Qal'eh Kharabeh in northern Iran

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Qal'eh Kharabeh in northern Iran: a Sasanian military tent city for ten thousand mounted soldiers?

Eberhard W. SAUER, Jebrael NOKANDEH, Hamid OMRANI REKAVANDI, Roger AINSLIE, Mohammad Arman ERSHADI and Davit NASKIDASHVILI[1]

1. Sasanian camps and campaign bases: revival and evolution of a new type of fortification for field armies in the east

"… out of all the peoples who waged war in ancient times, the Romans distinguished themselves through the construction of planned camps. There were already military camps among the ancient peoples of the East, namely the Persians, the Greeks, the Hellenistic empires, and the Carthaginians. However, none of them applied the principle of establishing them on the march, in sieges, and in peaceful areas, on a strictly prescribed scheme, as rigorously as the Romans. Following the motto 'sweat saves blood', it was always and consistently ensured that there was a fortified camp available on the march in enemy territory, before battles and sieges, even if only for a single night."[2]

Thomas Fischer's summary captures the importance of camps in keeping the Roman army secure when operating in warzones and away from their permanent bases. They are difficult to date, but appear to have been built almost exclusively in enemy territory or contested lands. It was indeed the Roman army which had pioneered the creation of fortified marching and siege camps "on a strictly prescribed scheme". In Late Antiquity, however, it was Persia that pioneered new forms of fortifications to keep its field armies secure whilst on campaign. Recent archaeological evidence suggests that the Sasanian army ensured with similar rigour that their layout followed a prescribed scheme. In the late Roman world, by contrast, the lack of positive archaeological evidence suggests that the tradition of constructing fortified marching and siege camps, which indeed undoubtedly had saved much blood in late Republican, early and high imperial times, had largely fallen into oblivion. Vegetius, writing in the first half of the 5th century,[3] laments that the Roman army had long abandoned building marching camps whilst the Persians did so, protecting them not just with ditches, but also with an innovative type of rampart consisting of piled-up sacks full of sand or earth.[4] Yet, until recently, we knew not even a single Persian marching or siege camp or any other fortification built for its army whilst on campaign, as opposed to hundreds of Roman camps (mainly or exclusively of late Republican to high imperial times). The late Roman author's testimony therefore has largely fallen on deaf ears.

[1] The fieldwork at Qal'eh Kharabeh was directed by Jebrael Nokandeh, Hamid Omrani Rekavandi and Eberhard W. Sauer, the geophysical survey was conducted by Roger Ainslie and Mohammad Arman Ershadi and the drone survey by Davit Naskidashvili. We are very grateful to Dr Guillaume Robin for having created a rectified drone image based on the oblique photos by Davit Naskidashvili. We are indebted to the European Research Council for its fundamental support of our fieldwork via the Persia and its Neighbours project. We are grateful to the Iranian Cultural Heritage, Handcraft and Tourism Organization, the Research Institute of Cultural Heritage and Tourism and the Iranian Center for Archaeological Research for their kind support of our joint project without which it could not have taken place. Our work benefited from a topographical survey carried out by Dr Kristen Hopper and James Ratcliffe in 2009. Nothing could have been achieved without our excellent Iranian and international team. We are grateful to Dr Phil Booth and Dr Mary Whitby for their kind editorial efforts and for inviting us to contribute.

[2] T. FISCHER, *Army of the Roman Emperors*, Oxford 2019, p. 224.

[3] M. COLOMBO, Nuove prove per la datazione di Vegezio sotto Teodosio II e la sua collocazione nell'impero romano d'Oriente, *Klio* 101.1, 2019, pp. 256–275.

[4] Vegetius III, 10.

James Howard-Johnston has long been ahead of his time, arguing already in the 1990s for "massive programmes of investment in military infrastructure" by the Sasanians and for a strong Sasanian army perhaps numbering "a quarter or a third of a million men",[5] at a time when scholars still often assumed that the empire's standing army was significantly smaller or even doubted its existence.[6] This was over a decade before archaeological evidence emerged, in the 2000s, that there were indeed numerous vast geometric fortifications within the Persian Empire, demonstrably built under the Sasanian dynasty. Empty in the interior, they were evidently designed for armies on campaign living in tented temporary accommodation, just as Roman soldiers had done in their ubiquitous earlier marching camps.

2. Qal'eh Kharabeh: a Sasanian fortress of the fifth century

The one site central to this contribution, Qal'eh Kharabeh (i.e. the 'Ruined Castle'), is located within the Sasanian Empire c. 29km north of modern Gorgan and c. 2km south of Fort 29 on the Gorgan Wall (Fig. 1) and centred on 37°06′09.53″ N, 54°25′34.15″ E. It was a rectangular fortress, surrounded by a moat and a wall, with a citadel in the south-east corner, four gates and an estimated 80 towers. At c. 41 hectares interior area (Fig. 2), it was far from the largest fortified Sasanian military compound. The inner enclosure of the probably Sasanian siege camp at Hatra in Upper Mesopotamia (Fig. 1) was more than four times the area (184 hectares) and probably capable of accommodating 40–50,000 soldiers on its own (not counting any additional armed personnel in a possible second, less well preserved, camp on the opposite side of the circumvallation around the city).[7] Similar troop numbers to those in the inner enclosure of the Hatra camp could have been housed in two heavily defended campaign bases of c. 175 hectares and 210 hectares interior area, one of them near modern Tehran, the other also in Upper Mesopotamia. The largest Sasanian non-urban military fortress in Transcaucasia and the largest on the Gorgan Plain both reached dimensions of c. 125 hectares each.[8] Since these mega-bases have all been identified as Sasanian military installations only in recent years, it seems likely that more await discovery. Qal'eh Kharabeh, perhaps designed for a mere 10,000 soldiers on campaign, is not extraordinary in size by Sasanian standards. It is, however, arguably the fortification with the clearest evidence that it housed a tent city. It is, furthermore,

