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SASANIAN WALLS, HINTERLAND FORTRESSES AND ABANDONED ANCIENT IRRIGATED LANDSCAPES: THE 2007 SEASON ON THE GREAT WALL OF GORGAN AND THE WALL OF TAMMISHE

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Iranian Cultural Heritage and Tourism Organisation (HO, GA, EST, MM, KR, ME and BS), University of Edinburgh (EWS and EM), University of Durham (TW and NG), British Museum (SP), Abingdon Archaeological Geophysics (RA and CO), Cambridge Archaeological Unit (JJ), Universities of Oxford and Tehran (MF) et al.

Abstract

The 2007 season yielded significant new insights into settlement expansion into the land north of the line of the Gorgan Wall and the later abandonment of these sites in the steppe, prior to the construction of the Wall. It also provided us with a better understanding of Sasanian hydraulic engineering and the date and strategic role of large square fortifications south of this linear barrier. Via underwater archaeology, we explored installations associated with the Tammishe Wall and now submerged in the Caspian Sea. A detailed study of the pottery from a variety of sites associated with the Walls, as well as of settlements in the hinterland, is beginning to provide us with a clearer picture of pottery typology and the sequence of building projects and settlement patterns in the Gorgan Plain.

Keywords

Forts; landscape archaeology; linear barriers; pottery; Sasanians; underwater archaeology; water supply.

I. INTRODUCTION

This paper analyses results of ongoing research on the great linear barriers of northern Iran. While our previous fieldwork in 2005¹ and 2006² focused on the date of construction of the linear barriers and the interior occupation of the associated forts, in 2007 the focus of our activities shifted to exploring the relationship between these walls and sites in the hinterland and to the north of the Gorgan Wall. We examined the extent, economic significance and chronology of settlements and other landscape features north of the Gorgan Wall, as well as the date and possible strategic role of one of the hinterland fortresses south of it. A comparative study of the pottery from one of the Wall forts and the hinterland sites on either side of

the Wall aimed at shedding new light on their relative chronology. It was also with the question of dating in mind that we explored a large three-aisled hall in a fort near the Tammishe Wall. Diving expeditions in the Caspian Sea promised to provide further insights into the submerged remains of installations associated with this shorter Wall, its extent and sea-level changes in antiquity.

II. SASANIAN AND EARLIER LANDSCAPES IN THE HINTERLAND OF THE GORGAN WALL (TW, HO, SP, NG AND KR)

II.1. Introduction

The 2007 field season of the Gorgan Wall landscape survey benefited from the availability of a wide range of

¹ Nokandeh *et al.* 2006.

² Omrani *et al.* 2007.

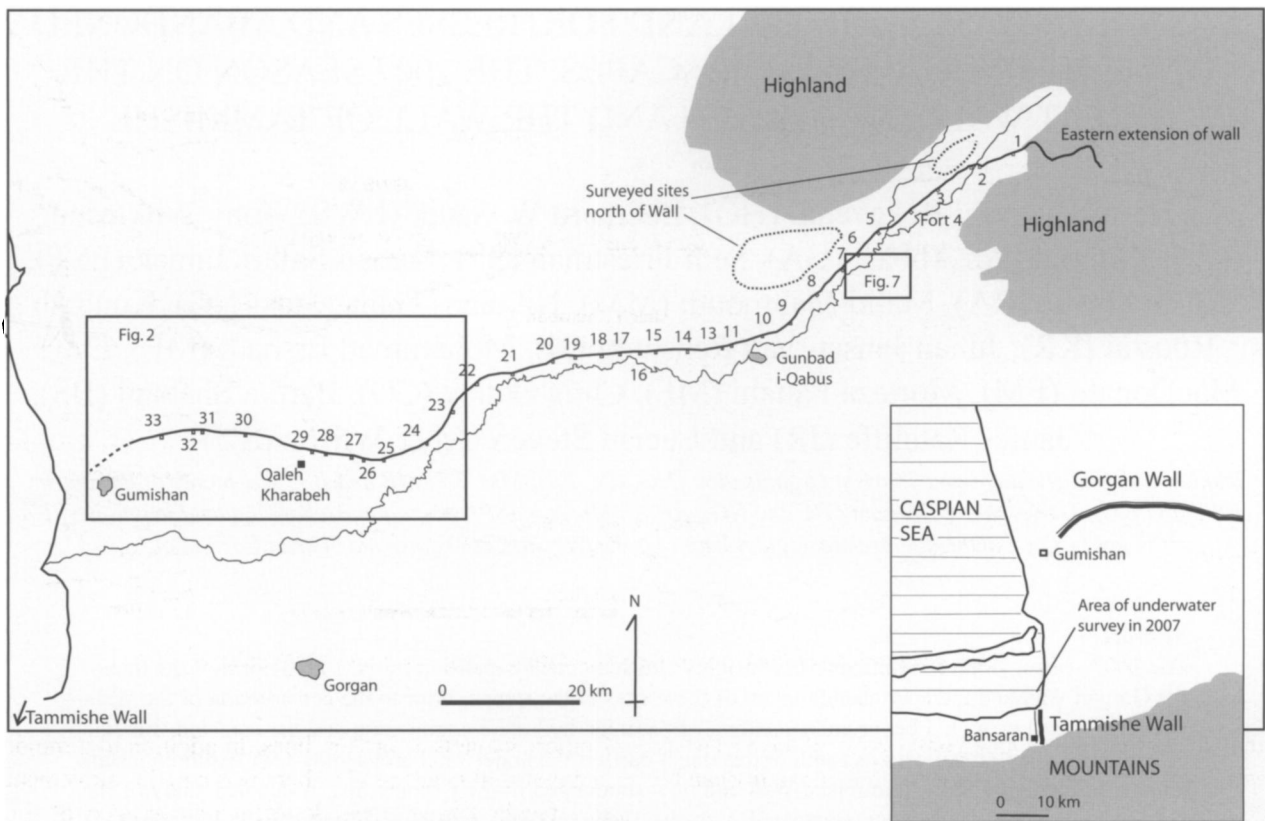


Fig. 1. Map of Gorgan Wall showing the location of the 2007 investigations.

remote sensing data, the most useful being the CORONA images taken in 1968 and 1969. These images provide photographs of the earth's surface at a resolution which is almost as good as air photographs, and importantly provide a view of the landscape before much of it had been destroyed or disturbed by modern agriculture, urbanisation and industrialisation.

The availability of satellite imagery and the incorporation of ceramic collection strategies into the survey increased the data sources significantly so that it is now possible to sketch trends of settlement associated with the Wall as well as in the dry steppe to the north. In addition, satellite images have made it possible to unravel phases of development of the Wall, as well as the layout of the water distribution systems that were associated with it (Fig. 1).

II.2. The use of satellite imagery

The satellite imagery used for this project included the declassified imagery from the reconnaissance programs

CORONA and GAMBIT³ and orthorectified Landsat 7⁴ from the Global Land Cover Facility (GLCF) of the University of Maryland. Furthermore, we downloaded elevation data from the Shuttle Radar Topography Mission (SRTM) version 2.⁵

The SRTM 3-arcsec Digital Elevation Model (DEM) is a particularly valuable source of height data for parts of the world where topographic maps are not readily available. The most up-to-date information suggests that its vertical accuracy is approximately 5 m., depending on the relief of the ground.⁶ However, various applications from Hungary,⁷ Portugal⁸ and Turkey⁹ have all demonstrated an accuracy of less than 5 m. in a variety of terrain. The SRTM 1-arcsec is not yet available outside

³ Galiatsatos 2004.

⁴ Tucker *et al.* 2004.

⁵ <ftp://e0srp01u.ecs.nasa.gov/>

⁶ Farr 2004.

⁷ Kay *et al.* 2005.

⁸ Gonçalves and Fernandes 2005.

⁹ Jacobsen 2005.

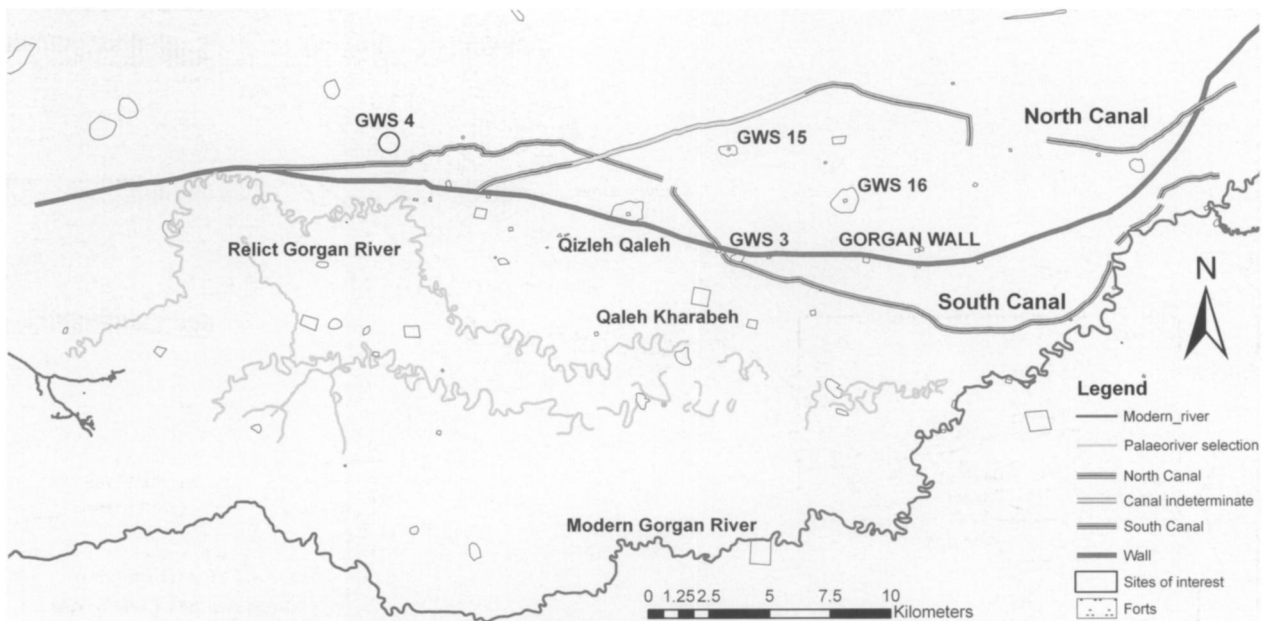


Fig. 2. The western part of the Gorgan Wall in relation to the north and south canals.

the United States. A detailed description of the SRTM as well as an evaluation of the DEM product quality can be found in Rabus *et al.*¹⁰

Unlike the 2005 and 2006 field seasons, the 2007 season benefited from the use of CORONA satellite images that had been taken in May 1968 (mission 1103, KH 4B) and in October 1969 (mission 1052, KH 4A). These images made fieldwork more efficient by enabling us to target key features that had been recognised; these features were then recorded in the field and sampled or collected for artefacts. Visits were made to sites and landscape features to the north and south of the Wall in order to describe them and fix their position using a handheld GPS. The ground control and image analysis enabled preliminary maps to be made of canals, archaeological sites and the Wall itself, as well as ancillary features.

I.3. The changing courses of the Gorgan River

The Gorgan River has shifted its course a number of times during recent millennia, and its history is important for an understanding of the Gorgan Wall. Relict courses of the river place it much closer to the Wall than is the case today, and Fig. 2 indicates the present river course as a dark sinuous line and the

former channels as broken lines. In addition to a minor channel shift near Fort 23, there was a major movement that resulted in the abandonment of a branch of the Gorgan River between Burak Tepe (GWS-2), Altin Tepe (GWS-28) and Gumishan to a more southern course. The location of the first two sites within protective meander loops suggests that they were in use when the river was actually flowing, and from this it can be inferred that this course was in use during the Sasanian and Ilkhanid periods. By the Safavid period, when the bridge of Agh Ghale was built, the bulk of flow had shifted to a course considerably further south. Nevertheless, the observation by Yate¹¹ that some flow still continued through to Gumishan when he visited the town at the end of the nineteenth century, suggests that the shift in channels was slow and progressive, rather than abrupt and total.

II.4. Sites north of the Wall

Limited archaeological survey was undertaken in 2007, to record key sites recognised on the CORONA images, as well as to provide preliminary dating of settlement to the north and south of the Wall. A total of 28 sites were recorded and allocated GWS (Gorgan Wall Survey)

¹⁰ Rabus *et al.* 2003.

¹¹ Yate 1900: 274.

