

THE BUSHEHR HINTERLAND RESULTS OF THE FIRST SEASON OF THE IRANIAN-BRITISH ARCHAEOLOGICAL SURVEY OF BUSHEHR PROVINCE, NOVEMBER–DECEMBER 2004

By R.A. Carter, K. Challis, S.M.N. Priestman and H. Tofghian

Oxford, Durham, Birmingham and ICAR

INTRODUCTION

A joint Iranian-British archaeological and geomorphological survey of Bushehr Province, Iran (Fig. 1) took place between 23rd November and 18th December 2004, as a pilot season to determine the course of future survey and excavation.¹ There were three main research aims:

- To clarify the nature and chronology of coastal settlement in the Persian Gulf, and build a chronological and cultural framework for the Bushehr coastal region.
- To seek evidence for contact between coastal Iran, Mesopotamia and the littoral of the Arabian Peninsula during the 6th/5th millennia B.C.E. (known as the Chalcolithic, Ubaid and Neolithic Periods in each respective region).
- To gather data towards establishing the sequence of sea-level change in the Persian Gulf.

The region was chosen because of its high archaeological potential, established through previous fieldwork (see below), and specifically because of reports of a Chalcolithic Ubaid-related site on the Bushehr Peninsula (Oates 1983: 255–56). The latter is relevant to previous and ongoing research on 5th/6th millennium maritime exchange and coastal occupation, undertaken in Kuwait, Saudi Arabia, Bahrain, Qatar and the United Arab Emirates (Masry 1974; Oates *et al.* 1977; Oates 1978; Inizan 1988; Uerpmann and Uerpmann 1996; Jasim 1996; Beech *et al.* 2000; Carter 2002).

Because of considerations of access, and because the Bushehr Peninsula had already been comparatively well studied, the work took place on the mainland. The resulting short survey of the Bushehr hinterland recorded 56 sites dating from the Chalcolithic through to the Late Islamic Period. The majority were Achaemenid to Sasanian in date. Areas suitable for more intensive survey were identified, and a Chalcolithic site was identified for test excavation in any future season.

History of Previous Investigations

Previous work indicated a rich history of occupation on the Bushehr Peninsula itself. More limited exploration of the adjacent mainland had also revealed significant occupation, especially during the Elamite and Parthian-Sasanian Periods. Investigations began early in the 19th century, when the British Residency attracted numerous individuals with an antiquarian interest (Simpson forthcoming). At least eight sites were noted, producing large numbers of Sasanian jar burials, often placed in the ground in linear alignments (*ibid.*). In 1913, a French delegation began excavating at Tul-e Peytul (ancient Liyan) (Pézard 1914), to investigate cuneiform inscribed bricks found on the surface during the third quarter of the 19th century, and excavated by Andreas in 1887 (Simpson forthcoming). Pézard described the painted pottery of the mound as “Chalcolithic”, though in fact it belongs to the Kaftari horizon of the late 3rd/early 2nd millennium B.C.E. (Potts 2003: 159; Petrie *et al.* 2005: 67–68; Carter 2003: 34–35). In 1933 Aurel Stein visited Bushehr (Stein 1937: 234–43). He was intrigued by the lack of Chalcolithic sites between Minab and Bushehr, and speculated that this was due not to an absence of occupation but changes in relative sea level (Stein 1937: 236–37). Unfortunately he was thwarted in his attempts to explore inland Fars and the mainland opposite the peninsula.

Between 1969 and 1971, Andrew Williamson and Martha Prickett surveyed the Peninsula, recording at least 89 individual archaeological sites and picking up abundant pottery (Priestman forthcoming). Williamson identified an intensive Sasanian presence, and concluded that the impressive remains at Rishahr, 6 km. south of Bushehr town, should be identified with the leading Sasanian port, Rev Ardashir (Whitehouse and Williamson 1973: 39–41). This was one of the principle ports of the Sasanian Empire founded as part of the strategic campaign by Ardashir I to gain mercantile