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[5] J. HOWARD-JOHNSTON, The Two Great Powers in Late Antiquity: A Comparison, in *The Byzantine and Early Islamic Near East III: States, Resources and Armies*, ed. by A. Cameron, Princeton 1995, pp. 157–226, at p. 168 and p. 196. See also J. HOWARD-JOHNSTON, The Late Sasanian Army, in *Late Antiquity: Eastern Perspectives*, ed. by T. Bernheimer & A. Silverstein, Exeter 2012, pp. 87–127 and J. HOWARD-JOHNSTON, The Sasanian state: the evidence of coinage and military construction, *Journal of Ancient History* 2.2, 2014, pp. 144–181.

[6] E.g. M. B. CHARLES, The Sassanian 'Immortals', *IA* 46, 2011, pp. 289–313, especially p. 305, expressing doubts that there were cavalry units numbering 10,000; S. MCDONOUGH, The Legs of the Throne: Kings, Elites, and the Subjects in Sasanian Iran, in *The Roman Empire in Context*, ed. by J. P. Arnason & K. A. Raaflaub, Chichester 2011, pp. 290–321, especially p. 299, doubting the existence of a Sasanian standing army, except for royal body-guards and auxiliaries; Z. RUBIN, The Reforms of Khusro Anūshirwān, in Cameron, *Byzantine and Early Islamic Near East III* (quoted n. 5), pp. 227–297, especially pp. 290–291, doubting the existence of a standing army prior to Khusro I.

[7] S. R. HAUSER & D. J. TUCKER, The Final Onslaught. The Sasanian Siege of Hatra, *Zeitschrift für Orient-Archäologie* 2, 2009, pp. 106–139, especially p. 129, estimating the holding capacity of the inner enclosure of 184 hectares at 46,000 men.

[8] M. NEMATI, M. MOUSAVINIA & E. W. SAUER, with a contribution by C. G. CERETI, Largest Ancient Fortress of South-West Asia and the Western World? Recent fieldwork at Sasanian Qaleh Iraj at Pishva, Iran, *Iran* 58.2, 2020, pp. 190–220; E. W. SAUER, J. NOKANDEH & H. OMRANI REKAVANDI, with further contributions, *Ancient Arms Race: Antiquity's Largest Fortresses and Sasanian Military Networks of Northern Iran. A joint fieldwork project by the Iranian Center for Archaeological Research, the Research Institute of Cultural Heritage and Tourism and the University of Edinburgh (2014–2016)*. British Institute of Persian Studies Archaeological Monographs Series VII, Oxford forthcoming 2022, chapters 8 and 9, with references.

strikingly similar in layout and dimensions to two further Sasanian compounds on the Gorgan Plain (Gabri Qal'eh and Qal'eh Gug A) and also similar in shape, size and the architecture of its towered walls to Qal'eh Daland (although, unlike the previous three, Qal'eh Daland has no corner citadel), not counting several additional certain or probable Sasanian campaign bases on the Gorgan Plain that differ more substantially in plan or size. Qal'eh Kharabeh and its sister sites thus provide examples of a massive programme of investment in military infrastructure. Jointly with other such installations, the fortress also provides circumstantial evidence that James Howard-Johnston is not likely to have overestimated the size of the Sasanian army when venturing his numerical estimate a generation ago.

Our fieldwork at Qal'eh Kharabeh has been presented and discussed in some detail elsewhere. The site has been explored via geophysical, topographical and aerial surveys and via excavations in 2007–2009 and in 2015–2016. To our surprise, a magnetometer survey detected rectangular enclosures in neat double rows in the interior (Fig. 3–4). These functioned probably as enclosure ditches around tents that were lined up in straight rows. Recent satellite imagery (Fig. 5) also shows some of the enclosures very clearly as crop marks, with lusher plant growth in the interior and on the outside of the enclosures than on top of the ditches. Our earlier excavations of parts of one enclosure have demonstrated that there was more clay in the ditch fills than in the silty deposits they cut, which would explain why plants in the interior of the enclosures were green when the image was taken and those growing on the less fertile ditch fills brown. There is no other obvious explanation; we found no tree-hole within the enclosure excavated, the rectangular shape of the features makes little sense for a plantation, growing trees would have been difficult in this arid environment even if canal-water was available, and one would not expect a royal park in such a remote location or with such strong defences. The quantity of finds and the depth of occupation deposits differed greatly from area to area and was moderate in a mud-brick structure along a central causeway and non-existent in the area of the one enclosure sampled. Overall, there appears to have been far less occupation than in a Gorgan Wall fort, but much more than one would expect in a short-lived camp, suggesting semi-permanent occupation, perhaps spanning several years or a few decades in total, but not generations, let alone centuries. Little would be gained by reiterating what is already in the public domain, and the reader is referred to previous publications.[9] Yet, there are three lacunae in our existing work:

1. As the tent(?) enclosures have produced only faint magnetic anomalies, some very clear, yet others identified only tentatively via our geophysical survey, we never attempted to produce a plan of their exact arrangement.
2. Whilst two aerial photographs taken during our drone survey have been published elsewhere,[10] it is only now that a rectified drone photo (i.e. an image that shows all features

[9] E. W. SAUER, H. OMRANI REKAVANDI, T. J. WILKINSON, J. NOKANDEH, K. HOPPER, G. A. ABBASI, R. AINSLIE, K. ROUSTAEI, E. MACDONALD, E. SAFARI TAMAK, J. RATCLIFFE, M. MAHMOUDI, C. OATLEY, M. ERSHADI, L. S. USHER-WILSON, A. NAZIFI, S. GRIFFITHS, B. SHABANI, D. PARKER, M. MOUSAVI, N. GALIATSATOS & H. TOLOUEI, with further contributions, *Persia's Imperial Power in Late Antiquity: The Great Wall of Gorgān and Frontier Landscapes of Sasanian Iran. A joint fieldwork project by the Iranian Cultural Heritage, Handcraft and Tourism Organization, the Iranian Center for Archaeological Research and the Universities of Edinburgh and Durham (2005–2009)*. British Institute of Persian Studies Archaeological Monographs Series II, Oxford 2013, pp. 312–353, incl. pp. 322–324 (topographical survey by Kristen Hopper and James Ratcliffe), cf. pp. 353–381; SAUER *et al.*, *Ancient Arms Race* (quoted n. 8), chapter 8.4.

[10] E. W. SAUER, J. NOKANDEH, H. OMRANI REKAVANDI, D. NASKIDASHVILI, M.-R. NEMATI, & M. MOUSAVINIA, Interconnected Frontiers: Trans-Caspian Defensive Networks of the Sasanian Empire, in *Proceedings of the 11th International Congress of the Archaeology of the Ancient Near East, 03–07 April 2018, Munich 2: Field Reports.*

undistorted and on the same scale) has been produced (by Dr Guillaume Robin) that provides a unique record of the dimensions and preservation of this important monument.
3. We may have erred on the side of caution in dating the fortress and are now in a position to offer a refined proposal. Based on four remarkably similar radiocarbon charcoal and bone samples (with calibrated dates of AD 417–544, 418–539, 419–545 and 420–542),[11] the site was clearly occupied in the 5th and/or 6th century, as observed before. All four samples have, however, yielded earlier *termini post quos* than any of the 31 Sasanian-era samples from Forts 2 and 4 on the Gorgan Wall, the latter not likely to be later than the 5th century. One is therefore inclined to think that Qal'eh Kharabeh's construction and (main?) occupation is earlier than that of the forts on the wall. Perhaps it was erected at some stage between the 410s and the middle of the 5th century, even if we cannot exclude a date in the later 5th or early 6th century with certainty. It thus probably belongs to an earlier phase of the military build-up on the Gorgan Plain than the Gorgan Wall, a time when the area was under a growing threat from the Hephthalites and when several Persian kings led military campaigns in the area. The site may have been occupied only in the 5th century or potentially also in the 6th century. There is no evidence for later reoccupation, but it should be stressed that our chronology is based on just four radiocarbon samples (and not very tightly datable Sasanian ceramics).

As Qal'eh Kharabeh is unique in having yielded evidence for the likely arrangement of tents in a Sasanian military installation, we believe that this is no minor detail, but of major significance for the level of organisation of the Sasanian army on campaign. What we have found is likely to be broadly mirrored in numerous other campaign bases (which also tend to be empty in the interior and designed for temporary accommodation). Except for the cited siege camp(s) at Hatra and camps at Dura-Europos that may be Sasanian or Roman,[12] no evidence has emerged to date for the ephemeral Persian camps described by Vegetius and other authors,[13] and unsurprisingly so, if their defences consisted of nothing more substantial than

Islamic Archaeology, ed. by A. Otto, M. Herles, K. Kaniuth, L. Korn & A. Heidenreich, Wiesbaden 2020, pp. 363–372, at p. 371 fig. 5; SAUER *et al.*, *Ancient Arms Race* (quoted n. 8), fig. 8.62.

[11] Cf. SAUER *et al.*, *Persia's Imperial Power* (quoted n. 9), pp. 349–353. Note that the radiocarbon samples have been recalibrated via the 2020 version of the OxCal programme (all at 95.4% confidence) and therefore differ slightly from those published previously.

[12] S. JAMES, Ancient Campaign Camps at *Dura-Europos*, Syria: A Preliminary Note', in *Limes XXII. Proceedings of the 22nd International Congress of Roman Frontier Studies, Ruse, Bulgaria, September 2012*, ed. by L. Vagalinski & N. Sharankov, Sofia 2015, pp. 307–312; S. JAMES, Of colossal camps and a new Roman battlefield: remote sensing, archival archaeology and the 'conflict landscape' of Dura-Europos, Syria, in *Understanding Roman Frontiers. A Celebration for Professor Bill Hanson*, ed. by D.J. Breeze, R. H. Jones & I. A. Oltean, Edinburgh 2015, pp. 328–345; P. LERICHE, Europos-Doura sur l'Euphrate, *RA* 2013.1, pp. 135–143; SAUER *et al.*, *Ancient Arms Race* (quoted n. 8), chapter 24.2.