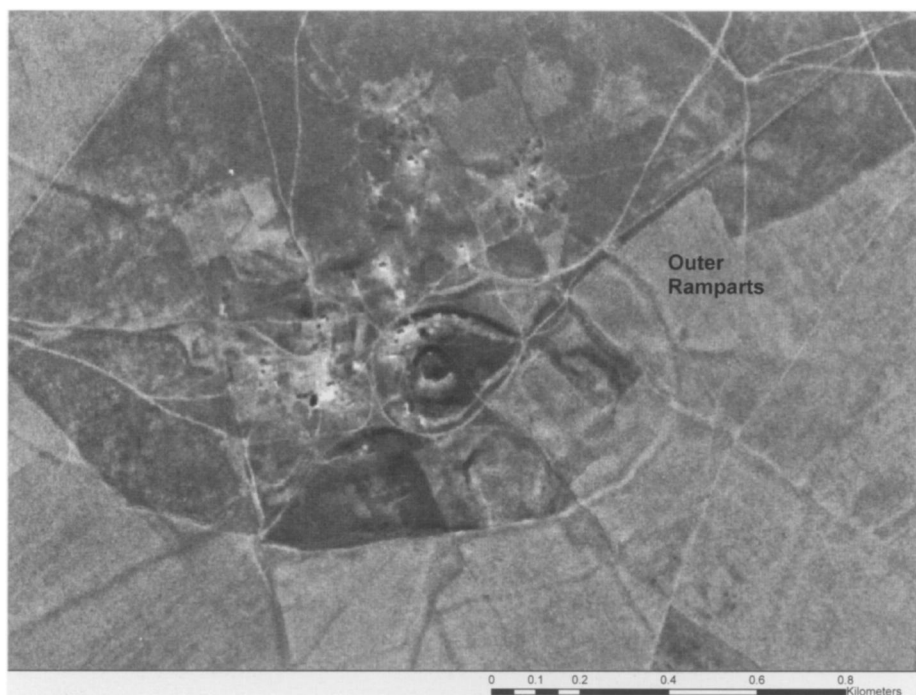


Fig. 3. CORONA image of Abadan Kuchek Qaleh (site GWS 21). CORONA satellite image by courtesy of the US Geological Survey.

numbers. All descriptions and dates are preliminary, and must await a more intensive and thorough survey.

Surveyed sites fell into the following morphological classes:

- 1) *Qaleh* (fort), sites dominated by conspicuous, upstanding mounds, usually with a concave-up dish interior.
- 2) *Upper and lower qaleh*: sites containing both a standard qaleh mound as well as a second outer qaleh area, equipped with high and well-developed ramparts.
- 3) Sites with a *qaleh*, and an *outer town*, the latter being contained within ramparts (Fig. 3).
- 4) Similar sites, but without ramparts.
- 5) *Geometric sites* such as square fortifications, or fortified towns as well as forts along the Wall.
- 6) Simple, *prominent tepes*.
- 7) Low, *rounded mounds*.

Of these, categories 1–5 appear to have been mainly Parthian and/or Sasanian in date, and a minority included some Islamic occupation of probably middle Islamic date. Categories 6 and 7 appear mainly to have been of earlier date, being Iron Age or Bronze Age.

Although our ceramic typology is still in the process of compilation by Seth Priestman and our Iranian colleagues, it is already evident that during the Parthian period or

before, perhaps as early as the mid-first millennium B.C., settlement extended from a core area of the plain to the south into the semi-arid steppe lands to the north of the Wall. In the case of sites located to the north of the Wall, there was a clear geographical distinction as follows:

- Those to the east appear to have developed within a rain-fed agricultural regime. These sites were frequently associated with “hollow ways” which appear to represent routes radiating from the settlements, perhaps to their fields and pastures beyond.¹²
- On the other hand, sites in the west were associated with irrigation canals as well as a lattice of what appear to have been fields and gardens (Fig. 4). Such field-like features are unusual, and appear to have resulted from the patterning of residual salt within saline soils.

In addition, many sites, in both the east and the west, were surrounded by extensive flat areas or slight depressions which would have been ideal places for the assembly of livestock. Overall, it therefore appears that the sites to the north of the Wall were largely those of agro-pastoral communities, with increased irrigation to the west and rain-fed farming to the east.

¹² Omrani *et al.* 2007: 104, fig. 12.

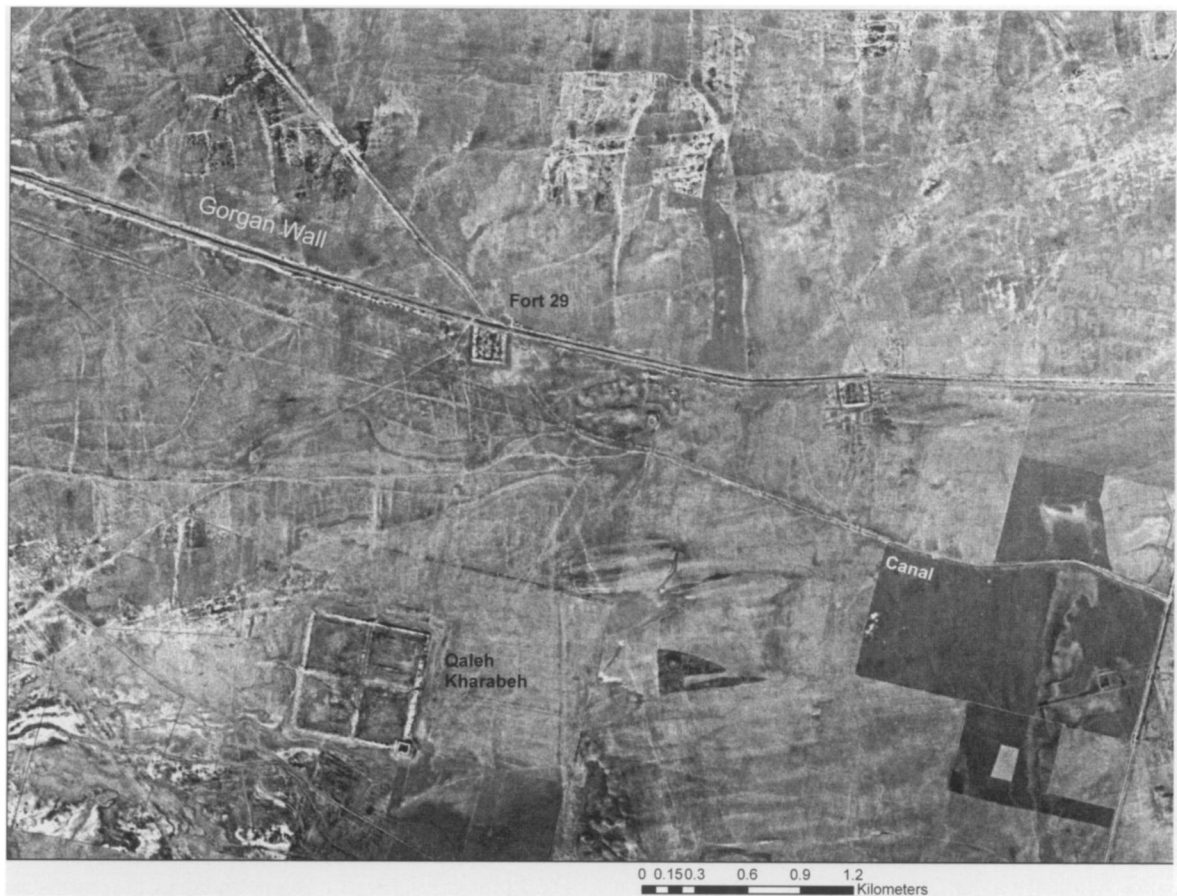


Fig. 4. Landscape palimpsest in the western part of the Gorgan Wall to the north of Qaleh Kharabeh. Note that the Wall cuts through the path of the south canal at Fort 29. CORONA satellite image by courtesy of the US Geological Survey.

II.5. Surface collection of ceramics

An additional task was to date key sites along the Wall using ceramics collected from the surface. Of specific interest was the recognition, description and collection from sites north of the Wall, in order to gain an impression of what activity had occurred in the steppe north of the Wall and how it might relate to the Wall itself. At this stage, we were not aiming to undertake a comprehensive survey, but to get a rapid appraisal of the sites and their dates, to supplement the earlier assessments of Kiani.¹³ Site visits therefore simply entailed making field sketches of the sites, taking GPS readings on key points, and taking “grab samples” of ceramics from specific areas or localities within each site.

The state of knowledge regarding the classification and dating of pottery for late historic periods in north-east Iran is not, at present, well understood. As a result, the

main focus during the initial season of the pottery study was towards establishing a secure and reliable basis upon which to characterise the assemblage for the main period of the Gorgan Wall’s use. In future seasons it is hoped that the chronological range can be extended beyond a narrow late-Sasanian horizon to encompass groups of pottery dated by absolute determinations to the late Sasanian/early Islamic transition and the early Sasanian and Parthian periods. Without this information, and indeed some work on ceramic groups extending beyond this range, it is clearly premature to provide any detailed assessment of the pottery recovered from outside the tightly focused range that has been considered so far (see section VII below). What it is possible to provide at this stage, is a reasonably accurate indication of whether the assemblages recovered from the landscape survey are the same or different to those recovered from the excavations at Fort 4 or what appears to be its immediate chronological precursor at Qaleh Kharabeh (see section III below). In addition, it is possible to identify with some confidence

¹³ Kiani 1982.

those assemblages that contain elements that are either earlier or later than the Wall's use, drawing on a more generalised scheme relating to the development of pottery across Iran.

II.6. Canals in relation to the Wall

Several major sites to the north of the Wall were supplied by water from two major canal systems located in the western part of the Project area. One of these (the northern canal), had already been recognised in the 2005 season, at which time it was unclear whether the canal had derived its water from the Gorgan Wall ditch or direct from a relict course of the Gorgan River.¹⁴ These northern and southern canals (Fig. 2) were recognised as such on both the satellite imagery and in the field by the distinctive up-cast banks alongside. Both canal systems were evidently cut by the Gorgan Wall and its associated ditch.

The southern canal had derived its water from the Gorgan River to the south of Fort 23. It flowed from east to west, and near its western end it had supplied water probably to the major site of Tokh Mogh (GWS-4) and its surrounding fields. This canal was cut by the Wall and ditch in the vicinity of Fort 29, which appears to have been built over the top of the canal (Fig. 4). Pottery collected from Tokh Mogh suggests that the site and associated south canal had been abandoned for several generations, or even centuries, when the Wall was constructed.

The northern canal collected water from a relict channel of the Gorgan River, east of Fort 23 to the west of which the Wall and ditch cut through the canal (Fig. 5). Almost the entire length of the canal lies to the north of the Gorgan Wall and it could be traced both on the ground and using CORONA images westwards to the large site of Mangali (GWS-15), the surrounding fields of which probably received their water from the canal (Fig. 2). The trace of the north canal becomes indeterminate where the canal negotiated a broad shallow valley. From its relationship to the Iron Age to early historic (Parthian?) site GWS-5, which apparently had received its water via a distributary canal from the northern canal, the canal was in use well before the Gorgan Wall was built through the area.

Because the pottery collected from both Tokh Mogh and Mangali pre-dates the ceramics excavated at the forts along the Wall and Qaleh Kharabeh, and included a significant number of pre-Sasanian diagnostic types, it

appears that the sites and the two major canals were predominantly Parthian or earlier (late Iron Age to Seleucid?) in date (see section VII below).

II.7. The Sasanian landscape

Fieldwork in earlier seasons had demonstrated that the Gorgan Wall ditch had received its water supply from a series of so-called "cross-canals" that derived their water from the Gorgan River to the south.¹⁵ One additional cross canal (termed locally the "Band-i Vali") was recognised on the CORONA satellite images and confirmed in the field by its large and distinctive soil up-cast banks. Located to the south of Fort 17 and north of the village of Yesergichen, the canal had been dug along the course of a long-abandoned channel of the Gorgan River to lead water from the Gorgan River directly into the ditch of the Gorgan Wall (Fig. 6). Unfortunately, the relationship between the Gorgan Wall ditch and the Band-i Vali is no longer evident because of the presence of modern irrigation lakes near the junction of the canal and the Wall ditch.

In previous seasons¹⁶ it was inferred that the cross canals had received their water from the Gorgan River via a series of major earthen dams, best exemplified by the Sadd-i Garkaz, near Fort 6. However, the recognition on CORONA images of a major canal system to the south-east of Sadd-i Garkaz, and running towards it, prompted a re-evaluation of the evidence. The field evidence in the form of massive soil banks and a central channel (Fig. 7: A), located several kilometres to the south-east of the Sadd-i Garkaz, demonstrated that it was indeed a canal, which had collected water from a vigorous left (i.e. south) bank tributary of the Gorgan River, the Rudkhane Dough. Where the canal needed to cross a minor tributary valley it may have done so via an embankment, although any signs of this have been obscured by a dam (the Monajim Dam; Fig. 7: B), built by a local landlord some 50 years ago. Downstream and to the west of the modern dam the canal followed a distinctive trace, which became progressively fainter towards the north and west, presumably as the canal became shallower in depth (Fig. 7: C). Nevertheless it could be followed by its weak trace on the CORONA satellite images towards the large earthen dam of Sadd-i Garkaz (Fig. 7: D). Although narrow, the top of the "dam" (5–6 m. wide in the south, 3–4 m. in the north), revealed evidence of fine gravel, small potsherds, and numerous

¹⁴ Nokandeh *et al.* 2006: 146.

