's coastline atop the Persian Gulf in the early part of

[138] Ammianus Marcellinus, 23.5.6.
[139] Ammianus Marcellinus, 23.6.23.
[140] Libanius, I 132-134.

the 4th century CE, which occurred during the reign of Shapur II. The invasions resulted in significant disruptions to the local economy and populace, necessitating a decisive response by the Sasanian empire. The Spah led by Shapur II organized a shattering counteroffensive against the Arabian invaders.[141] Pivotal to the Spah's offensive were the armored Savaran lancers who ejected the Arabian invaders out of southern and southwest Iran as well as Mesopotamia.[142] A number of Arab forces would again attempt to attack the Sasanian empire by joining Emperor Julian's failed campaign against the Sasanian empire in 363.[143]

Despite the Spah's successes in the expulsion of the Arabs in the 4th century CE, the empire's southwest/southern marches remained vulnerable to future attacks. As the Arabs recovered, it would be a question of time as to when they would be resuming their raids into the south of Mesopotamia. In addition, the southwestern frontier was vulnerable to the attacks of the pro-Roman Ghassanids and Romano-Byzantines themselves. All of these types of attacks posed grave risks to the empire's military security as well as economic stability. In this regard the Spah was faced with very similar challenges to those posed by nomadic warriors situated along the empire's northeast and northern frontiers respectively. Much like the Caucasus and Central Asia, the Spah high command was obliged to formulate a 'barrier' military solution for its southwestern marches.

The *Khandaq-e Shapur* and *War-e Tazigan*?

According to Mahamedi the military barrier facing the southwest was composed of two elements: (1) a large ditch or moat facing the Arabian side of the Sasanian frontier (termed as *Khandaq-e Shapur* by Mahamedi) and (2) an actual wall on the Iranian side of the Sasanian frontier which may be the *War-e Tazigan.*[144] The moat itself was most likely maintained by pumping in water by way of a series of channels from various water sources.[145] Hamavi has detailed the geographical position of the moat as well as the military architecture of its fortifications[146]:

> Xandaq-i Sabur is in Bariyat al-Kufa, as was dug by the order of Sabur to separate his realm from that of the Arabs, for fear of their raids. Sabur, the lord of the shoulders, built and made frontier watchtowers to protect the areas that laid near the desert, and ordered a Moat (xandaq) to be dug from the lower region of the desert to what precedes Basra, and is joined by the sea. There he

[141] *Bundahishn*, XXXIII 16.
[142] FARROKH, 2007: 199; 2017: 239.
[143] FARROKH, 2017: 179.
[144] MAHAMEDI, 2003: 145.
[145] JALALI, 1383/2004: 86.
[146] Ḥamawī, II, 65.

built turrets and forts and arranged frontier watchtowers, so that the moat could be a barrier between the inhabitants of the desert and the people of as-Sawad.

Simply put (as per Hamavi's description) the barrier was positioned between the (urban and agricultural) lands of the Sasanian empire and the desert terrain situated near Kufa.[147] This has been verified by the archaeological expeditions of Jotheri, Allen and Wilkinson who have traced the fluvial patterns of the ancient Pallukkatu Channel (active in 539 BCE to 1258 CE) in Mesopotamia which appears to have swung towards Karbala to the southeast, flowing as far as Kufa – it is in this area where a canal identified as part of the Khandaq Shapur system has been located.[148]

Based on Hamavi's report it may be expected that Sasanian engineers had constructed the watchtowers, pavilions, forts and other defensive structures in an equidistant fashion from the trench[149] and/or canal when considering the aforementioned Kufa section. A key inquiry pertains as to when the barrier was first constructed. According to Mahamedi the foundations of this system was first established by Ardashir I to be either completed or possibly even reconstructed during the reign of Shapur II.[150] As alluded to previously Hamavi attributed the origins of the Khandaq Shapur to Shapur II, however another Islamic-era historian, al-Bakri, attributes the origins of this system to Khosrow I.[151] Radio-carbon dating by Jotheri, Allen and Wilkinson of the Kufa section of the Khandaq Shapur has calibrated this to a time period spanning 420-570.[152] While this chronology lies certainly outside the reign of Shapur II, the fact that this particular site has been set at 420-570 does not necessarily preclude the basic origins of the site to Shapur II or even before his reign. One hypothesis may be that the southwest barrier was a system established from the empire's early days as far back as Ardashir I to then be considerably improved during the tenures of Shapur II and up to (and possibly after) Khosrow I.