[13] See Ammianus Marcellinus XIX, 6.7–11, on a Persian camp for reportedly 100,000 soldiers with a rampart and a royal tent inside; Eḷishē 96 on Persians gathering intelligence on Armenian capabilities in camp and entrenchment construction; *History of Khusro* (attributed to Sebeos) 12, on a royal tent in a Persian camp, 32, on a Persian camp; Georgios Pisides, *Expeditio Persica* III, 78 (kind reference by Dr Mary Whitby) & III, 282, on Persian soldiers' tents; Łazar 37, on an entrenched Persian camp; Mauricius, *Strategicon* XI, 1.17–20, on Persian camps defended with a ditch and a palisade; Procopius, *Bella* I, 13.15, I, 18.10, II, 5.10, II, 8.3 & II, 17.17 on Persian encampments; Theophanes Confessor, *Chronographia* 251 on a Persian royal tent. Ferdowsi's *Shahnama* (e.g. ed. & trans. MOHL, *Le livre des rois* VI, pp. 184–189) contains numerous references to camp enclosures with tented accommodation for the Persian king and his army inside. See *Movsēs Dasxurançi* II, 14 on tents in Khazar camps, perhaps evidence for mutual Persian-Khazar influence. Of particular relevance is Eḷishē's (105) reference to a Persian 'camp', erected in AD 451 in the province of Her and Zarevand near Lake Urmia, for a large army with ditches, a rampart and a wooden palisade, fortified 'like a city' and used as an operational base. The description implies that it was a campaign base built at a similar time as, or not long after, Qal'eh Kharabeh and resembling it in function and the strength of its urban-style defences, though not necessarily of identical architecture; timber would have been in short supply in the treeless steppe around Qal'eh Kharabeh, and it seems unlikely that it boasted a wooden palisade.

sacks of sand or soil. It seems likely, however, that some will be found in future, as ditches should often survive, wooden palisades/obstacles, as attested by Ṭabarī,[14] may be traceable too and even minor ramparts may survive on uncultivated land. Dating and identifying such enclosures as camps will, however, not be easy. Camp occupants will undoubtedly also have lived in tents or other basic temporary accommodation. It would have made sense for the arrangement of tents in overnight marching camps in enemy territory or fought-over land to match that in the much more heavily fortified semi-permanent bases in a border zone. Applying the same familiar blueprint to all tent cities any one unit successively occupied would have facilitated rapid erection. Replication of the same geometric plan at all sites would have ensured that every soldier knew his place and how to reach the defences or gates rapidly. As no certain Persian marching camp has been found to date, let alone any with known emplacements of tents, this is admittedly speculative. Yet, as there was less time to pitch tents and less time to fend off an attack on the weaker defences, a standardised layout will have been of even greater importance in a camp than in a campaign base. The regular arrangement of tents at Qal'eh Kharabeh was thus probably not just typical for campaign bases, but also for the once arguably much more numerous short-lived camps.

3. A tent city planned with military precision

The enclosures at Qal'eh Kharabeh were detectable, as the site was never reoccupied. Had there been later occupation deposits or modern metallic or ceramic debris near the surface, these would have made it probably impossible for our instruments to trace the slightly magnetic fills of enclosure ditches. Any substantial later deposits on top of the features would also have placed them beyond the reach of plant roots, so that no crop marks would have revealed their existence. The site is unique in its favourable ground conditions and the quality of the magnetometer survey. Furthermore, it seems likely that most military tents elsewhere were never surrounded with ditches and would be undetectable even in ideal circumstances, and that we were lucky in finding a site where they were. There will have been hundreds or thousands of Sasanian military tent cities, but this is the only one with clear traces of the ephemeral temporary accommodation inside detected to date. The rectangular enclosures could only be identified in the eastern half of the compound. Satellite imagery (Fig. 5) that covered the entire fortress shows their overall spatial distribution, notably in the north-east, even more clearly than our geophysical survey (Fig. 3–4). We assume that the absence of certain examples in the west is a result of either because the military unit(s) occupying the western half did not dig enclosure ditches around their tents or because the western half of the compound was unoccupied at the time. Potentially, it might have been kept empty in expectation of the arrival of reinforcements or during reoccupation of the fortress by a unit of half the strength it had been designed for. The enclosure ditches may have been intended for drainage purposes. It is possible that the soil extracted was used to raise the ground inside, to keep the tent site in the interior dry. Soil may perhaps have been placed on the lower parts of the canvas or leather to make the tents more wind-resistant. If so, they may have been dug during a spell of wet or windy weather and their absence in the west does not prove that this half of the fortress was never occupied; it suggests only that on this particular occasion the fortress was partially occupied or that the military unit(s) occupying the western half did not dig enclosure ditches around their tents, perhaps because they differed in tradition or perhaps because they used different types of tents (or maybe yurts).

[14] Ṭabarī I, 2456–2457, referring to a Persian camp surrounded by a ditch and a continuous palisade of pointed wooden stakes with gate openings.

If one only plots certain or almost certain enclosures, one observes that these are in neat alignments west–east, all perfectly parallel and also parallel/at a right angle to the walls of the compound (or reasonably close to parallel/right-angled, bearing in mind that the compound is no perfect rectangle). There are always two rows in fairly close proximity. The distance between these parallel double-rows is greater than the distance been the two rows in any one double-row (Fig. 3–7). The wider corridors between the double-rows would have facilitated access from the central north–south causeway to the tents and from the tents to the defences and vice versa. As elsewhere, horses would probably have been tethered here and next to their riders' tents,[15] rather than in the western half of the fortress. There is, to our knowledge, no other ancient military compound where one half of the interior area was reserved for animal pens, and such an asymmetrical arrangement would not only have resulted in an unusually low occupation density overall, but would also have increased the time soldiers would have needed to man the western walls or to gather their horses for a sortie.