¹⁵ Nokandeh *et al.* 2006: 138–41; Omrani *et al.* 2007: 95–98.

¹⁶ Nokandeh *et al.* 2006: 140–41; Omrani *et al.* 2007: 98.



Fig. 5. Area of Fort 23 showing the Gorgan Wall and ditch where it cuts through the course of the north canal. CORONA satellite image by courtesy of the US Geological Survey.



Fig. 6. The route of the Band-i Vali canal where it joins the Gorgan Wall ditch in the vicinity of Fort 17. CORONA satellite image by courtesy of the US Geological Survey.

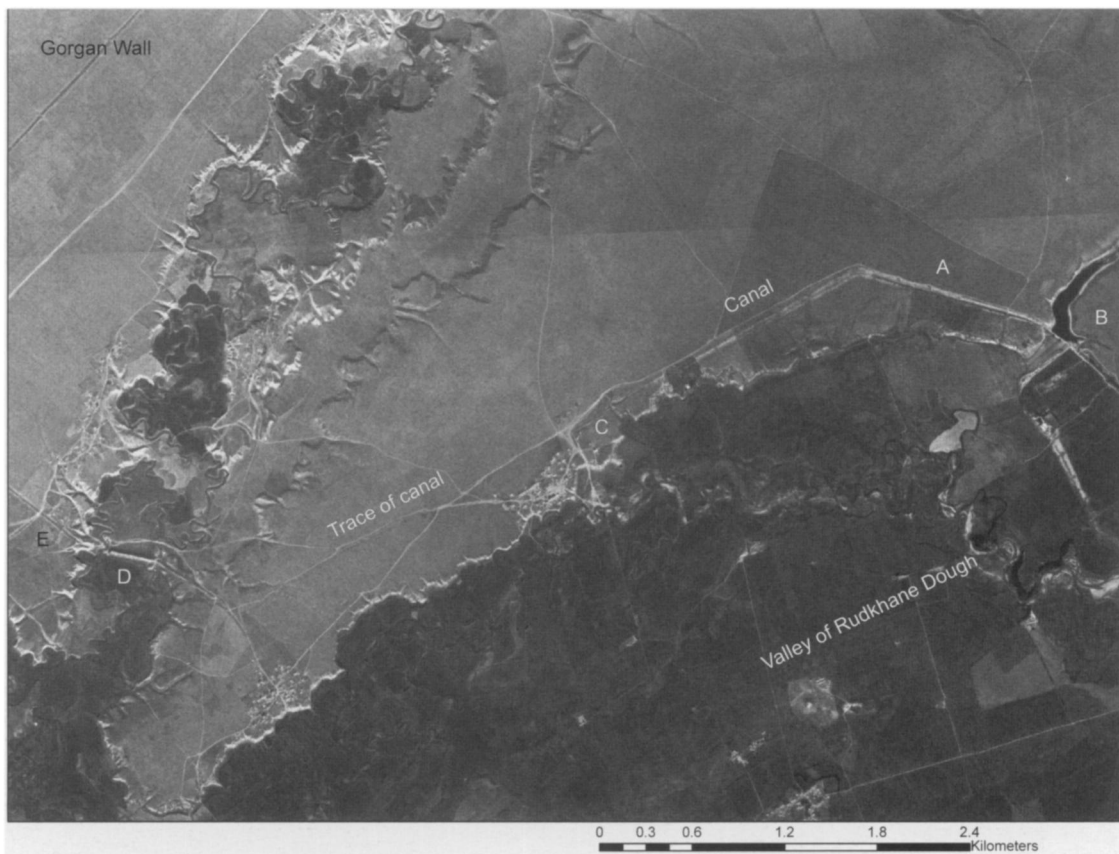


Fig. 7. CORONA image of the Sadd-i Garkaz and feeder canal from the SE (north to the top). A: canal where it is most visible on the ground; B: the Monajim Dam and associated lake; C: the course of canal where it is shallow and the associated banks are less visible; D: Sadd-i Garkaz; E: the Chai Ghushan Kuchek canal leading towards the Gorgan Wall. CORONA image by courtesy of US Geological Survey.

small freshwater gastropod shells. These demonstrate that the Sadd carried water via a canal which ran along its crest from south to north and thence onwards towards the Gorgan Wall ditch via the Chai Ghushan Kuchek canal.¹⁷

North of Sadd-i Garkaz, one branch of the Chai Ghushan Kuchek (Fig. 7: E) was traced in the field to lead into the Gorgan Wall ditch. In addition, CORONA imagery demonstrated that a second branch of the canal followed an alternative course, turning through 90 degrees to take water parallel to the Wall, and a short distance to its south, toward Fort 7. Survey along this branch canal parallel to the Wall demonstrates that a number of brick kilns occurred along the Wall towards Fort 7. In addition, a gap through the Wall at its junction with the Chai Ghushan Kuchek suggests that it also supplied water to the Gorgan Wall ditch.

The 2007 season therefore witnessed a significant reinterpretation of the Sadd-i Garkaz. Rather than operating as

a dam to store water from the Gorgan River and raise it to the level of the loess plateau, it functioned as an earthen aqueduct to convey water from the Rudkhane Dough to the south, across the Gorgan River, to supply water for brick-making and defence, for the Gorgan Wall ditch, as well as perhaps for the supply of Fort 7 and local irrigation.

West of Fort 5 the Gorgan Wall ditch must have conveyed water for some or most of its length, and must therefore have functioned as a canal. It therefore suffered from some of the disadvantages of canal design, namely that it required a constant “design gradient” to function efficiently. If valleys crossed its path it was necessary to negotiate these by the use of engineering works to maintain an even gradient. For example, between Forts 14 and 15 a large “embankment” of silt¹⁸ appears to represent the soil cast up during either the construction of the Gorgan Wall ditch, or of a subsidiary canal. In other words, where the ditch or its water supply canals needed

¹⁷ Nokandeh *et al.* 2006: 138–41.

¹⁸ Omrani *et al.* 2007: 96 fig. 2.



Fig. 8. Satellite image of Qaleh Kharabeh south of the Gorgan Wall. CORONA satellite image by courtesy of the US Geological Survey.



Fig. 9. The prominent citadel of Qaleh Kharabeh with trench L in the right (north-west) corner.

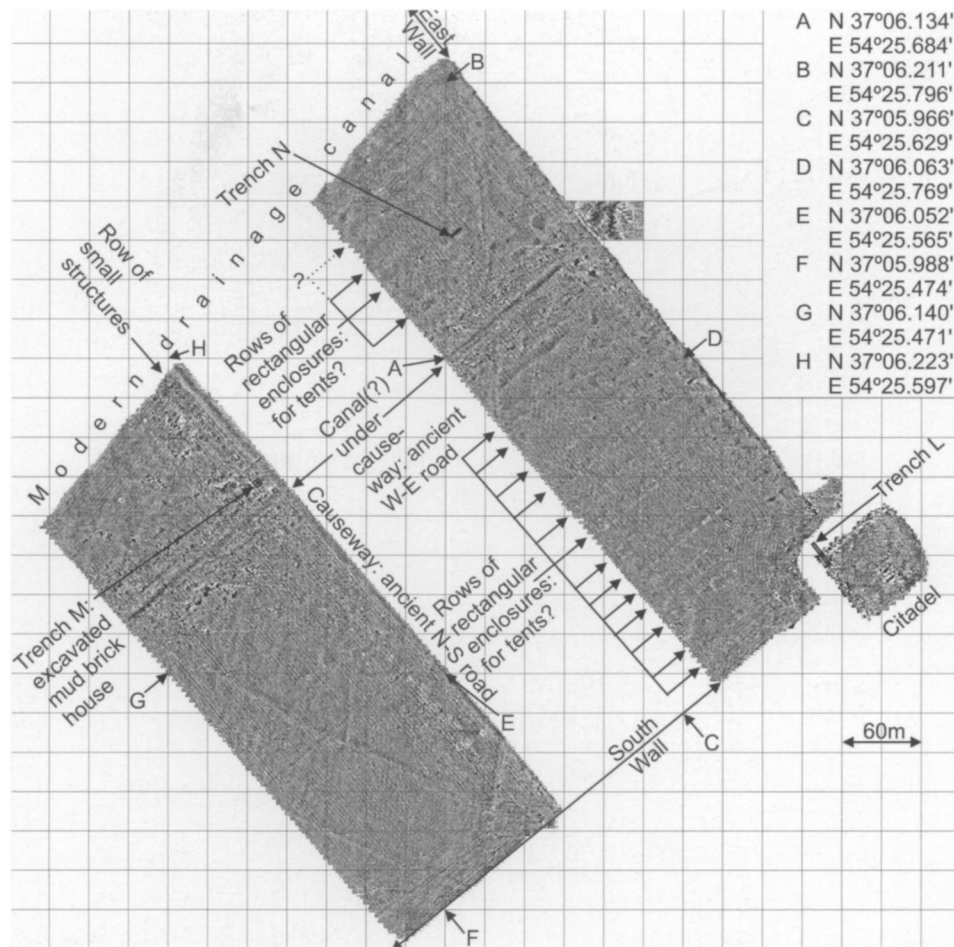


Fig. 10. Qaleh Kharabeh: Results of the magnetometer survey (by RA, CO, ME, MM and SU, Abingdon Archaeological Geophysics and the ICHTO) and location of the trenches (L, M and N) excavated in 2007.

to negotiate a side valley, first the canal or ditch was dug deeper so that when the valley was encountered, the level of the water was of sufficiently low elevation for the water to have been conducted across the valley without the need for an embankment.

The brick-built installation exposed in the bed of the Rudkhane Sari Seyyid (Rudkhane Qarnaveh; WP 438),¹⁹ was revisited in 2007. A section of a former canal or river channel, partly infilled with fragments of Gorgan Wall brick, was exposed in the bank of the Sari Seyyid River to the south-west of the brick structure. This channel lines up with the north-south element of the brick structure WP 438 and appears to be the course of a former canal that led water downstream towards a line of brick masonry which formed either part of a canal, or a reinforced brick structure built to protect the canal from erosion. Viewed

together, these features suggest that during the Sasanian period, water was gathered from a brick off-take in the bed of the Sari Seyyid (WP 438), and conducted downstream via an earthen channel, reinforced at intervals by masonry structures specifically where the canal channel was vulnerable to riverine erosion. The location of this canal, just within the alignment of the Gorgan Wall, places it within the protective confines of the Wall, rather than being located outside its boundaries, where it could have been vulnerable to sabotage.

II.8. The Eastern Extension of the Wall

The landscape of the Wall changes significantly towards its east end. First it follows the crest of the Pishkamar Rocks, to then drop down from a fortlet on the high scarp east of Pishkamar, down to a valley-floor compound

¹⁹ Omrani *et al.* 2007: 105–6, figs 13–14.

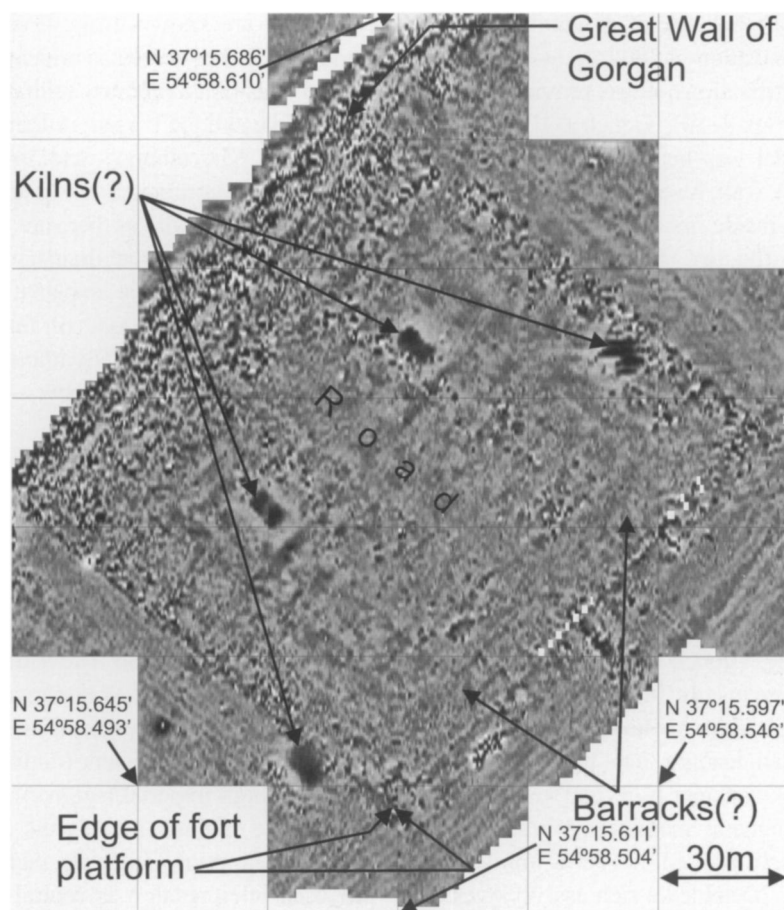


Fig. 11. Magnetometer survey of Fort 16: unclear traces of two barrack blocks and clear traces of four rectangular anomalies under the fort platform, almost certainly brick kilns (by RA, ME and MM, Abingdon Archaeological Geophysics and the ICHTO).