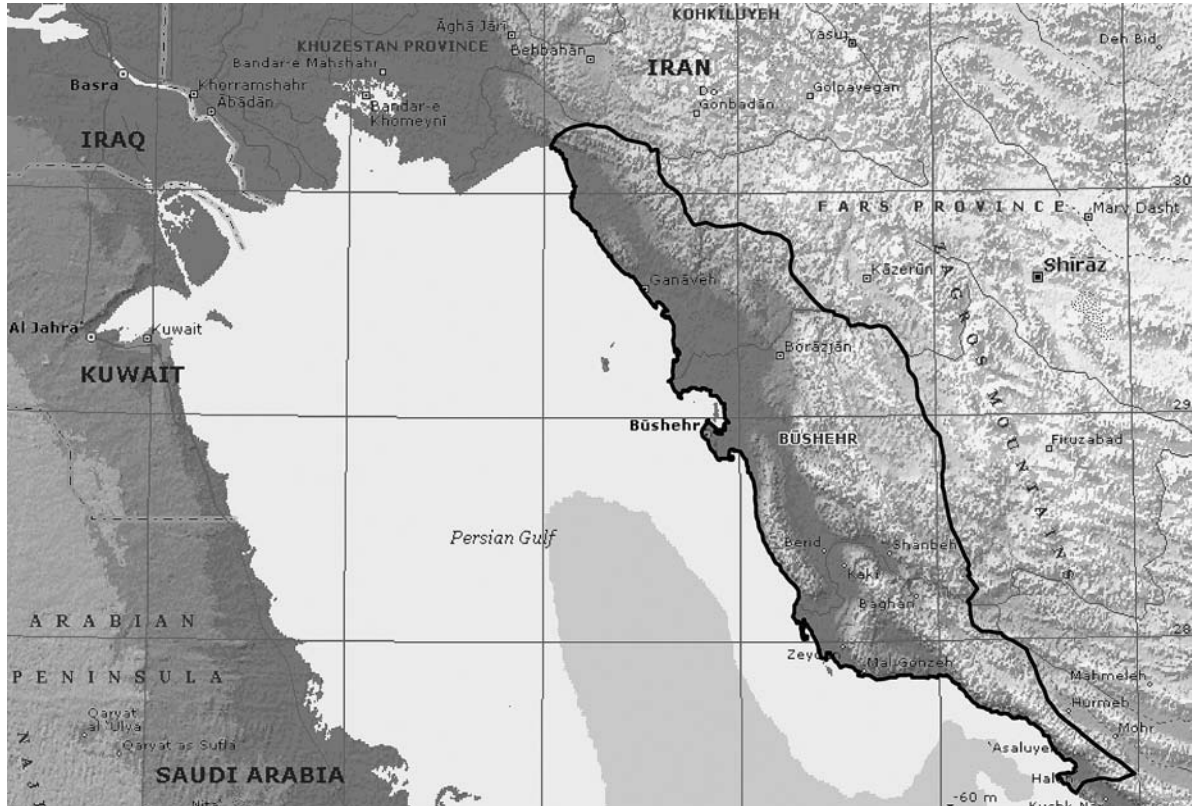


Fig. 1. The northern Persian Gulf, with mainland Bushehr Province outlined in black.

supremacy within the Persian Gulf (Piacentini 1985: 60). Historical texts indicate that it became the main Sasanian trade emporium within the Persian Gulf, as well as the seat of the Nestorian metropolitan of Persis (Gropp 1991: 86). Renewed work on Williamson's collection is nearing completion (Priestman and Kennet 2002; Priestman 2003). Apart from Sasanian and Islamic settlements, a Chalcolithic/Ubaid-related site, H200, was found at the southern end of the peninsula, at or near the village of Halileh (Whitehouse and Williamson 1973: 35, n. 32).

In 1973 Donald Whitcomb carried out a survey and published pottery from two sites on the peninsula and 13 on the mainland. He dated most of them to the Elamite and Partho-Sasanian Periods. Some were reidentified during the 2004 season. Whitcomb also used aerial photography and textual sources to posit the existence of a canal system used to supply the Bushehr Peninsula with water from as early as the Achaemenid Period (Whitcomb 1987: 331). The so-called Angali Canal was investigated during the 2004 survey and found not to exist. The features observed by Whitcomb relate to a road and rail system used to supply the Bushehr

Peninsula, which channelled goods from the hinterland down to the small port of Shif and thence to the peninsula (see below). This route may have had earlier origins.