Surprisingly, the tent enclosures also seem to be in an alignment north to south. This makes one wonder if, as an alternative to the hypothesis proposed above, they were perhaps not dug in response to weather or ground conditions, but represent an attempt by surveyors to mark the position of each tent, prior to the arrival of the field army. One notices that the interior of the fortress is not only neatly divided into four quadrants by its intersecting central causeways, but that the southern and northern half are further subdivided by a central linear anomaly (a ditch?) in a west–east alignment – further evidence for much attention to a neat division of the interior by surveyors, as further explored below.

Excavation established that the west–east causeway contained a raised water canal and the same is likely to be true for the north–south causeway.[16] It is possible that the slightly oblique alignment of canals was a result of them leading towards gateways in a zigzag alignment, like the passageways through the gates at Qal'eh Iraj.[17] There are possible traces on the drone image and satellite imagery of a zigzag or curved gateway leading through the east gate of Qal'eh Kharabeh. A narrow gateway in such an alignment would have stopped any assailants not repelled on the approaches from charging through the gate rapidly, but would have meant that any water channelled through the gate also had to follow a circuitous route. On CORONA satellite imagery of the 1960s[18] (and less clearly on more recent satellite images) one sees traces of possible linear features (causeways containing raised canals?) leading towards/away from the west, north and east gates. These may have supplied the intramural canals and the moat with water and may also have provided dry roadways leading towards the fortress. Water was likely diverted from the nearby Old Gorgan River, less than 2km south of the fortress or potentially an old canal. Contrary to Gabri Qal'eh, a compound of strikingly similar design 81km further east where a causeway crossing the moat seems to be a secondary feature of a later phase,[19] there may have been causeways across the moat at Qal'eh Kharabeh from the start. Our reconstruction (Fig. 6–7) assumes that the vanished south gate was at the approximate centre of this side and mirrored other gates in its architecture. If intramural canals led towards gateways, one wonders if the south gate was further east or if the gateway was straight or curved in the opposite direction. We are not aware, however, of a linear feature leading towards the south gate from the outside, and there is no evidence that water was channelled into or out of this gate. The causeways (paralleled at several other campaign bases) are likely to have

[15] SAUER *et al.*, *Persia's Imperial Power* (quoted n. 9), p. 342.
[16] SAUER *et al.*, *Persia's Imperial Power* (quoted n. 9), pp. 330–334.
[17] NEMATI *et al.*, Largest Ancient Fortress (quoted n. 8), pp. 207–210.
[18] SAUER *et al.*, *Persia's Imperial Power* (quoted n. 9), p. 314 fig. 12:10.
[19] SAUER *et al.*, *Ancient Arms Race* (quoted n. 8), chapter 8.3.

served a dual function. They could be used as well-drained traffic arteries and the canals inside provided, initially at least, water for mud-brick production.

An additional benefit of the causeways was that they divided the interior area neatly into four quadrants of similar size and shape. There was space for seven double-rows of enclosures in each quadrant. The northern and southern half of the compound were further subdivided by an internal west–east division line/ditch.[20] These linear features not only form the approximate axes of symmetry of the northern and southern halves of the fortress, but also that of its central double-row in the south-east (and the same may apply in the other quadrants). It is unclear, however, what the purpose of this subdivision was: perhaps each half-quadrant housed a separate military unit, accommodated in seven parallel rows of tents, perhaps it was no more than a drainage ditch, or a water supply channel branching off the central canal, placed in a central position, or perhaps this linear feature was meant to facilitate marking out the rows of tent enclosures on the ground.

From west to east, we can identify 20 north–south alignments of enclosures. Due to partial survey and, we assume, variable ground conditions the number of actual enclosures securely identified varies greatly from row to row. We have, however, been able to detect a sufficient number of these enclosures in alignment that we are confident that at least 20 enclosures were marked out – or intended to be marked out – in each of the 14 west–east rows in the south-east corner. Further east, towards the edges of the compound, the picture is less clear, perhaps as there is debris from the decayed mud-brick wall. We therefore cannot be sure how close the rows of enclosures came to the wall. We are unsure if there were further enclosures (of which there may be faint traces, both on the survey plot and, more clearly, on recent satellite imagery (Fig. 3–5), but no examples we consider secure) or if there was a c. 30m-wide empty *intervallum*-style strip on the east side of the fortress. An *intervallum*, i.e. an empty strip of land all around the inside of the walls, is also frequently found in Roman military compounds. Surprisingly, however, the southernmost row of enclosures leaves only a little over 10m of unoccupied land along the inside of the southern wall. This admits two possibilities:

1. The empty cordon on the inside differed greatly between the east and the south side and there were 14 rows of up to 20 enclosures in the south-east quadrant.
2. Alternatively, the hypothetical easternmost two alignments of enclosures could not be clearly identified due to ground conditions. This would result in 14 rows of up to 22 enclosures.