(excavated by Nokandeh and Omrani). At this point the Wall makes a dramatic change from a position north of the Gorgan River to one that occupies the south (or left) bank of the river where it is overlooked by high loess cliffs to the north. This would have placed the Wall in a position of military vulnerability. This impression is reinforced by the small size of the Gorgan River in this area (2–4 m. wide), and the lack of a ditch. The point where the Wall switched from the north to the south bank of the Gorgan River (and where it drops from the command of the limestone ridge) is therefore very significant.

II.9. Discussion

During the Parthian period, or perhaps somewhat earlier, the lands north of the Wall were well populated by agro-pastoral communities living in numerous settlements up to some 25 ha. in area. In other words, perhaps at the time

when the region fell close to the core of the Parthian Empire, settlements extended some way into the arid northern steppe. These settlements were then abandoned, so that when the Gorgan Wall was built, and the area lay closer to the northern fringes of the Sasanian Empire, the Wall cut through what a few centuries earlier had been a well occupied landscape. It is the intention of future field seasons to test this model further.

III. HINTERLAND FORTRESSES (EWS, EST, RA, MM, ME, CO, SU and BS)

In contrast to the Gorgan Wall forts, little was known about the date and function of large square fortifications south of the Gorgan Wall.²⁰ We thus selected Qaleh Kharabeh, a c. 650 x 650 m.-large square fortification

²⁰ Omrani *et al.* 2007: 130–31.

south of Fort 29 (Fig. 8), because of its good preservation, for survey and excavation in 2007. As with most of the other hinterland fortifications, it was provided with a raised corner citadel (Figs 8–10). Trench L (Figs 9–10) revealed that this citadel was heavily defended with a 4.40 m.-wide mud-brick wall. A second wall parallel to it and measuring 4.90 m. inside (inner to inner edge) and a third perpendicular to the two, partially unearthed in trench L, may conceivably form part of a corner tower. Seven graves, four of them covered with reused Gorgan Wall bricks, were left *in situ*, thus preventing us from excavating down to ancient levels in significant parts of the trench.

A magnetometer survey (Fig. 11), covering about one third of the interior of Qaleh Kharabeh, revealed in the eastern transect of the compound a large number of rectangular anomalies, arranged in neat parallel west-east-running rows—with *c.* 17 m.-wide access corridors between pairs of two rows each. A section through one of the rectangular anomalies (trench N) brought traces of a possible ditched enclosure to light, but no associated finds.

Permanent buildings seem to have lined the main roads. Notably the road leading into the fortification from the north (Fig. 10: “ancient N-S road”) is lined by a row of small high magnetic anomalies. We excavated one (trench M), which proved to be a mud-brick structure with a hearth. It yielded a rich assemblage of finds, notably pottery, animal bones (including fish from rivers, canals or the Caspian Sea, now *c.* 45 km. further west), charcoal, some glass shards and a significant quantity of iron fragments (unfortunately too corroded for identification, even after x-raying).

Before venturing any hypotheses on the purpose and historical context of Qaleh Kharabeh as a whole, it is necessary to evaluate the possible functions of its individual architectural components. Without knowing what, if any, structures occupied the citadel’s interior space in antiquity, any functional explanation has to remain hypothetical. Perhaps it served as a defensible retreat for high status occupants or a garrison during times when the vast main compound was unoccupied. The observation that it is surrounded by a ditch, cutting through the ramparts of the main compound, adds strength to the latter theory, though does not prove that this was its original purpose. A function as a watchtower and/or for signal transmission is also conceivable, and not necessarily mutually exclusive with the above theories.

Even more puzzling are the neatly aligned rectangular anomalies in the east of the compound. No parallels for such an internal layout of a Sasanian town or defensive

compound are known to us. It seems possible that the enclosure ditches served as drainage or boundary ditches around tents of a temporary military garrison. The use of tents in late antique Persian military camps is attested by Ammianus Marcellinus²¹ and Procopius.²² Why these enclosures are confined to the eastern geophysics transect is not clear, especially as there are no obvious differences in elevation and potential drainage problems between the two transects. Possible explanations include that the seemingly empty sections of the interior space were occupied by tents or yurts without drainage ditches—or that they were indeed left empty—for example as a space for horses or livestock.

The striking difference between the absence of finds from the (tent?) enclosure in trench N and the richness of finds from trench M calls for an explanation. The central position near the crossroads of the trench M house might suggest that it was a high-status building, but the small size would argue against this. Perhaps it is more likely that it represents one in a row of shops, workshops or magazines, which tend to line main urban traffic arteries in old bazaars and colonnaded streets in the ancient Near East,²³ and roads in ancient Mediterranean towns and in early and high imperial legionary fortresses.²⁴ The wide assemblage of finds, notably the evidence for extensive meat consumption, suggests that, whether or not the proposed interpretation as central supply facility of one sort or another is correct, these small room or house units also served as dwellings, probably for those operating these postulated storage, repair or redistribution centres.

The finds from trench M shed significant light not just on the manner of occupation of the compound, but also on its chronology. The pottery suggests that Qaleh Kharabeh dates to around the same time as the earliest occupation at Fort 4 (see section VII below). Qaleh Kharabeh, which may well be representative also for the other square hinterland compounds south of the Gorgan Wall, thus appears to have been constructed roughly contemporaneously with some or all of the Gorgan Wall forts. This and other architectural parallels (notably the association of roads with canals [see section IV below] and the projecting mud-brick towers, regularly spaced along Qaleh Kharabeh’s and the Gorgan Wall forts’ defences) suggests strongly that the Gorgan Wall and the square hinterland fortifications were part of the same

²¹ Ammianus Marcellinus 19, 7, 11.

²² Procopius, Wars 1, 5, 21–25.

²³ Ball 2000: 261–76.

²⁴ Petrikovits 1975: 51–54, 58, 96–97.

architectural scheme. Three possible interpretations are worth considering:

- Qaleh Kharabeh was an urban foundation created at about the same time as the Wall—perhaps part of a programme to deliberately bring new settlers into these fertile, and now more secure, borderlands,
- It was a heavily defended compound with temporary accommodation for the Persian field army, whilst fighting major wars in the north or
- It served as a defensible retreat for the frontier army during the construction of the Gorgan Wall and before troops were moved to the forts on the Wall.

Of these options, the first seems the least likely. Not only are no parallels known for an urban foundation, with a significant proportion of the interior space filled with small and presumably temporary enclosures, but, as most of the settlements north of the Wall appear to have been abandoned long before its construction (see section II.6 above), there is no obvious local population which needed resettling. This does not disprove the hypothesis that the Qaleh was a failed urban foundation, as the intended urban population could have come from south of the Wall or from further afield. Indeed, there appear to have been urban foundations, even if not yet precisely dated, notably the *c.* 338 ha. large Dasht Qaleh²⁵ with its recently detected vast structures, possibly consisting of parallel rows of brick pillars enclosing possible courtyards.²⁶ In contrast to the rectangular plans of the Gorgan Wall forts and the square shape of the hinterland fortresses, Dasht Qaleh is surrounded by a polygonal town wall. Rectangular compounds are ideal for military purposes, as they allow accommodating the maximum number of troops in rectangular tents or permanent dwellings, whilst enabling them to quickly reach the defences via a simple network of straight roads. In addition to Qaleh Kharabeh's ideal square plan, there are other indications to suggest a military function: its abandonment after an apparently short period of occupation and the scarcity of finds in most of the interior of the compound, are much easier to reconcile with a military installation—especially bearing in mind that army members on campaign had good reasons to avoid carrying non-essential bulky and fragile goods.

If Qaleh Kharabeh was occupied by the army, then the question as to whether we are dealing with field army (hypothesis 2 above) or frontier troops (hypothesis 3) deserves further investigation. The magnetometer survey of Fort 16 (Fig. 11) suggests that this particular fort overlies four brick kilns and thus was most probably not part of the original design. Whether this suggests that all forts were added to the Wall only after its completion and troops originally stationed in hinterland sites, like Qaleh Kharabeh (hypothesis 3), or whether many forts belonged to the original design and only some added later, is open to debate. Fort 16 is so far the only such military compound on the Wall known to overlie kilns. This observation, the fact that the pottery evidence for Qaleh Kharabeh and the earliest phase of Fort 4 are roughly contemporary and the large size of the hinterland fortresses, ideal for strong troop contingents, render explanation 2 the most likely. It is perfectly possible, even if far from proven, that compounds, like Qaleh Kharabeh, could have played a key role in one or more war(s), such as those fought by king Peroz against the Hephthalites.

Qaleh Kharabeh is, of course, only one of several square hinterland fortresses.²⁷ While further fieldwork is needed to test to what extent our conclusions about the foundation date and interior occupation of Qaleh Kharabeh hold true for its counterparts further east, the striking similarities in overall layout suggest that they should probably all be attributed to the same building programme. Whether Qaleh Kharabeh's early abandonment is mirrored in its "siblings" is as yet unknown. Even if the hinterland fortresses and the Wall forts were not occupied simultaneously for long, if at all, the sheer scale and number of the certain and probable military compounds in the Gorgan Plain demonstrate powerfully what resources the Persian Empire could muster in the fifth/sixth century A.D. to defend as little as a *c.* 200 km. stretch of vulnerable frontier. It suggests strongly that the late Sasanian army matched its Roman counterpart in numerical size and technical capabilities. The recent hypothesis, that the Sasanian army was probably substantially smaller than that of the Eastern Roman Empire,²⁸ now seems doubtful in the extreme (especially as the result of our excavations in Fort 4 suggest a high occupation density over a long period of time and not just during the construction phase).

²⁵ Kiani 1982: 48–52, figs 30–31, 33–35, pls 17,2–22,1.

²⁶ Amin Pour and Omrani 2007.

²⁷ Omrani *et al.* 2007: 130–31.

²⁸ Börm 2007: 161 with no. 8.

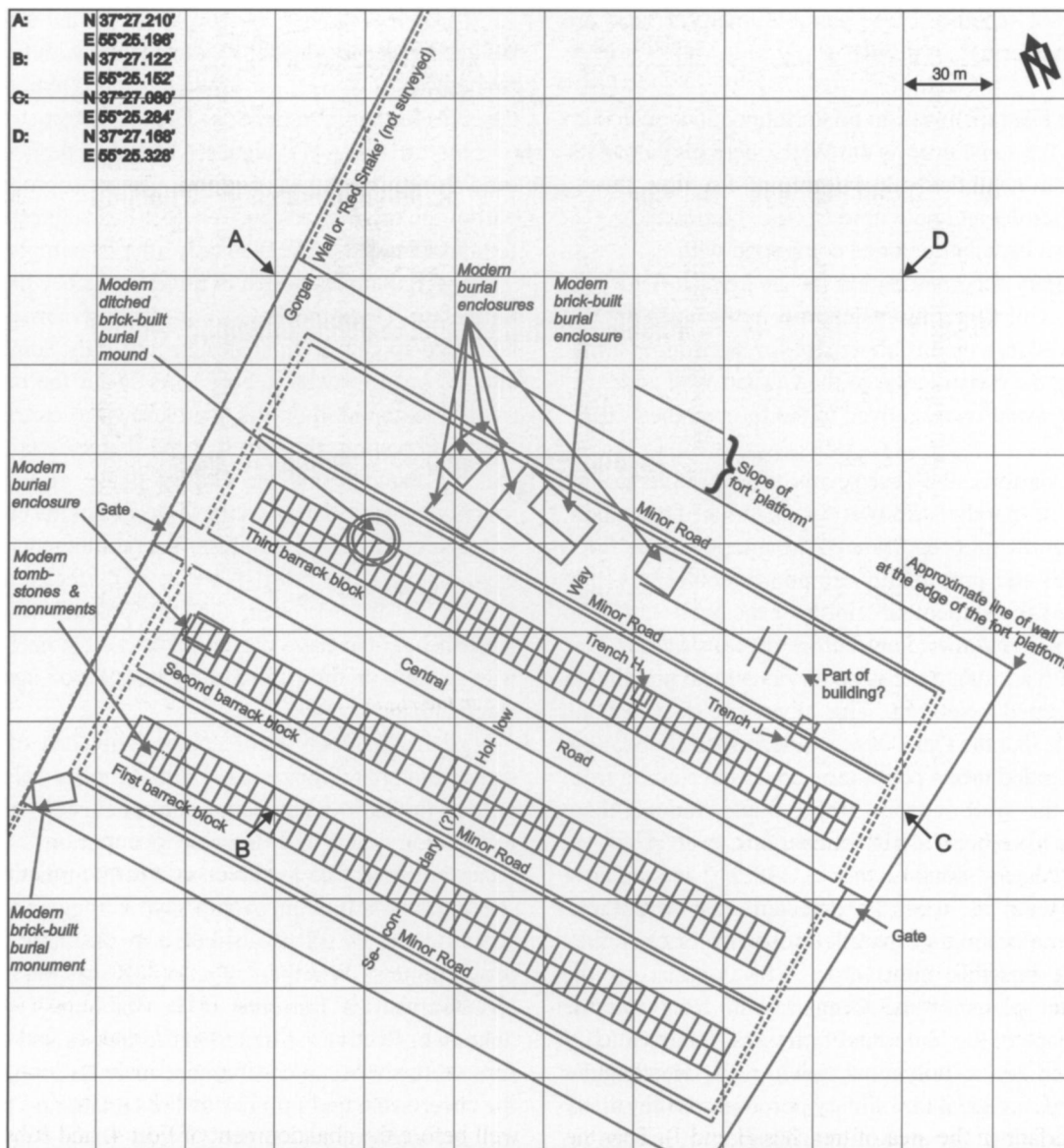


Fig. 12. Plan of Fort 4 with the location of trench J.