Fieldwork by western archaeologists ceased after 1979, but Iranian archaeologists were busy both before and after the Revolution. The Early Islamic site of Tawwaj (2004 site code: BH12), north of Borazjan, was visited and identified by A. Iqtidari in 1970 (Whitcomb 1987: 333 and n. 31). Professor A. Sarfaraz discovered several Achaemenid sites in the region, including a palace near Borazjan, Char Khab (BH27), which he dated to the later years of Cyrus the Great (Sarfaraz 1971–72; Sarfaraz 1973). This was later reinvestigated by the Bushehr Cultural Heritage and Tourism Organisation. Professor Sarfaraz investigated another Achaemenid Palace at Sang-e Siah (BH48), a site which has now been entirely bulldozed. Mr Ismael Yaghma'i has been conducting survey and excavations since the 1970s at a large group of sites dating to the Achaemenid to Sasanian periods, outside Deh Qa'ed, a village to the north of Borazjan (BH29–44).² Together these sites appear to constitute an extensive town, which is discussed further below.

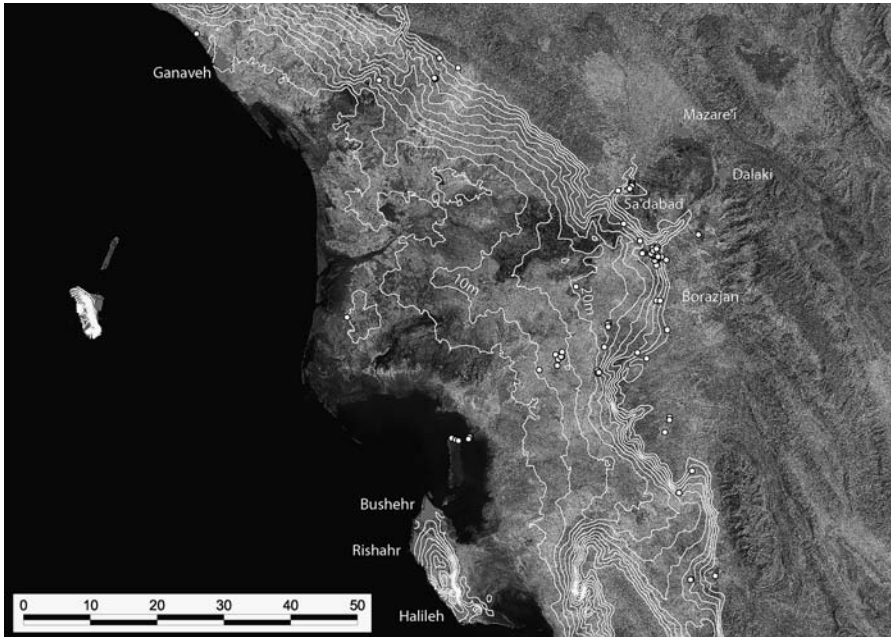


Fig. 2. Map of the study area, with 5 m. contour lines and sites located on the survey.