The battles to expel the Arabs from the empire's southwestern marches would have certainly emphasized the importance of a functional southwest barrier to Shapur II and the Spah (hence the term: *Khandaq-e Shapur*). With the arrival of Khosrow I during whose reign the four *Spāhbed*s were established, the value of the Khandaq-e Shapur to the *Nēmrōz-Spāhbed* would have been militarily appreciated, as were the empire's barriers situated in the regions of the *Ādurbādagān-Spāhbed* and *Xwarāsān-Spāhbed*. Arab raids did take place against the region of the *Nēmrōz-Spāhbed* during the reign of Khosrow I. As noted by Hamavi[153]:

[147] FRYE, 1977: 10.
[148] JOTHERI, ALLEN, & WILKINSON, 2016: 186.
[149] MOHAMMADI-MALAYERI, 1993/1372: 243-255.
[150] MAHAMEDI, 2003: 145.
[151] Bakrī, 641.
[152] JOTHERI, ALLEN, & WILKINSON, 2016: 182.
[153] Ḥamawī, II, 476.

> when Anushirvan ruled he was informed that certain tribes of the Arabs were attacking what was near the desert of the Sawad. Then he ordered the marking off a wall belonging to a town called al-Nasr which Shapur [II] had built and fortified to protect what was adjacent to the desert…he ordered a moat dug from Hit and passing through the edge of the desert to Kazime and beyond Basra reaching to the sea. He built on it towers and pavilions and he joined it together with fortified points

Three observations of interest in Hamavi's statements are the references to the construction of (1) an actual wall (2) the manufacture of towers and pavilions upon that wall and (3) the joining of these with fortified points. This is not unlike the descriptions of the wall of Gorgan discussed earlier which would indicate that the Khandaq-e Shapur was a sophisticated military barrier system. The attention afforded to the Khandaq-e Shapur is reflective of the appreciation by Khosrow I and the Spah of the serious threat posed against the office of the *Nēmrōz-Spāhbed* by Arab raiders. Nevertheless, while Hamavi's descriptions have outlined the installation of forts, turrets and watchtowers the notion of an actual wall remains less clear. Hamavi's description of course refers to a wall with built-in installations during the reign of Khosrow I. In Middle Persian (Pahlavi) *war/dewar* may variously designate 'wall' as well as 'surrounding' and 'enclosed space'. The term *dewar* survives to this day in West Iranian languages such as Persian (*divar*) and Kurdish (*dewar*). The Pahlavi term *frawar* (Armenian: *patuar*) is translated as 'bastion'. In this context the *War-e Tazigan* would be translated as 'wall of the Arabs'. However, *war* (distinct from *dewar*) can also be translated as 'lake', 'bay/fjord', 'body of water' as well as 'sea'. As noted by Frye[154] and Mahemedi[155] the designation 'lake/sea of Arabs' is inaccurate as it is implausible that the Persians would have referred to the Persian Gulf as 'lake of the Arabs' prior to the Arab conquests of the 7th century CE, a fact well documented by sources in the classical and Islamic era.[156]

Baladuri has outlined the military role of pro-Sasanian Arab garrisons in the southwest who had been granted lands and tax exemptions for their service since the reign of Shapur II.[157] The latter appointed a certain Imr'ul Qais as Hira's governor, with his son Nu'man to later serve as the ward of the Sasanian king. Nu'man was to later raise Bahram V Gur at the Arab Lakhmid court in Hira.[158] Archaeological expeditions at Hira have shown that the city did not feature any type of defensive walls, most likely due to the powerful and long wall and moat already in place.[159]

[154] FRYE, 1977: 11.
[155] MAHAMEDI, 2003: 145.
[156] Consult comprehensive textbook by SAHAB (2005) outlining all maps and designations of the Persian Gulf in the classical, Islamic and modern eras.
[157] Balādhurī, 298.
[158] MAHAMEDI, 2003: 157.
[159] FRYE, 1977: 10.

The Lakhmid Arabs certainly gained a prominent military role in the empire's southwest, acting as a military buffer against the pro-Roman Ghassanid Arabs as well as raiders from the interior of Arabia.[160] A major military blunder by the Sasanian empire was to neglect the office of the *Nēmrōz-Spāhbed* by the early 7th century CE, possibly in part due to the wars with the Romano-Byzantines in the west (602-628) and the Turco-Hephthalite invasion (619). The neglect of the critical *Nēmrōz-Spāhbed* sector led to the weakening of the Sasanian military posture in the southwest, just as the Arabs were unifying under the leadership of the first caliphate. The final doom of the empire was to come in 637-651 from the southwest in the form of the Arab conquests.[161]

Sasanian Military Architecture: Development in accordance with Regional Opponents and Terrain