The latter hypothesis, whilst unproven, is perhaps more likely in the light of how often principles of symmetry seem to have been observed in Sasanian defensive architecture. Examples for the phenomenon include the fact that barracks in forts on the Gorgan Wall always appear to occur in even numbers and always seem to be arranged symmetrically. The original barracks in Fort 2 (consisting as at other forts of two parallel rows of rooms of similar width) appear to have had annexes of a similar width and the same number of rooms on both sides. Gorgan Wall forts and fortresses in the hinterland were mostly provided with gates exactly in the centre of the respective side of the compound. Whilst frequent examples of broadly

[20] On the drone image and Google Earth satellite imagery, one also notices to the east of the Qal‘eh a linear feature in a similar alignment to the southern division line/ditch within the Qal‘eh. This is probably a modern land division, just like parallel equidistant linear features north and south of it. It seems unlikely that it follows an ancient canal and has therefore not been plotted. Due to their symmetrical arrangement, one is inclined to think that the land divisions within the Qal‘eh are ancient rather than modern, but excavation is needed to verify this hypothesis.

symmetrical architecture in Sasanian military bases does not prove that the unoccupied strip of land all around our fortress was of similar width, there is a strong possibility that it was.

A 30m-wide *intervallum* would have facilitated troop movement and access to the wall much more than an empty strip of just 10m or so. It would also have reduced the risk of tents being hit by enemy missiles, which was perhaps also the reason why the Hatra camp had a, probably unoccupied, c. 160m-wide security cordon around its inner enclosure.[21] As Qal'eh Kharabeh's walls (and those of most other campaign bases we know) were, however, lined by a substantial moat, enemy archers approaching the site's formidable defences on the open steppe-land would have been at much greater risk of being successfully targeted with long-range weapons than those manning its tall walls or those camped inside. Furthermore, in the open land around Qal'eh Kharabeh any approaching force would have been spotted early and the risk of a sudden surprise attack will have been slim, so that quick access to the defences may not have been a priority. Irrespective of the advantages a wider *intervallum* may have offered, there would have been no obvious benefit in having a much wider empty strip in the east than in the south.

We may conclude that a quadrant may have contained 14 × 22 = 308 tents enclosures, but at least 14 × 20 = 280. In the south-east, however, the citadel would have reduced the space to perhaps 302 or 278 respectively. Assuming there were 280 or 308 in the other quadrants, including those in the west without detected examples, and 278 or 302 in the south-east, there would have been 1,118–1,226 tent enclosures overall (Fig. 6–7).

4. Garrison size

Based on our excavations, the area within a ditched enclosure may have measured c. 3.25m west–east (excluding the ditches),[22] but the north–south extent was greater, maybe four to six metres, enough space for a larger tent. Assuming there were eight occupants per tent enclosure (i.e. the same number as those sharing a tent of just 3m by 3m in a Roman marching camp), the total garrison may have approached 9,000–10,000.[23]

The number of enclosures, or the more securely quantifiable number of west–east rows (probably 28), seems to have been no neat round number, notably in the eyes of those used to the decimal system. It ought to be borne in mind, however, that also in the early to high imperial Roman army, a 'century' is normally thought to have comprised just 80 men, some nominally '500-strong' auxiliary units are estimated to have numbered 480 soldiers, other such units 600; estimates for various '1,000-strong' Roman units range from 768 to 1056,[24] not to mention that the real strength may have fluctuated even more. We should not expect accommodation units to add up to round numbers, either in Roman or in Persian military compounds.

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[21] HAUSER & TUCKER, The Final Onslaught (quoted n. 7), especially pp. 128–129.
[22] SAUER *et al.*, *Persia's Imperial Power* (quoted n. 9), pp. 341–346.
[23] Pseudo-Hyginus, *De Munitionibus castrorum* 1, attests that eight soldiers shared a tent, but that tents were pitched only for 80% of men, as 20% were on guard duties. According to Vegetius (II, 8 and II, 13), ten men shared a tent in the Roman army. If we assumed that there were also ten soldiers in a tent at Qal'eh Kharabeh and/or that tents were similarly occupied in rotation, at least 25% additional personnel could have been accommodated in the tents. On the dimensions and other physical characteristics of tents, for groups of soldiers, officers and the emperor, in Roman marching camps, see O. STOLL, Kämpfst Du noch, oder wohnst Du schon? Das Zelt des römischen Kaisers als Feldherrn, *Marburger Beiträge zur antiken Handels-, Wirtschafts- und Sozialgeschichte* 37, 2019, pp. 77–103.
[24] D. J. BREEZE & B. DOBSON, *Hadrian's Wall*, 4th edn, Harmondsworth 2000, pp. 159–162.

Much of the field army will have lived in tents on campaign, but not all of Qal'eh Kharabeh's occupants will have lived in tented accommodation. It is likely that there was permanent housing in the citadel, perhaps including the high command, and probably also in the c. 80 towers on the walls (including the postulated seven towers on the citadel, as proposed in our reconstruction). It is possible that there was an eighth tower on the citadel, near the centre of its west side, and 81 towers in total. At the Sasanian campaign base of Qal'eh Iraj there were, furthermore, hundreds of rooms embedded in the walls.[25] The walls of Qal'eh Kharabeh were sufficiently wide for them to contain rooms, but there is no proof, as they have not been excavated and are in places in poor condition (Fig. 8–11).