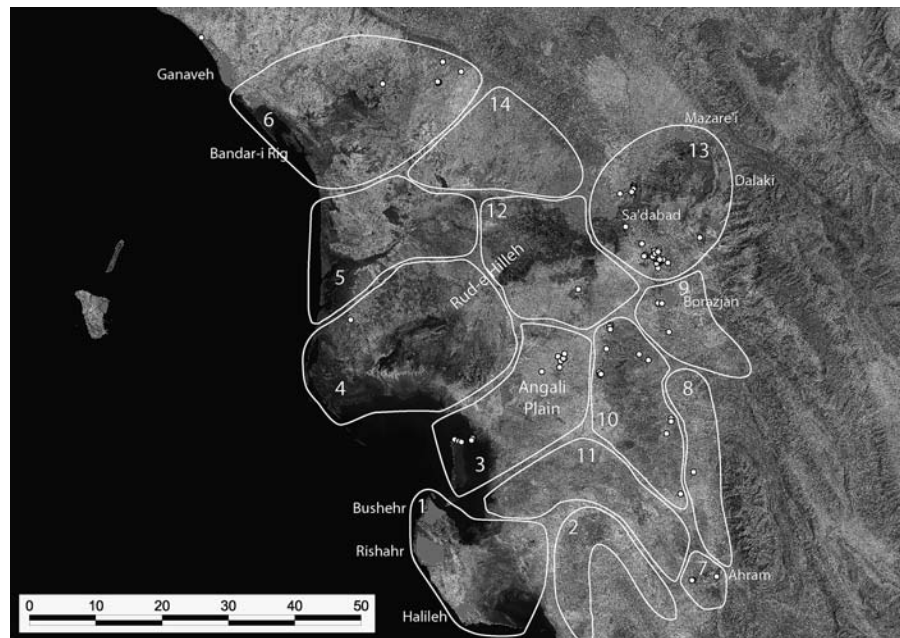


Fig. 3. Map of study area with survey zones and sites located on the survey.

Additionally, the Bushehr Cultural Heritage and Tourism organisation has been conducting test excavations at various sites in the region, including at Hazar Mardom on the Bushehr Peninsula, at Ziyarat on the south bank of the River Hilleh, and at the fort in Ahram. Most recently, Hossein Tofighian carried out underwater survey at Bandar-e Rig in 2004, where submerged torpedo jars were discovered. These date to between the Parthian and Early Islamic periods.

Strategic location, geography and geomorphology

The designated study area extended between the towns of Bushehr, Ganaveh, Ahram and Dalaki, measuring c. 90 km. SE-NW and 60 km. SW-NE at the widest points (Fig. 2). It consists of a broad plain between the Zagros mountains and the sea, bisected by one major river, the Rud-e Hilleh, which flows year-round. This divides upstream near Sa'adabad into the Rivers Shapur (or

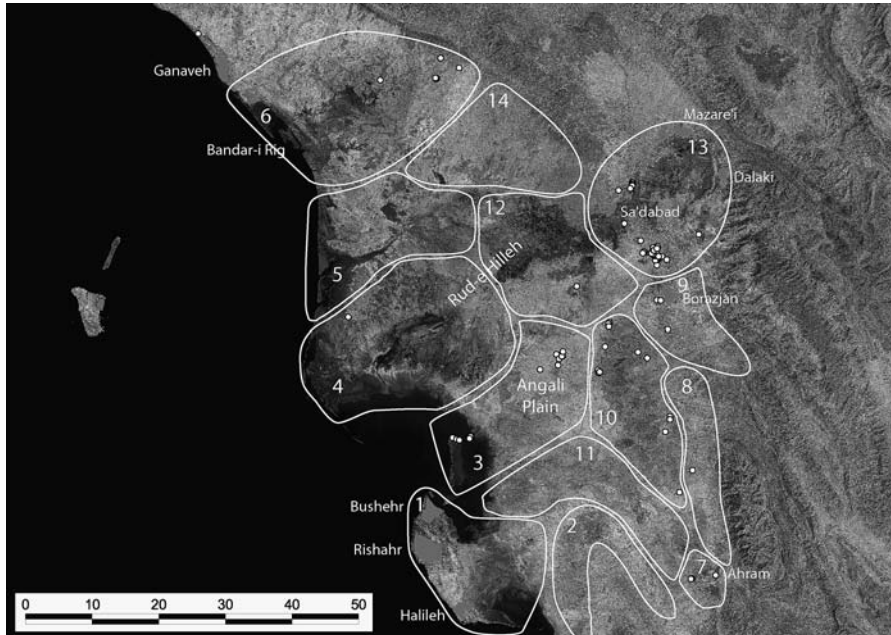


Fig. 4. Distribution of sites of the Early Periods (Chalcolithic to Elamite).

Shirin) and Dalaki (Fig. 4). The most significant modern settlements on the mainland cluster around this system, particularly near the divide. There are several smaller rivers which do not flow year round, the most significant of which are the Shur, just north of the Hilleh, and the Ahram, which flows past the town of Ahram but does not reach the sea. The existence of the perennial river flow is significant to human occupation and agriculture, given the low rainfall of the province. Bushehr Town receives only 259 mm. of rainfall annually, and the months of June to September are entirely dry (Potts 1999: 14, tab. 2.1). This would allow rain-fed agriculture to take place during certain months, but irrigation would be necessary for year-round cultivation.