IV. THE INTERIOR OCCUPATION OF A GORGAN WALL FORT (GA, EWS, EM, EST, SP, BS and MF)

The pottery analysis (see section VII below) suggests that the earliest features in Fort 4 and in Qaleh Kharabeh are of broadly similar date. The 2007 excavation in trench J (Fig. 12) revealed also a possible parallel in their infrastructure (i.e. their roads and associated canals), suggesting that some or all of the Gorgan Wall forts, and some or all of the hinterland fortresses, may belong to the same grand building programme. The trench aimed at

clarifying the function of a linear anomaly, first thought to be part of an enclosure. Excavation, however, revealed that this anomaly was caused by a subsidiary road with paving consisting of stone cobbles and brick fragments and a *c.* 0.30 m. wide and *c.* 1.80 m. deep stone-lined gully on its west side (Fig. 13). The gully was within an earlier filled-up ditch, originally *c.* 2.10 m. wide and flat-bottomed. The greenish iron staining of the bottom fill of the ditch (J.020) and that of the gully (J.018) suggests that both successive features had carried water. While a drainage purpose cannot be excluded, the elaborate stone-lining of the gully, its (for such a purpose)



Fig. 13. Trench J with the subsidiary road and stone-lined gully, looking in a south-easterly direction. The road overlies one certain and a second possible pit/well (half-sectioned in the sondage; note the cluster of brick fragments in its fill, between the sondage and the road). One of the ovens is visible near the right margin, a second is (scarcely visible) just behind the road, a third (half-sectioned), at a much higher level, on the baulk on the left, where there are also parts of a late brick paving. The red and white segments of the scales measure 0.50 m. each.

unnecessary depth and impractical narrow profile with vertical sides, and the observation that the ditch and later gully line the road on one side only, render it more likely that we are dealing with water supply canals rather than a drainage ditch and gully.

Natural soil was encountered at *c.* 95 m. OD in a sondage in trench J (matching strikingly the base of a barrack block's mud-brick wall in nearby trench H at 95.04 m. OD—probably the approximate level of the ancient surface in the area of trenches H and J). That the ancient surface level in the area of trenches H and J appears to have been similar is further circumstantial evidence to suggest that the barrack blocks were built at ground level, had no cellars and were at least two storeys high.²⁹ The remarkable elevation of the road paving, 1.80 m. above the postulated ancient ground level, may indicate that it was on top of a causeway, built specifically to channel water into the fort.

The long occupation of Fort 4 led to sediments building up on either side of the causeway and its eventual disappearance under rising levels of debris. By contrast, Qaleh Kharabeh's presumably much shorter

occupation, and the much lower quantity of occupation debris building up, has preserved the two main roads as distinct causeways to the present day (Fig. 8). No section across the north-south road has been surveyed, but the west-east road in the Qaleh displays a distinct linear anomaly close to its crest (Fig. 10), almost certainly caused by a canal. Such raised canals would have allowed the use of water (e.g. for brick-making) without employing water-lifting devices. The gully fell out of use well before the abandonment of Fort 4, and subsequently much occupation debris accumulated in its middle (J.021) and upper fill (J.009) (see section VII below). Complex water supply systems are one of the hallmarks of Sasanian engineering. The famous ancient university town of Jundi Shapur in Khuzestan, for example, was supplied with water from the perennial River Dez via a *c.* 14 km. long canal and an elaborate tunnel system³⁰—mirroring the scale and technical sophistication of the installations supplying the Gorgan Wall forts with water from the Gorgan River.

²⁹ Omrani *et al.* 2007: 121–23.

³⁰ Adams and Hansen 1968: 59–63; The authors are grateful to Mr Housein Yousefifar for showing us the impressive remains of the system in December 2007.

If we are right in thinking that Fort 4 and Qaleh Kharabeh were, initially at least, supplied with flowing water, then this need not have been their only source of water. Sealed underneath the road paving was the probable corner of the curb of a pit or well at *c.* 96.36 m. OD, consisting of large fired brick fragments, the unbroken straight sides facing inside. Our sondage revealed that this curb overlay a deep pit, which we explored down to a depth of *c.* 92.74 m. OD. Its dimensions (*c.* 1.25 m. north-south and *c.* 1.50 m. west-east, as far as they can be reconstructed on the basis of a partial excavation) would be perfect for a well. If so, it is likely to have been much deeper, and the hazardous shaft would probably have been filled up deliberately soon after its abandonment. The early pottery from the deepest excavated deposit in its fill (J.027) (see section VII below) provides us with a *terminus post quem* for the date of its abandonment and, possibly, a *terminus ad quem* for any redeposited early occupation debris accumulating within the fort. Too little was excavated of a second feature in the sondage to the west of this postulated well to offer a certain interpretation. Yet, its depth (reaching down to the bottom of the sondage and possibly beyond) and the early pottery from its lowest fill (J.030) suggest a possible second well.

The trench also contained two ovens on either side of the road and at a similar level, as well as a third oven next to a paving of fired bricks (of 0.40 x 0.40 m., the typical size of bricks from this section of the Gorgan Wall) at 0.65–0.90 m. above the road paving (Fig. 13), suggesting that the area of trench J may have played a role in food preparation over some time. The complexity of the multi-phase stratigraphy and the large quantities of pottery and animal bone add strength to our assumption that Fort 4 was occupied for a considerable period of time, perhaps from the construction of the Gorgan Wall (in the fifth century?) to its abandonment (possibly in the first half of the seventh century). Further samples for scientific dating, taken from trenches J, G, L, M and O and Sadd-i Garkaz in 2007, should hopefully allow us to refine the chronology of the Walls and associated installations, but are not yet available.

V. UNDERWATER SURVEY (JJ, HO, EWS, BS and JR)

From a previous underwater survey we know that the Wall of Tammishe runs into terrain now flooded by the

Caspian Sea.³¹ The 2007 season provided the opportunity to explore the flooded remains of the Wall in more detail. Notably a satellite image (Fig. 14), first studied by Tony Wilkinson and Nikolaus Galiatsatos, shows a well-defined rectangular to rhomboid platform of *c.* 60 x 110 m. size on the seabed, its west (enemy) side in almost perfect alignment with the Tammishe Wall, and also an oblong one, extending further into the Sea. We first carried out a systematic depth survey of transects through the Gulf of Gorgan, on the premise that any preserved or collapsed section of the Wall should form detectable ridges above the sea floor. While further work is needed to firmly link the results of the depth survey with the features visible on the image, several promising features were explored by diving transects. In one area, centred on 36 x 48.616' north and 54 x 01.251' east, bricks from a 12 x 2 m. large area were systematically collected and weighed, yielding an average of 6.3 kg. of bricks per square m. (or 8.3 kg. per square m. in four adjacent 2 x 2 m. squares). The sheer quantity and wide spatial distribution of Sasanian brick fragments, occasionally associated with Sasanian pottery, from the seabed in the Gulf of Gorgan, eradicates any doubt that there were extensive Sasanian fired brick structures. Whilst flooded now by the Caspian Sea, due to a rise in its water level, they must have been on dry land (or, possibly partially in shallow water) when constructed. That these brick scatters and zones of more shallow water cluster along the alignment of the Wall is hardly fortuitous. As neither the wide distribution of brick nor the platform can be explained with a single linear feature, we have to assume that, in addition to a continuation of the Tammishe Wall, there were other Sasanian features. These may well have included a fort (the rectangular to rhomboid platform visible on the CORONA satellite image?). The seaside terminal of the Wall would have formed an attractive location for a potential harbour. Any associated brick-built installations might have contributed to a wide scatter of brick fragments, even if much more extensive mapping of the ancient debris will be required to test this hypothesis. It is, of course, also possible that the Wall extended much further north—and while the alignment of the Tammishe Wall might argue against it joining up with the Gorgan Wall,³² further research is needed to settle the question.

³¹ Nokandeh *et al.* 2006: 152; Omrani *et al.* 2007: 112–13.

³² Omrani *et al.* 2007: 112–13.



Fig. 14. Satellite image of the Wall of Tammishe, including probably associated flooded features in the Gulf of Gorgan. CORONA satellite image by courtesy of the US Geological Survey.

Interesting in this context is that the Arab geographer Dimishqui (A.D. 1256–1327) attributes the foundation of the Caspian Sea port at Abskun to Kavad I (A.D. 488–531).³³ Traditionally, Abskun has been identified with Gomish Tepe, presumably just south of the western section of the Gorgan Wall.³⁴ In the light of the Caspian Sea's lower water table at the time of the Wall's construction, this prominent settlement mound would have been even further inland some 1,500 years ago than it is now.

If the identification is, nevertheless, correct (and it would fit the descriptions of later medieval authors),³⁵ then any associated harbour has to be sought further west. If Dimishqui³⁶ is right in postulating the foundation of a harbour at the south-east corner of the Caspian Sea under Kavad I, despite writing some eight centuries later, then the Walls may also have served to protect maritime trade across the Caspian Sea. Frye³⁷ argued, albeit on the basis of circumstantial evidence, that trade across the Caspian

³³ Mehren 1874: 314; cf. Frye 1972: 267; Schippmann 1990: 90–91.

³⁴ Bosworth 1985; Omrani *et al.* 2007: 112.

³⁵ Bosworth 1985.

³⁶ Mehren 1874: 314.

³⁷ Frye 1972; cf. Harper 2000: 48–49.

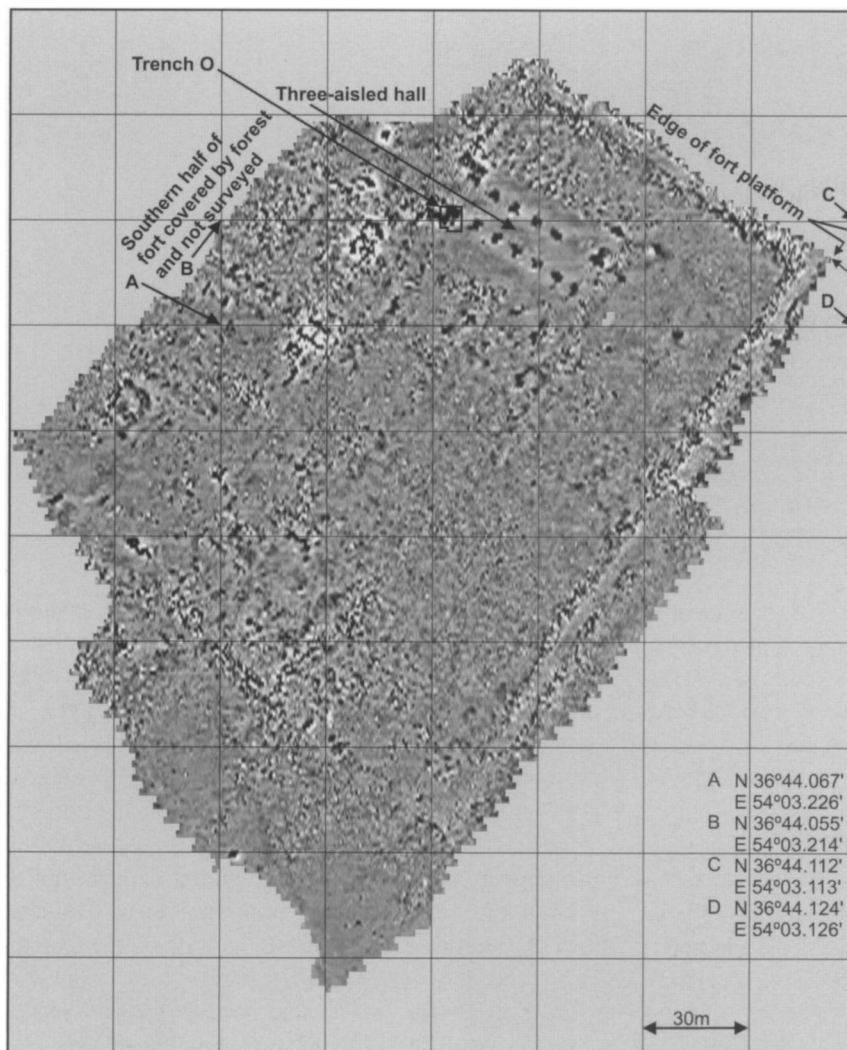


Fig. 15. Magnetometer survey of the northern part of the Bansaran Fort with dense interior occupation, including a prominent three-aisled hall (by CO, RA, MM, ME and JR, Abingdon Archaeological Geophysics and the ICHTO).