In addition to the tent-dwellers in the vast empty interior, how many more people could have been accommodated in permanent housing? Qal'eh Kharabeh's citadel is remarkably similar in size and plan to the nearby Sasanian fort of Buraq Tappeh. We have argued that the latter may have had the capacity to house up to 400–900 occupants, depending on whether occupation was single or double-storey.[26] If each tower sheltered eight soldiers, the citadel and the towers could have comfortably accommodated an additional 1,000 guards. For Qal'eh Iraj, we estimated the combined holding capacity of the more than 800 rooms in its walls at 2,000–5,000 occupants.[27] The walls of Qal'eh Kharabeh were c. 2.6km long, excluding those of its citadel, a little less than half of the c. 5.4km of walls around Qal'eh Iraj. If there were rooms in its walls, and there is no proof as yet, they may have provided space for an additional 1,000–2,500 men. In addition to those occupying the tent city in the interior, there may have been space for anything from 1,000 to 3,500 personnel in its walls and its citadel. Mud-brick structures, thought to be supply facilities, based on our findings from one example excavated, lining the northern half of the north–south causeway[28] may well have sheltered additional people, perhaps up to a few hundred in total. There are faint traces of possibly similar structures also lining the causeways from the centre to the west, east and south gates, most clearly perhaps on the north side of the causeway leading to the west gate. As their identification is insecure, they have not been plotted. They may potentially have housed a significant number of further occupants.

Little would be gained by extensive speculation as to the precise numerical strength of the force occupying Qal'eh Kharabeh, but an estimate of roughly/nominally ten thousand cavalry (as also attested by the church historian Socrates[29] for the Sasanian 'immortals') seems reasonable, perhaps 8,000–10,000 living in tents and 1,000–3,000, in the citadel, the towers, the mud-brick structures and potentially the walls. In Roman marching camps the occupation (albeit of foot-soldiers) is thought to have been much denser; Rebecca Jones cites estimates for occupation density of Roman marching camps from 307 to 1,444 men per hectare and argues that 480–690 is probably most realistic.[30] Applying these estimates to Qal'eh Kharabeh, with its interior area of c. 41 hectares, produces figures of c. 13,000, 20,000, 28,000 or even an implausible 59,000. If one also counts the walls and citadel, these figures rise to c. 14,000, 22,000, 32,000 or 66,000 (spread over 46 hectares). Our estimate of c. 10,000 occupants is thus no more than half to a third of the numbers proposed for Roman camps of a similar size. There would have been more mounts in Qal'eh Kharabeh, if we are right in thinking that it was designed for cavalry, than in a Roman marching camp. But even bearing this in mind, it is hardly an implausibly high

[25] NEMATI *et al.*, Largest Ancient Fortress (quoted n. 8).
[26] SAUER *et al.*, *Ancient Arms Race* (quoted n. 8), chapter 7.2.
[27] NEMATI *et al.*, Largest Ancient Fortress (quoted n. 8), p. 214.
[28] SAUER *et al.*, *Persia's Imperial Power* (quoted n. 9), pp. 314–315 and pp. 334–341.
[29] Socrates, *Historia ecclesiastica* VII, 20.
[30] R. H. JONES, *Roman Camps in Britain*, Stroud 2012, pp. 47–58.

estimate. Whilst our proposed figures for the number of soldiers sharing a tent and the number of potential occupants of the citadel, the towers, the mud-brick structures and any rooms that may have been embedded in the walls is inevitably speculative, a comparison with better-known Roman compounds adds much strength to our hypothesis. The Qal‘eh could easily have sheltered 10,000, quite possibly even a few thousand more. Even if the discovery of enclosures in the eastern half of the compound alone might have been the result of a partial (re-?)occupation of the fortress, there still may well have been 5,000 soldiers present, even if half-empty at the time. As there are campaign bases of just half the size of Qal‘eh Kharabeh, we may be confident that it was designed for full occupation, even if episodes of partial reoccupation are possible. It would have made no sense to invest the labour to erect a vast fortress, if its architects had not envisaged full occupation. Even if one errs on the side of caution, it is hard to dispute that the interior was designed for dense occupation by a force that must have numbered at least a few thousand.

Whether the layout of the fortress suggests that the garrison was split into four or eight units, or if there were other pragmatic reasons why the surveyors divided the interior into four quadrants and each of these into two halves, cannot be decided. It is clear that the layout was remarkably symmetrical, so that troops on campaign knew exactly where to pitch their tents in each new compound. The rectilinear layout ensured that they could reach the defences speedily and without any unnecessary obstructions in their path.

5. Conclusion

Our latest research has not caused us to change our overall interpretation of Qal‘eh Kharabeh and other Sasanian campaign bases, but it has added much detail and nuances, not previously observed, e.g. the exact number of enclosures detected per row and that they are in alignment not only from west to east, but also from north to south. It provides the first plan of a Sasanian military tent city and the first rectified drone image of this pivotal site. This is of particular relevance as the Persian camps attested in literature must have been filled with tents as well, and a similarly regular arrangement of tents would have been as advantageous. Qal‘eh Kharabeh is likely to provide a snapshot not only of what a typical campaign base, but also what a typical Persian camp may have looked like in the interior. Due to the lack of strong defences, canals or even minor mud-brick structures, most camps will remain elusive, but it seems likely that literally thousands of such tent cities were erected over the centuries within the sphere of operations of the Sasanian field army. Some of them will have been occupied just once for a single night or a few days, but the more heavily fortified representatives may often have seen repeated occupation for longer periods, perhaps of up to a few years or even decades. James Howard-Johnston has made a strong case a generation ago that the Sasanian army was much stronger, in numbers and capabilities, than recognised previously. More and more evidence is emerging to prove that this was indeed the case. Heavily fortified bases with temporary accommodation in the interior are a testimony for a new strategy of proactive defence. This involved dispatching strong mobile units to frontier zones under threat. Operating from secure bases, they ensured that it was difficult for enemy forces to penetrate the empire’s fortification belt. They provided a protective umbrella for the Sasanian Empire’s heartlands and safeguarded its prosperity and longevity.