The coastal plain exhibits a varied geography, dominated in its lower part by the delta of the River Hilleh. Examination of the satellite images (see below) and ground observations indicate that the current delta, all of the Angali plain and most of the other lower areas of the Bushehr hinterland, consist of alluvial sediments deposited by the Hilleh system, and to a lesser extent the other rivers, up to around the 20 m. or even the 25 m. contour. The 20 m. contour is 40 km. from the tip of the delta, giving an indication of the flatness of the plain (declining 0.5 m. every km). The delta is a prograding tongue of extremely flat land, which becomes progressively more muddy and saline as one nears the sea.

The flat land on the south side, the Angali Plain, consists of fine silty deposits laid down by the Hilleh

during past episodes of flooding, or when it followed a slightly different course. Several features visible on the satellite imagery indicate previous courses for the river, which has meandered across the flat plain. The modern course is only maintained by human intervention. Except in the lowest parts below the 10 m. contour where it is very saline, the alluvial silts are cultivable and although barren for much of the year, are farmed with rain-fed cereals. Although slightly saline, the water from the Hilleh itself is extracted to feed crops and date groves year-round in the areas closer to the river.

The effects of the sedimentation regime on the archaeological landscape are significant. The survey showed that, with the exception of a possible Achaemenid or post-Achaemenid component in an otherwise Sasanian sherd scatter on the Angali Plain,³ no sites earlier than the Sasanian were found anywhere below the 20 m. contour. Earlier sites either did not exist below this line, as what is now land would then have been sea; or they have been buried by alluvium; or they have been washed away as the river shifted course. The offloading of sediments, and resulting alluviation and delta formation, would not have begun in this area until the sea reached roughly modern levels, around or soon after 6000 B.C.E.⁴ Any earlier ground surface is buried beneath the alluvium. Furthermore, the 15 km. of mud-flats which now connect the Bushehr Peninsula to the mainland would not have existed before the alluviation began (see also Petrie *et al.* 2005: 68 and fig.13). It

would have been a true island for some time after the sea first encircled it. By the time of the Sasanian period, when sites appear on the Angali plain and at the edge of the sea at Shif, the shoreline had advanced close to its modern position.

On the north side of the Hilleh delta the effect of alluviation is less, and eroded hilly land can be found as far down as the 10 m. mark, with muddy plains below. Potentially significant geographical features include what appear to be an extensive raised shoreline above the large mud-filled bay through which the Rud-e Shur exits into the sea. The Chalcolithic site identified in 2004, BH56, was located upon this shoreline.

Above the 25 m. line the landscape on both sides of the river mostly consists of hilly land bisected by steep-sided water channels which are dry most of the year round. Gravel fans are found at the foothills of the Zagros, at the base of which settlements and agricultural areas are concentrated, presumably taking advantage of the aquifers found below such features or from the direct seasonal run-off indicated by the presence of numerous heavily scoured flood channels running through the gravel fans.

The 20 km. long Bushehr Peninsula itself is a ridge of quaternary sandstone, rising to 35 m. (De Planhol 1990: 569). The sheltered waters on the northern side offer a good but shallow anchorage.⁵ The alluvial isthmus that connects it to the mainland sometimes flooded at high tide before a raised causeway was built (Lockhart 1960: 1341). Water supplies are limited. There is no perennial surface flow, though dams were built to collect seasonal spate (Whitehouse and Williamson 1973: 40). Groundwater was available, however: the interior of the peninsula was studded with numerous wells (Whitehouse and Williamson 1973: 40; Lorimer 1908: 331; Williamson 1971–72: 35), and although the wells near the town of Bushehr yielded very bad brackish water, better supplies could be found 5–6 miles away (de Planhol 1990: 571; Lorimer 1908: 346). The availability of water in the central part of the peninsula is indicated by the location of the residences of European merchants and diplomats (de Planhol 1990: 571), the **Elamite settlement of Liyan**, and the **Sasanian and later settlements at Rishahr**. Stein notes the presence of at least three water conduits (*qanat*) at the edge of the gullies to the south of this area (Stein 1937: 238), which he believed must have led to irrigated land. **Sweet water was also found at Halileh in the south, which had a good anchorage (Lorimer 1908: 331)**. The yield from the wells

was sufficient to allow “a large proportion” of the peninsula to be cultivated in the time of Lorimer, some of it year-round, and some only after rain (Lorimer 1908: 331). It is unlikely, however, that the agricultural potential of the peninsula was sufficient to provision large urban settlements such as were seen during the Sasanian Period.