Sea and along the Volga and Kama Rivers expanded in the late Sasanian period, and that it involved the export of Persian silver vessels into territories far beyond the Caspian Sea's northern shore. If so (and this theory has gained further strength by the discovery of predominantly fifth to seventh-century Sasanian coins from graves in the same area),³⁸ the Gorgan and Tammishe Walls may have created the secure and stable conditions needed for creating, in a literal sense, a safe haven for long-distance trade, even if their main function was undoubtedly to protect other economic and agricultural assets of the rich and fertile Gorgan Plain.

VI. CONTINUITY OF OCCUPATION IN THE BANSARAN FORT (GA, EWS, RA, ME, MM, CO, HO and SP)

Parts of the interior of the Bansaran Fort, 500–700 m. west of the Tammishe Wall at the foot of the Elburz Mountains, had already been explored before, most recently in 2005, when a *c.* 33 x 53 m. large three-aisled brick hall was discovered.³⁹ The 2007 season offered the opportunity to extend the magnetometer survey over all parts of the fort (Fig. 15), except for the forest-covered south. Whilst the three-aisled hall remains the most prominent feature, it appears that it is part of a larger complex filling much of the interior. Whether some of

³⁸ Goldina and Nikitin 1997.

³⁹ Nokandeh *et al.* 2006: 156–58.



Fig. 16. A brick pillar with parts of the entrance façade of the three-aisled hall in the Bansaran Fort (trench O), looking south, with the forest-covered part of the fort and the Elburz Mountains in the background. The red and white segments of the scales measure 0.50 m. each.

the remains are those Ibn Isfandiyyār saw in the thirteenth century, and thought to be the ruins of a legendary palace,⁴⁰ is open to debate. The sparing use of fired brick (to judge by the magnetometer survey) suggests that this expensive material was mainly employed for load-bearing elements of the tallest buildings, e.g. the pillars of the hall and two possible rectangular features south-east of it, possible elements of a monumental façade, minarets or other towers.

We excavated one of the pillars, measuring 3.00 x 3.30 m., excluding the adjoining parts of the entrance façade of the three-aisled hall (Fig. 16). The pillar was stabilised by a deposit of soft mid-yellowish brown silt with c. 60% of fine to coarse pebbles and fragments of ceramic building material in the foundation trench—a further indication that it was designed to carry substantial weight: probably the high roof of an imposing monument? The size of the pillar's bricks (28 x 28 x 5 to 6 cm.) differed from those on the Gorgan and Tammishe Walls, suggesting that the hall was not part of the same building programme. A later date is also indicated by a preliminary analysis of the small pottery assemblage. Scientific dating should hopefully confirm and refine, or correct, our current assumption that the hall is later than the Walls and that it dates to the early Islamic period (or, possibly, just before). Should it prove to be early Islamic, then it may well be an early mosque. We encountered an earlier charcoal-rich occupation layer underneath the level of the three-aisled hall's foundations, but did not reach the natural soil. We hope that radiocarbon dating

will establish whether or not this occupation layer is Sasanian. The location of the Bansaran Fort on a platform similar to those of the Gorgan Wall forts and finds from excavations in 1964⁴¹ indicate, in any case, Sasanian origins. The reasons why the Bansaran Fort, unlike those on the Gorgan Wall, presumably continued to be densely occupied in the early Islamic period have to be sought in the exceptional fertility of the surrounding coastal plain and its humid climate, not to mention the vicinity of the important early medieval town of Tammishe. By contrast, the forts on the Gorgan Wall, in land of far lower agricultural potential, and not on any major traffic route, were far less attractive places to inhabit, once the Wall had been abandoned.

VII. POTTERY FROM THE GORGAN WALL: A LATE SASANIAN "MILITARY" ASSEMBLAGE (SP)

The study of pottery recovered as a result of excavations and survey associated with the investigation of the Gorgan Wall has an important contribution to make in relation to the project as a whole. Of primary importance is the potential to establish a relative chronology to compliment that of the absolute dating program. As the relationship between the two is developed and strengthened, the ability to recognise significant temporal relationships "on the spot" becomes an increasingly powerful tool in investigating and recording.

⁴⁰ Browne 1905: 16.

⁴¹ Bivar and Fehérvári 1966.

More immediately, pottery associated with the Gorgan Wall provides a significant opportunity to characterise the assemblage from contexts that are securely dated. The study of Sasanian ceramics in general has been plagued by insecure dating, insufficient attention to detail, and the prevalence of chronologically contaminated contexts.

The main aim for the first season of the pottery study was to define the ceramic assemblage typically associated with the use of the Gorgan Wall. A number of fundamental questions needed to be answered at the outset:

- Was there any detectable change in the ceramic assemblage between the earliest and latest deposits excavated?
- Did the ceramic assemblage compliment the scientific dating that places all activity associated with the Gorgan Wall within a relatively narrow 150 year time period?
- Does the ceramic assemblage provide an indication of the type of activity associated with the Wall, for example domestic occupation?

During the first two seasons of fieldwork, the main emphasis was on the absolute dating of the Wall, and most excavations were targeted at low finds-yielding contexts, such as brick kilns and the Wall itself. This pattern changed at the end of the second and continuing into the third seasons, as greater emphasis was given to the use and occupation of the Wall.

So far, the major body of material that has been studied in detail comes from two trenches within one of the Wall forts, Fort 4.

VII.1. Trench H

Trench H encompassed the adjacent corners of two rooms in one of the *c.* 228 m. long buildings detected by magnetometer survey (Fig. 12).⁴² The excavations did not produce an abundance of finds, but the 143 sherds, concentrated mostly towards the floor level, do suggest domestic use. This is consistent with the interpretation of these buildings as barrack blocks.⁴³ Seven sherds from trench H showed signs of having been burned after breakage with black staining across the core. Evidence of burning was not noted as a prominent feature within the excavation deposits, and this may or may not be a

significant feature. Most of these sherds were concentrated between 96.38–96.45 m. OD, which falls within the upper part of the occupation layers and at a similar elevation to a “red storage vessel” (H.025).⁴⁴ This is actually a medium sized jar with relatively thin walls, not by regular definition a storage-jar, and the “organic residue” noted inside is a patch of bitumen that has been used to seal a crack in the base of the vessel that opened during firing. Part of a recycled vessel and burnt sherds may be the sort of material that would accumulate within a building as it was being abandoned.

VII.2. Trench J

This second trench was opened in 2006 and completed in 2007 over one of the subsidiary route ways in Fort 4 (see section IV above). The upper layers of the stone-lined gully west of the road produced a particularly rich accumulation of pottery, and the addition of a larger body of material sealed within a securely dated sequence proved to be of great value in defining the assemblage relating to the occupation of Fort 4.

VII.3. Processing

The ceramic assemblage from the two trenches was studied in detail during the 2007 season, in order to lay down a precise framework for the classification of the pottery associated with the period of the Gorgan Wall's use. In the analysis of the material there is a clear disparity between the two areas, with trench H producing 143 sherds, while trench J yielded 2,125. Trench J was therefore used to provide the primary basis for the classification. Close to the end of the season, large amounts of pottery started to be recovered from Qalah Kharabeh and to a lesser extent the Bansaran Fort. Time only allowed basic processing of this material and the recording and analysis of these assemblages awaits another field season.

In order to provide a reliable foundation for the classification of the assemblage, it was necessary to see all of the pottery spread out together (Fig. 17). This seemed particularly important for an assemblage, which, on first impressions, displayed limited obvious variation. On the Gorgan Plain one is essentially dealing with a landlocked

⁴² Omrani *et al.* 2007: 113–26.

⁴³ Omrani *et al.* 2007: 114–16.

⁴⁴ Omrani *et al.* 2007: 125.



Fig. 17. All of the pottery from trench J spread out together for sorting by class.

area, where a similar range of fabrics appear to have been used over long periods of time.

VII.4. The assemblage

The assemblage from Fort 4 contains no glazed pottery⁴⁵ and very little material with surface decoration (Fig. 18

and Table 1). The most common classes are plain vessels with a fine, hard fabric and burnished surfaces (REDBUR, PINBUR, MOTBUR). The most common form for these classes is a small to medium sized jar with an off-set rim (Type J1). There are also two well represented classes with an unburnished cream coloured fabric (SELSCEP, CREWE). The most distinctive class is a coarse white grit-tempered cooking-pot (WIGTEM). These vessels all have the same form with a round bottom, a low squat profile, a flaring rim and rounded handles attached at the shoulder (Type CP1).

⁴⁵ The absence of glazed pottery up until the early Islamic period has also been noted at Merv (Herrmann *et al.* 1993: 52) and in previous excavations of the Gorgan Wall (Kiani 1982: 36). In the case of the Gorgan Wall this requires further critical examination. At least three sherds seemed to have very small traces of a green alkaline-glaze adhering. It may be that a small portion of the classes with cream coloured fabric (CREWE, SELSCEP) were originally glazed and that the glaze has exfoliated. In some cases it is

difficult to differentiate between post-depositional accretions and degraded glaze remnants.

TABLE 1. Summary of the classes recognised within the Fort 4 assemblages from trenches J and H.

Class Code	Class Name	Types	Description
CREWE	Cream Ware		Hard, cream-coloured fabric with plain unburnished surfaces.
MIGTEM	Mixed Grit Tempered Ware	CP2	Brittle, heavily reduced dark-brown or orange cooking pots tempered with a mixture of grey and red schist flakes and crystalline grits. Surfaces are decorated with impressed horizontal and vertical groves.
MOTBUR	Mottled Brown/Purple Burnished Ware		Hard, brown, purple, dull orange or grey slightly soft fabric. Surfaces are burnished with heavy striations. Mostly undecorated.
OVEN	Oven Fragment		Small roughly formed blocks derive from the broken up sections of crudely formed coil-built oven walls.
REDBUR	Fine Burnished Red Ware	J1, J3	Hard, red, orange or pink earthenware with occasional patches of reduced grey. Walls tend to be thin and are always burnished with strong striations. Undecorated.
REDPLI	Plain or Incised Red Ware	J1, J2, J4	Hard, orange earthenware sometimes with a reduced grey core. Surfaces are mostly unburnished and have incised decoration.
REDREG	Reduced Red and Grey Ware		Hard, slightly brittle fabric fired through the core to a dull oxidised orange-brown. Exterior surfaces are consistently reduced to a smoky grey. Undecorated.
PINBUR	Fine Burnished Cream/Pink Ware	J1, J3	Hard, pink, cream or light orange fabric often reddening towards the core. Surfaces are smooth and burnished with strong striations. Undecorated.
SELSCEP	Self-Slipped Cream and Pink Ware	B1, B2	Hard earthenware, light pink to cream through the core turning to cream on the surface. Surfaces are unburnished. Mostly undecorated.
SMOG	Smooth Grey Ware		Hard, consistently reduced light grey earthenware with a distinctive smooth chalky feel. Undecorated.
SOBRO	Soft Brown Ware		Hard, orange/brown earthenware with a smooth leathery feel. Surfaces are heavily worn.
SOREB	Soft Red Burnished Ware		Hard, brown earthenware with a smooth reddish brown slipped and burnished exterior and thick cream slipped interior.
WIGTEM	Coarse White Grit Tempered Ware	CP1	Brittle, coarse, white grit-tempered, hand-built cooking-pots fired either to a buff-brown or black.