In overall conclusion, each of the Sasanian Spah's four-region *Spāhbed* system developed unique defensive systems for defense against opponents of diverse military capabilities. More specifically, the Sasanian Spah was faced with sophisticated military enemies along a variety of geographical regions. Military opponents in general could be classified into two distinct categories: (a) professional standing armies such as the Roman-Byzantines faced by the *Xwarbārān-Spāhbed* and (b) the broader category of nomadic warriors. The latter in turn were of two types. The first were those based in northern zones of Asia and Eurasia. These types of nomadic warriors could threaten the Sasanian empire's northeastern marches by attacking into Central Asia, northeast Iran and Afghanistan, regions defended by the *Xwarāsān-Spāhbed*. Nomadic warriors based in the steppes and along the northern Caucasus faced by the *Ādurbādagān-Spāhbed* would be able to threaten the empire along its northwestern marches by attacking into the Southern Caucasus (Iberia, Colchis, Albania and Armenia) as well as northwest Iran. While formidable as cavalry armies, nomadic warriors attacking northeast Iran from Central Asia and the Caucasus generally lacked the military doctrine and equipment of the Romano-Byzantines in siege warfare, notably against formidable wall defensive systems. The Spah's (man-made) systems facing Central Asia (e.g. Wall of Tammisha) and the northern Caucasus (e.g. Wall of Darband) were constructed with natural frontiers to maximize the defensive capabilities of the Spah against nomadic attacks.[162] If nomadic forces were able to break through, the Spah would attempt to channel these attacks in time for organizing counterattacks with mobile armies, with the objective of not just repelling the enemy, but to significantly degrade and even destroy the invading forces.[163] Nomadic Bedouin

[160] PIGULEVSKAYA, 1354/1975: 410.
[161] FARROKH & SÁNCHEZ-GRACIA, 2021.
[162] LABBAF-KHANIKI, 2018: 117.
[163] FARROKH, 2017: 237-238.

Arab raiders from the Arabian Peninsula posed their own unique challenges to the regional *Nēmrōz-Spāhbed* as these were capable of launching very rapid attacks into southern Mesopotamia, southwest Iran or even southern Iran from the southern shores of the Persian Gulf. These types of Bedouin raiders were often difficult to pin down and destroy as these usually chose not to linger within Sasanian territory and rapidly retreated back into the Arabian Peninsula. The empire's military doctrine against these types of nomadic raiders was to rely upon the Arabian Lakhmids of Hira in southern Mesopotamia as well as the Khandaq Shapur ditch/wall system in order to contain attacks emanating from the Arabian Peninsula. If the Bedouin Arab raiders chose to remain in Sasanian territory, the Spah would then deploy its forces as it would against any invading forces, much as Shapur II did during the Arab invasions during his reign.[164]

The Romano-Byzantines along the *Xwarbārān-Spāhbed* marches posed different military challenges. The Romano-Byzantines possessed a centuries-long tradition of military engineering and siege warfare capabilities which matched those of the Sasanians. This meant that the construction of wall systems along the Romano-Byzantine frontier was not as militarily effective as the Romano-Byzantines (who in contrast to nomadic forces) would have effective capabilities in penetrating such defenses. As a result, the Spah's defense system against the Roman-Byzantines was based upon a system of garrisons of professional forces based in formidable fortress cities.

Construction materials for military architecture in general would vary depending on the most resilient materials as availed by local geography. Mud-bricks were commonly used in the Mesopotamian terrain (e.g., Ctesiphon) with fortresses located in in the Caucasus, northwest and northern Iran often utilizing a combination of materials such as various limestones, different varieties of stones, different chalk types, etc. with fortifications long the Iranian plateau typically constructed with bricks and plasters (these often hardened). Wall systems (which could be as thick as 16.6 meters in locales such as Dastegerd) were also constructed from the best local materials available such as mortar, bricks (baked and unbaked) and rocks/stones. Sasanian fortresses could also be built with de-humidifier systems to protect the foundations and structures against the elements as seen for example at Dezh-e Shapur Khwast in Luristan province.

The Sasanian empire's fortress and other defense systems (e.g, ditches, moats, ramparts) can be broadly classified into two types: (a) those integrated and/or part of the Spah's four-region *Spāhbed* system and (b) those outside of that system. The latter is a broad classification which includes prime cities with formidable defense works such as Ctesiphon, fortresses within the Iranian plateau, fortresses located in strategic geographic locations in mountains (e.g., Bazz castle in Iran's Azerbaijan province) as

[164] FARROKH, 2017: 239-241.

well as those along Iran's Persian Gulf coastal line (e.g., Siraf). Fortress designs were generally of three types: (a) circular, polygon and oval systems designed for defense against flank attacks (e.g., Ardashir Khurra) (b) square-rectangular designs in which each of the four corners had a built-in tower (e.g., Qasr-e Shirin) and (c) fortresses combining square-rectangular and circular systems for the maximization of defense as required by geographical factors (e.g., Firuzabad). Much like the Roman Empire and the Chinese dynasties, the Sasanians were capable of constructing formidable fortress and wall systems, often designed to counter the military capabilities of the local enemies they often be facing. The resilience of Sasanian military architecture was integral in the protection of the empire well into the early 7th century CE.

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