Finally, note must be made of the strategic location of Bushehr, which was well positioned to control the northern part of the Gulf and the Iranian coast, through naval means. Harbour facilities were good. Moreover, **the peninsula was effectively an island**, and therefore easily defensible. The peninsula was high enough to avoid inundation, and rocky enough to provide building materials and solid land to build on. Although its own agricultural resources were limited, it had a productive hinterland on the coastal plain of the mainland, with rich alluvial soil watered by a perennial river. This river, the Hilleh, its tributaries and other valleys, allowed access to inland Fars. Access can eventually be gained along the Dalaki and Shapur to the major Sasanian city of Bishapur, some 120 km. from the Bushehr Peninsula to the north-west as the crow flies.

Certain disadvantages also pertained. Limited or low-quality water has already been mentioned. Although it was certainly present on the peninsula, extra supplies may have had to be brought in. Moreover, there were difficulties of access across the isthmus connecting the hinterland to the peninsula. This problem was averted in historical times by the use of **a port on the mainland, Shif, which is found on a small rocky peninsula where the Angali plain meets the sea**. Sasanian and Islamic remains are also abundant there (see below, BH5). **An inhabited island, seemingly also called Shif but known too as Sheikh Sa’ad, lies just offshore. Caravans from the interior would unload onto boats at the Shif peninsula, which would transfer the goods to Bushehr after a three hour journey, and vice versa (Lorimer 1908: 347)**. During the 17th–19th centuries, when Bushehr acted as the main port within the Persian Gulf for the Dutch and British East India Companies, Shif provided the main route for boats carrying goods on and off the peninsula, being used in preference to the slower and more treacherous route across the flats that separate the peninsula from the mainland (de Planhol 1990: 570). By 1906 the Shif route had been deliberately shut down by the Qajar government (Lorimer 1908: 82), but in 1919 a light railway connected Borazjan to Shif, and thence Bushire,

allowing the passage of civil traffic (Floor 2005: 194). This was dismantled in 1921.

A final barrier to communications was the Rud-e Hilleh and its tributaries, which while allowing access to the interior, greatly inhibited north-south traffic along the coast. Lorimer described it as “a considerable obstacle to movement, especially in summer” (Lorimer 1908: 1596). In his day there was no bridge, only a ferry service. The modern bridge was completely inundated during floods in late December 2004, preventing access to the survey areas on the northern side of the river. In the lower parts the land bordering the river is swampy and prone to flooding, while in the upper parts the river valleys are deeply cut into the land surface.

Survey Methodology

The study area was initially divided into 14 zones (Fig. 3), roughly corresponding to different geomorphological regimes, according to visual analysis of the satellite images. The whole of the study area could not be intensively surveyed, and the intention was to make brief visits to as many of the 14 zones as possible, in order to assess their archaeological potential. The Bushehr Peninsula itself (Zone 1) was excluded, while Zones 2, 5, 11 and 14 were not surveyed.⁶ The period of active archaeological survey lasted just under three weeks (23rd November–12th December), following which one week was spent recording the collections in full. Information was entered into a database (Microsoft Access).

Sites were identified by a combination of field walking and consultation of villagers about the whereabouts of ancient remains. The knowledge of Mr Hamed Zar’eh and Mr Biladi of the Bushehr Cultural Heritage and Tourism Organisation was invaluable in targeting certain known sites, in order to place them on a map and collect dated ceramics for the project’s reference collection. Existing publications were also used (especially Whitcomb 1987), which give partial summaries of previous archaeological investigations.