VII.5. Analysis

There are two factors that make attention to vessel form and diagnostic type particularly important for the ceramic assemblage of Golestan. First, the lack of significant diversity caused by the absence of imports in an essentially landlocked setting, and second, the apparent continuity of fabric composition and firing modes across chronological periods, which is most clearly observed in multi-period surface survey assemblages. Unfortunately only a very small proportion of pieces from the excavations are diagnostic. From the collection of over 2,000 sherds from trench J, just 10% come from rim or base portions (Fig. 19). In general bases tend to be signif-

icantly less diagnostic, and within this assemblage almost all bases are flat and otherwise featureless. This leaves just 6% of rims as diagnostic sherds.

Breaking the assemblage down first by class and then into broader class families, it is possible to gain some impression of its functional composition (Fig. 20). Cooking-pots form an important component, though their concentration tends to vary depending on the nature of the contexts. This is likely to partially reflect context use, but may also be related to conditions of preservation. Conditions in the gully, where there is a high concentration, may have been better suited to the survival of this particularly fragile class. Alternatively, if the gully functioned as a drain rather than as a water channel, then

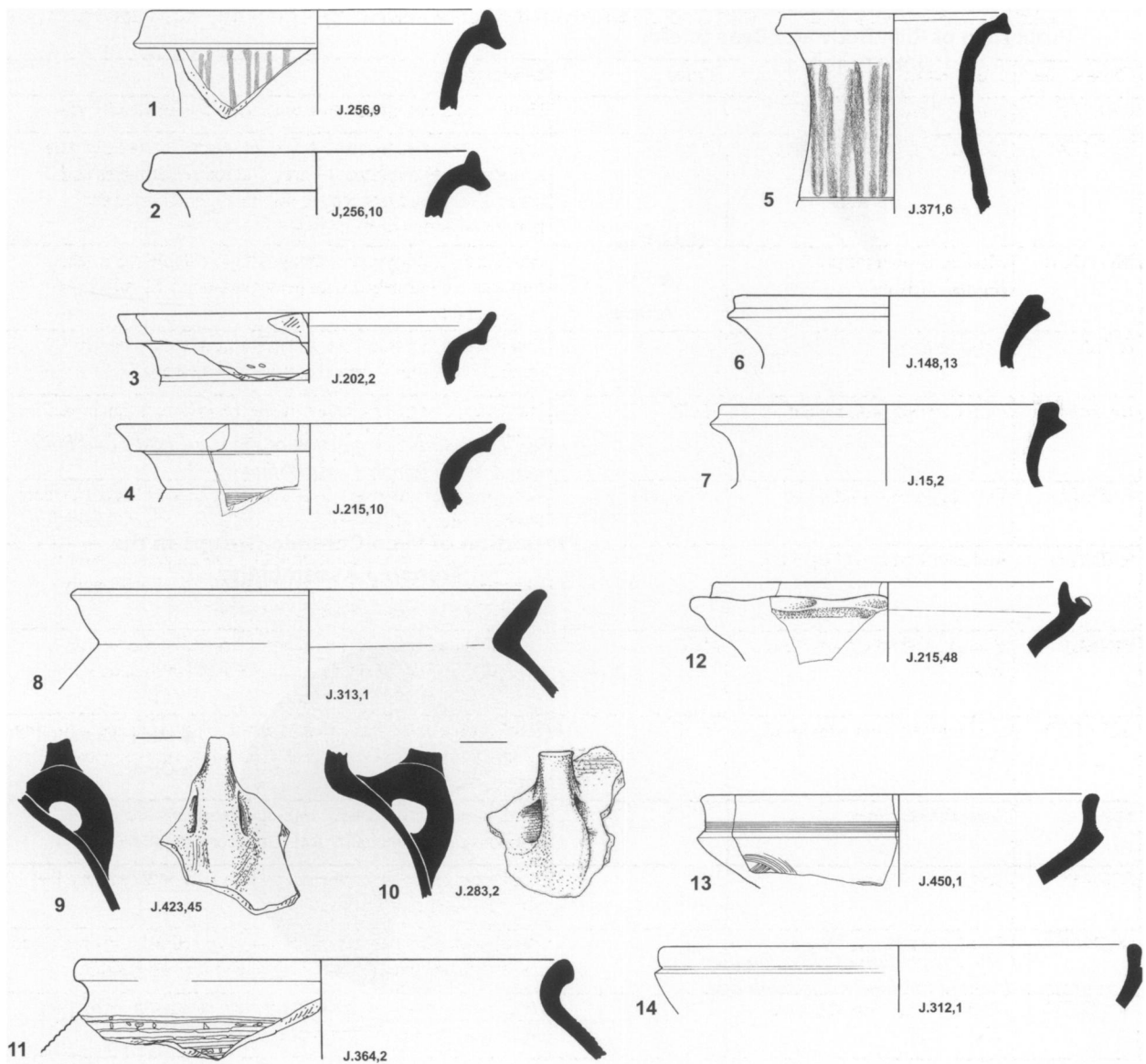


Fig. 18. Illustration of the diagnostic types within the Fort 4 assemblage. 1–2 = J1; 3–4 = J2; 5 = J3; 6–7 = J4; 8–9 = CP1; 10 = CP2; 11 = B1; 12–13 = B2, drawn by Mohaddeseh Mansouri Razi. Where there are repeated examples of a particular form, two at a minimum, a type number has been assigned and recorded. Type groups are subdivided by broad vessel category into cooking pots (CP1>), jars (J1>) and bowls (B1>).

broken cooking-pots may have been deliberately added in order to break up the accumulation of fine sediment and prevent drain blocking.⁴⁶

⁴⁶ I am grateful to Dr Jonathan Tubb for providing this suggestion based on his experience at Tel es-Sa'idiyeh in Jordan and other excavations.

Another feature that may be of importance is the composition of the assemblage in terms of vessel shape and size. Just 4% of the sherds in the assemblage come from bowls. Almost all vessels are jars and most fall within a small to medium size range. Notable is the rapid fall off in the proportion of vessels within the assemblage over the 21–25 cm. rim diameter range (Fig. 21). There

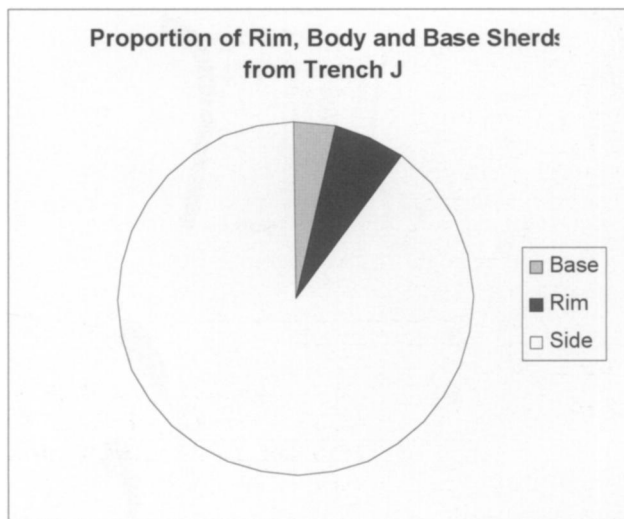


Fig. 19. Relative proportion of the rims, bases and body sherds in the trench J assemblage.

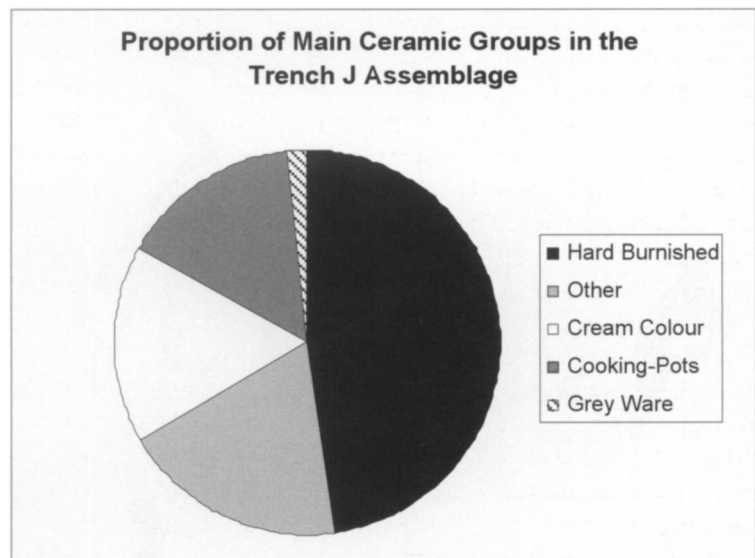


Fig. 20. Proportion of class families represented within the trench J assemblage.

are very few large vessels and no sherds that one would characterise as storage-jars. This seems to be a peculiar feature, and there remains a distinct possibility that the functional composition represents a particular hallmark of the late Sasanian military assemblage.

Apart from the functional composition of the assemblage, one of the most important features to note is that the classes from both of the trenches within Fort 4 are the same. Also all of the classes are represented from the uppermost layers down to the lowest deposits, with one important exception (see below). This seems to fit well with the idea that the major occupation and use of the Gorgan Wall and its associated forts, falls within a relatively narrow time-span.

VII.6. Early Material

By far the most interesting chronological dimension that was established, came from two deposits of differing soil colour and with a greater concentration of finds that were picked up at either end of the deep sondage in trench J (contexts J.027 and J.030). Unfortunately due to the constraints of time and safety, it was not possible to continue the exposure of these features or to provide a conclusive interpretation of their use. What is clear is that they occur at an elevation below the foundations of the barrack blocks in trench H and are probably, therefore, pits or wells reaching underneath the original ground surface.

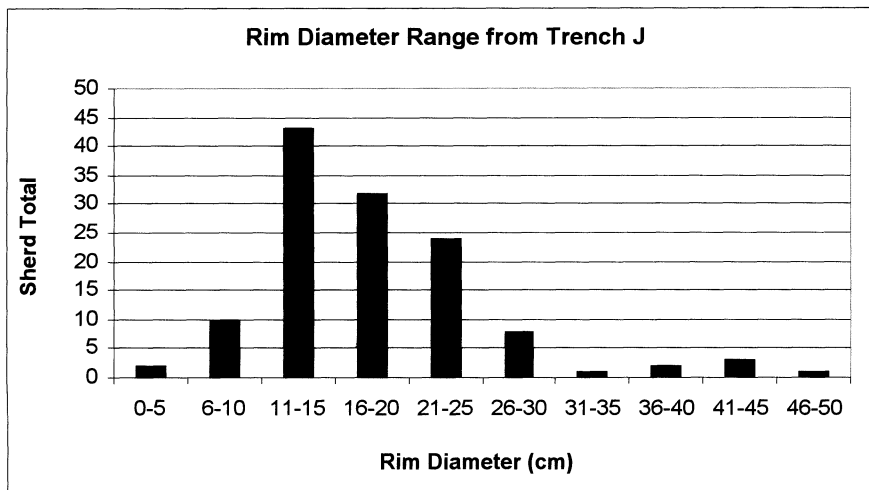


Fig. 21. Number of rims within the trench J assemblage broken down according to estimated diameter range.

Amongst the small assemblage recovered from contexts J.027 and J.030, there were just three sherds of a very distinctive cooking-pot (MIGTEM). These have a different form and fabric to the main cooking-pot class found through the rest of the sequence (WIGTEM) and have impressed markings covering the exterior. The material did not immediately stand out until pottery started being recovered from a second site that was being excavated at Qaleh Kharabeh, notably from trench M (see section III above).

It is significant that all aspects of the ceramic assemblage from Qaleh Kharabeh are different to the main deposits associated with the use of the Gorgan Wall at Fort 4. Also, the ubiquitous cooking-pot from Qaleh Kharabeh is the same as the distinctive sherds recovered from the deepest deposits at Fort 4. Although the evidence at present rests on just a few pieces, the association is very strong and the implications are clear. Qaleh Kharabeh was occupied in the same period as the first activity at Fort 4, most likely its foundation. Could it be that Qaleh Kharabeh acted as a temporary installation used by soldiers involved in the Wall's construction or in shoring up the border regions to make construction possible?

VII.7. Discussion

Clearly this is just the beginning and much more remains to be learnt about the sequence of events associated with the construction and use of the Gorgan Wall. One of the first questions, that needs to be answered, is whether the main Fort 4 assemblage is replicated along the length of the Wall (i.e. those classes represented in Table 1 other

than MIGTEM). Also, what is the broader geographic distribution of this assemblage? Some of the material excavated appears to have good parallels with the assemblage described by Kiani, particularly the group of "Sasanian red wares".⁴⁷ The exception here is any mention of cooking-pots, however the pottery report is selective and these may have been encountered, but omitted from the description.

The most substantial and well documented sequence for the Gorgan region to date comes from Tureng Tepe situated south of the Gorgan Wall. The uppermost 5 m. of deposits in the "Grand Tepe" cover the period from the third–fourteenth centuries.⁴⁸ The major structure within this period is a Sasanian mud-brick fortification. After the fort was abandoned, the site was reused as the setting for a small fire temple, dated to the seventh/eighth centuries. Minor activity, mostly involving the excavation and filling of pits, continued into the Islamic period.