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7. Abstract

Eberhard W. SAUER, Jebrael NOKANDEH, Hamid OMRANI REKAVANDI, Roger AINSLIE, Mohammad Arman ERSHADI and Davit NASKIDASHVILI, *Qal'eh Kharabeh in northern Iran: a Sasanian military tent city for ten thousand mounted soldiers?*

Until recently, the odd passage in ancient and medieval literature was the only evidence for Sasanian temporary camps and semi-permanent campaign bases. Since 2007 more and more campaign bases have been identified. This article presents the only such monument with

preserved traces of a tent city inside. Its remarkably regular layout was probably mirrored not only at other campaign bases, but also in the once arguably much more numerous camps. Moat-enclosed substantial towered walls and causeways, often also citadels and sometimes smaller mud-brick structures inside, have ensured that many campaign bases have survived as prominent landmarks, whereas short-lived camps with light temporary defences remain elusive. Qal'eh Kharabeh and other Sasanian military compounds provide unique insights into Persian defensive infrastructure, erected in the fifth and sixth centuries on an unprecedented scale. These purpose-built bases for mobile forces are the physical manifestation of a military strategy that aimed at minimising losses by keeping field armies in contested territories and in borderland secure. The regular arrangement of tents exemplifies efficient use of space by well-organised troops. The Sasanian field army boasted some of the largest fortresses of the late antique world. Our new evidence for their dense occupation and sophisticated design demonstrates that it was a formidable force, in numbers and capabilities.

8. Short biographies

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9. Illustrations:

Fig. 1: Location of Qal'eh Kharabeh in the Sasanian Empire.

Fig. 2: Rectified drone image of Qal'eh Kharabeh by Dr Guillaume Robin, based on drone photos by Davit Naskidashvili and the joint project, taken in 2016. The site has clearly been damaged by modern agriculture, notably in the south, but one can still clearly see the outer walls and the citadel in the south-east as well as the intersecting causeways which divide the interior into four quadrants. The monumental projecting gates still form landmarks in the north, east and west, but on the poorly preserved south side no clear traces remain. Regularly spaced tower mounds on its walls are also visible, but they are more clearly recognisable from a terrestrial perspective. Large dried-up water pools mark the location of the moat, most clearly in the north, that once surrounded the fortress and provided the material for its walls.

Fig. 3: The geophysical survey by the Iranian Cultural Heritage, Handcraft and Tourism Organization and Abingdon Archaeological Geophysics revealed enclosures in neatly aligned parallel double-rows. Each one of them probably enclosed a tent.

Fig. 4: Enclosures identified with confidence plotted onto the survey.

Fig. 5: Google Earth image of Qal‘eh Kharabeh of 4 June 2017. The enclosures show up clearly as crop marks. The fills of the ditches appear to contain less humus than the interior and surroundings of the enclosures, to judge by the light brown as opposed to lush green colour of the vegetation (Image © Maxar Technologies).

Fig. 6: Interpretative plot and proposed reconstruction of the original arrangements, based on the assumption that once the entire interior was filled with rectangular enclosure ditches (probably around tents), in a similar arrangement as those identified in the eastern half. The interior is divided into four quadrants via causeways containing raised canals. The number and approximate location of towers is based on pedestrian and topographical survey. For the purpose of our reconstruction, we assume that the towers correspond to those at Qal‘eh Iraj in dimensions and shape. The gates are also based on the excavated south-east gate of Qal‘eh Iraj, but the eroded remains suggest that those of Qal‘eh Kharabeh projected less strongly, and we have reduced the projection accordingly. The plotted outer edge of the moat is approximate only and based on CORONA satellite imagery and our drone photos. In the light of the broadly symmetrical plan of the fortress, we assume that structures that have been heavily damaged or disappeared altogether (e.g. missing towers, segments of wall and the south gate) correspond in relative position, shape and dimensions to better-preserved counterparts. Note that this is an attempt to reconcile our geophysical survey, our drone image and CORONA and Google Earth satellite imagery, as well as the results of our pedestrian survey and excavations. Overlapping these was not easy and there is likely to be an error of a few metres here and there in the relative position of features.

Fig. 7: Close-up of the fortress.

Fig. 8: The eastern section of Qal‘eh Kharabeh’s northern walls (looking towards the north-east corner of the fortress, left, in 2009) is still well preserved. As at several other such monuments, the eroded projecting mud-brick towers are clearly visible and now form regularly-spaced ridges and hillocks.

Fig. 9: Qal‘eh Kharabeh’s southern walls (looking east towards the citadel and adjacent parts of the east walls from a terrestrial perspective in 2015) are now used as a driveway and are heavily damaged.

Fig. 10: The citadel and the eastern part of the south wall in 2015: despite poor preservation, tower mounds are still recognisable.

Fig. 11: View from the citadel, with its mud-brick walls, to the north into the vast empty interior in 2007.