It is surprising, given the chronological overlap between the Tureng Tepe sequence and the use of the Gorgan Wall, that there is not a close association in terms of the pottery. There are some indications of a link between the latest occupation of the fort (Periods VIA/B) and the assemblage from Qaleh Kharabeh, particularly in the two pieces of coarse incised cooking-pot⁴⁹ and numerous jars with flaring necks and a simple bevelled lip. For the assemblage from the main part of the sequence at Fort 4 the best parallels are with Period VIIC, with, for example, "lid-bowls", a very specific lamp form and a

⁴⁷ Kiani 1982: 21, 36, figs 27.3, 28.

⁴⁸ Boucharlat and Lecomte 1987; Whitehouse 1992: 380–81.

⁴⁹ Boucharlat and Lecomte 1987: fig. 54.14–15.

glass flask.⁵⁰ Period VIIC also contains numerous coarse round bottomed cooking-pots, “*céramique grossière*”. Some have a distinctive notch on the inside of the rim for a lid, but the simple form with an everted lip⁵¹ could be the same as the main cooking-pot class from Fort 4 (WIGTEM, Type CP1). The problem with Period VIIC is that the pits were excavated after the abandonment of the fire temple and they also contain quantities of material clearly dating to the ninth–tenth centuries. This question needs to be looked into in more detail.

Elsewhere on the Gorgan Plain, the material from the upper strata at Shah Tepe⁵² appears to be dated later than the occupation of Fort 4 and finds better association with the early Islamic levels represented at the Bansaran Fort on the Tammishe Wall.⁵³ Moving further north, there are no obvious parallels with a small selection of material presented from survey in the Atrek Valley, though there are superficial points of similarity in the description.⁵⁴ One site with good parallels for both the main jar and cooking-pot forms represented at Fort 4 (Types J1 and CP1) is the unpublished site of Khalni Depe, excavated by Soviet archaeologists in the Misrian Oasis in Dehistan.⁵⁵ Dehistan clearly falls within the same geographical catchment as the Gorgan Plain.

Looking more widely to material of comparative date from Merv⁵⁶ to the east, or Shahr-i Qumis⁵⁷ and Damghan to the south,⁵⁸ there are no obvious points of comparison. This points again to the fact that the distribution of pottery across the Sasanian Empire was firmly bound by the major geographic lines of demarcation.⁵⁹ If one goes south of the Elburz or east of the Kopet Dagh, it appears that one enters a new cultural world. Not just in terms of clay sourcing and product distribution, but

also to a significant extent in terms of vessel forms. Presumably this must be a basic reflection of differing patterns of consumption. Although this is a small and rather modest contribution, it is particularly encouraging to see how the study of pottery can feed rapidly into much larger questions relating to the project as a whole.

VIII. CONCLUSIONS

While more fieldwork is required to obtain an absolute chronology for settlement expansion and abandonment in the strip of land north of the Gorgan Wall, it now seems that most sites in this area had long been derelict by the time the Wall was built. By this time the Wall had cut across two redundant canals, which had once supplied a thriving agricultural landscape with water. By contrast, Qaleh Kharabeh south of the Wall may date to around the time of the Wall's construction. This observation, and the discovery of remarkably regular rows of enclosures in the interior, indicate that this fortress (and probably the architecturally similar other large square hinterland fortresses) played an important military role during the construction and/or early occupation of the Wall. New evidence emerged to suggest that some of the water, needed for brick production to build the Wall, was channelled there over some distance via an aqueduct (rather than coming from a reservoir, as thought before). Fieldwork in Fort 4 and Qaleh Kharabeh yielded yet further insights into the sophisticated technology used by the Sasanians to supply these sites with water. Diving operations confirmed the presence of extensive collapsed brick-built structures where the roughly contemporary Tammishe Wall runs into terrain now flooded by the Caspian Sea. The exploration of a three-aisled hall in a fort near the Tammishe Wall added strength to literary sources, which suggested that installations associated with this Wall outlasted the Gorgan Wall. Pottery analysis and a scientific dating programme are beginning to build up a detailed picture of the relative sequence and absolute dating of these key developments: the early settlement expansion into the steppe, followed by the construction, occupation and decline of two major linear barriers and their associated forts and fortresses.

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⁵⁰ Boucharlat and Lecomte 1987: figs 81.a–f, j–k, 103.14.

⁵¹ Boucharlat and Lecomte 1987: fig. 84.a–c, h–j.

⁵² Arne 1945: pl. 88.723a–c.

⁵³ Bivar and Fehérvári 1966: 46, pl. IV.a–f.

⁵⁴ Venco Ricciardi 1980: 67, note 24, figs K.1–10, L.1–3.

⁵⁵ Sarianidi 1952: figs 7.7–8, 12–13, 17; I am grateful to Dr St John Simpson for bringing this site to my attention and providing the reference.

⁵⁶ In addition to the published pottery Seth Priestman has been able to look through the large collection of the pottery from Merv held in the Middle East Department at the British Museum. I am extremely grateful to Dr St John Simpson for guiding me through the material.

⁵⁷ Hansman 1968: 127; Hansman and Stronach 1970: 55–56, 61.

⁵⁸ Trinkaus 1986.

⁵⁹ Simpson 1997: 74; Huff 1987: 307.

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Bibliography

- Adams, R.McC. and Hansen, D.P. 1968. "Archaeological Reconnaissance and Soundings in Jundi Shāpūr", *Ars Orientalis* 7: 53–70.
- Amin Pour, B. and Omrani Rekavandi, H. 2007. "به روش مغناطیسی سنجی در محوطه باستانی دشت حاقه" "بر رسی باستان ژنو فیزیکی" in *Archaeological Reports 7, On the occasion of the 9th Annual Symposium on Iranian Archaeology* (Research Centre for ICHHTO, Iranian Center for Archaeological Research), vol. 1, Tehran: ۸۴–۷۹.
- Arne, T.J. 1945. *Excavations at Shah Tepe*, Iran, Reports from the Scientific Expedition to the Northwestern Provinces of China under the Leadership of Dr Sven Hedin, Stockholm.
- Ball, W. 2000. *Rome in the East. The transformation of an Empire*, London and New York.
- Bivar, A.D.H. and Fehérvári, G. 1966. "The Walls of Tammīsha", *Iran* 4: 35–50.
- Börm, H. 2007. *Prokop und die Perser: Untersuchungen zu den römisch-sasanidischen Kontakten in der ausgehenden Spätantike*, Oriens et Occidens 16, Stuttgart.
- Bosworth, C.E. 1985. "Abaskūn", *Elr* 1, London, Boston and Henley: 69–70.
- Boucharlat, R. and Lecomte, O. 1987. *Fouilles de Tureng Tepe sous la direction de Jean Deshayes 1. Les périodes Sassanides et Islamiques*, Paris.
- Browne, E.G. 1905. *An Abridged Translation of the History of Tabaristan compiled about A.H. 613 (A.D. 1216) by Muhammad B. Al-Hassan B. Isfandiyār*, Leiden and London.
- Farr, T. 2004. "Reply in the discussion forum for users of SRTM data." URL: <http://pub7.bravenet.com/forum/537683448/fetch/394357/> (last day accessed: 21 June 2005).
- Frye, R.N. 1972. "Byzantine and Sasanian Trade Relations with Northeastern Russia", *Dumbarton Oaks Papers* 26: 263–69.
- Galiatsatos, N. 2004. *Assessment of the CORONA series of satellite imagery for landscape archaeology: a case study from the Orontes valley, Syria*, PhD dissertation, Durham University.
- Goldina, R.D. and Nikitin, A.B. 1997. "New finds of Sasanian, Central Asian and Byzantine coins from the region of Perm, the Kama-Urals area", in K. Tanabe, J. Cribb and H. Wang (eds.), *Studies in Silk Road Coins and Culture. Papers in honour of Professor Ikuo Hirayama on his 65th birthday*, Kamakura: 111–30.
- Gonçalves, J. and Fernandes, J.C. 2005. "Assessment of SRTM-3 DEM in Portugal with topographic map data", *Proceedings of the EARSeL Workshop 3D-Remote Sensing*, 10–11 June, Porto, Portugal (European Association of Remote Sensing Laboratories), unpaginated CD-ROM.
- Hansman, J. 1968. "The problems of Qumis", *Journal of the Royal Asiatic Society of Great Britain & Ireland* 1968: 110–39.
- and Stronach, D. 1970. "Excavations at Shahr-e Qumis, 1967", *Journal of the Royal Asiatic Society of Great Britain & Ireland* 1970: 29–62.
- Harper, P.O. 2000. "Sasanian Silver Vessels: The Formation and Study of Early Museum Collections", in J. Curtis (ed.), *Mesopotamia and Iran in the Parthian and Sasanian Periods: Rejection and Revival c. 238 BC–A.D. 642*, London: 46–56.
- Herrmann, G., Masson, V.M., Kurbansakhatov, K. et al. 1993. "The International Merv Project: preliminary report on the first season (1992)", *Iran* 31: 39–62.
- Huff, D. 1987. "Archaeology iv. Sasanian", *Elr* 2, London and New York: 302–8.
- Jacobsen, K. 2005. "Analyses of SRTM elevation models", *Proceedings of the EARSeL Workshop 3D-Remote Sensing*, 10–11 June, Porto, Portugal (European Association of Remote Sensing Laboratories), unpaginated CD-ROM.
- Kay, S., Spruyt, P., Zielinski, R., Winkler, P., Mihály, S. and Ivan, G. 2005. "Quality checking of DEM derived from satellite data (SPOT and SRTM)", *Proceedings of the EARSeL Workshop 3D-Remote Sensing*, 10–11 June, Porto, Portugal

- (European Association of Remote Sensing Laboratories), unpaginated CD-ROM.
- Kiani, M.Y. 1982. *Parthian Sites in Hyrcania. The Gorgan Plain*, Archäologische Mitteilungen aus Iran Ergänzungsband 9, Berlin.
- Mehren, A.F. (ed.) 1874. *Manuel de la Cosmographie du Moyen Age, traduit de l'Arabe "Nokhbet ed-dahr fi 'adjaib-il-birr wal-bahr" de Shems Ed-din Abou-Abdallah Moh'ammed de Damas*. Copenhagen.
- Nokandeh, J., Sauer, E., Omrani Rekavandi, H., Wilkinson, T., Abbasi, G.A., Schwenninger, J.-L., Mahmoudi, M., Parker, D., Fattahi, M., Usher-Wilson, L.S., Ershadi, M., Ratcliffe, J. and Gale, R. 2006. "Linear Barriers of Northern Iran: The Great Wall of Gorgan and the Wall of Tammishe", *Iran* 44: 121–73.
- Omrani Rekavandi, H., Sauer, E., Wilkinson, T., Safari Tamak, E., Ainslie, R., Mahmoudi, M., Griffiths, S., Ershadi, M., Jansen Van Rensburg, J., Fattahi, M., Ratcliffe, J., Nokandeh, J., Nazifi, A., Thomas, R., Gale, R. and Hoffmann, B. 2007. "An Imperial Frontier of the Sasanian Empire: further fieldwork at the Great Wall of Gorgan", *Iran* 45: 95–136.
- Petrikovits, H. von 1975. *Die Innenbauten römischer Legionaslager während der Prinzipatszeit*, Opladen.
- Rabus, B., Eineder, M., Roth, A. and Bamler, R. 2003. "The shuttle radar topography mission—a new class of digital elevation models acquired by spaceborne radar", *ISPRS Journal of photogrammetry and remote sensing* 57: 241–62.
- Sarianidi, V.J. 1952. *Ancient City of Khalni-Depe*, Unpublished Diploma, Historical Faculty, University of Tashkent.
- Schippmann, K. 1990. *Grundzüge der Geschichte des Sasanidischen Reiches*, Darmstadt.
- Simpson, S.J. 1997. "Partho-Sasanian ceramic industries in Mesopotamia", in I. Freestone and D. Gamester (eds.), *Pottery in the Making. World Ceramic Traditions*, London: 74–79.
- Trinkaus, K.M. 1986. "Pottery from the Damghan Plain, Iran: chronology and variability from the Parthian to the Early Islamic periods", *Studia Iranica* 15.1: 23–88.
- Tucker, C.J., Grant, D.M. and Dykstra, J.D. 2004. "NASA's global orthorectified Landsat data set", *Photogrammetric Engineering & Remote Sensing* 70.3: 313–22.
- Venco Ricciardi, R. 1980. "Archaeological survey in the upper Atrak valley (Khorassan, Iran): preliminary report", *Mesopotamia* 15: 51–72.
- Whitehouse, D. 1992. "Review of Boucharlat and Lecomte 1987", *American Journal of Archaeology* 98: 380–81.
- Yate, C.E. 1900. *Khurasan and Sistan*, Edinburgh and London.