When sites were encountered, they were photographed and given site codes (BH1, BH2 etc.). Record sheets were filled out, GPS coordinates were taken and artefact collections were made, mainly of pottery. The GPS data were recorded using UTM coordinates (WGS 84). In places where closely grouped archaeological remains were found, and it was unclear whether they should be included as a single large site or several

smaller ones, sub-site codes were given (e.g. BH5A, BH5B etc). Sub-sites were recorded individually and the collections were kept separate, in case they corresponded to occupations of different dates.

Satellite Remote Sensing for Landscape Investigation

Introduction

Satellite remote sensing has seen widespread use in the Middle East, including pioneering analysis of Landsat data to produce regional scale landscape character maps (Adams 1981; Allan and Richards 1983) and the innovative use of SIR-A/B radar data to map palaeodrainage in the Sahara (McCauley 1982; McHugh *et al.* 1988). Studies combining a variety of data sources, including high-resolution satellite imagery, have attempted to prospect for archaeological sites and to map site locations (Comfort 1997; Kennedy 1998). Several studies have utilised Corona imagery for regional and site-based studies (Challis *et al.* 2004; Ur 2003; Philip *et al.* 2002; De Meyer 2004) or explored the technical possibilities of Corona imagery for producing regional DTM (Altmaier and Kany 2002).

The present work was carried out by the author of this section (Keith Challis) at the HP Visual and Spatial Technology Centre, Institute of Archaeology and Antiquity, University of Birmingham. The study made use of Landsat 7 Enhanced Thematic Mapper (ETM) digital multispectral imagery to provide medium resolution coverage of the study area and Corona declassified intelligence satellite photographs to provide high resolution coverage of the study area. In addition, terrain data acquired by the Shuttle Radar Topography Mission (SRTM) was acquired from the NASA Jet Propulsion Laboratory (JPL) and served to provide a digital terrain model (DTM) of the study area.

During the course of the survey and analysis the ETM and CORONA images proved invaluable in understanding the landscape and the distribution of sites, and in choosing appropriate areas to investigate. In addition to the purchased imagery a regional composite ETM image of the west of Iran acquired from the Global Land Cover Facility, University of Maryland (<http://glcf.umiacs.umd.edu>) was used in the field, and as a base map to show site distributions in this report. Despite its low resolution and unrealistic coloration, this imagery shows gross topographic features very well, giving an effective guide to the landscape of the study area.

Landsat 7 Enhanced Thematic Mapper (ETM)

A single Landsat ETM scene for the study area was acquired from the US Geological Survey.⁷ In general analysis of the ETM data was restricted to generating a natural colour composite image (ETM bands 4,3,2) for visual inspection and comparison with the Corona imagery. More complex analysis of the multispectral imagery might be attempted in the future if it were possible to determine distinct spectral signatures for target sites (for example areas of archaeological activity) through fieldwork.

Corona

Five stereo pairs of Corona images were acquired from the US Geological Survey.⁸ This imagery covers the entire Bushehr peninsular from Halileh in the south to Bandar-e Rig in the north. Georeferencing was achieved by matching features on the Corona imagery with those identifiable on the georeferenced Landsat ETM image. This practice, although far from ideal, minimised the propagation of error as in effect a single image provided the referencing source for all subsequent operations. Once georeferenced, Corona images were combined with GPS-collected field survey data within ArcGIS to produce interpretative mapping.

Shuttle Radar Topography Mission (SRTM)

SRTM elevation data are derived from a Space Shuttle Synthetic Aperture Radar (SAR) survey that obtained elevation data on a near-global scale to generate a high-resolution digital topographic database of the Earth.⁹ Contours at 2 m. and 5 m. intervals were automatically generated from the SRTM DTM within the GIS.

Overview of the Results of the Survey

56 sites were identified, ranging in date from the Chalcolithic (6th/5th millennium B.C.E.) to the recent period (20th century C.E.). If sub-sites are counted individually, the total is 73 sites. Seven of the 56 were modern or very recently-abandoned settlements. These were recorded in order to collect pottery to allow recognition of the local modern or recent assemblage. Unless specified, they are excluded from the maps, analyses and site counts given below. Pottery was taken from 64 of the sites/sub-sites (including the six modern settlements). Pottery formed by far the greatest quantity of material, but other artefacts which were picked up included glass, lithics (stone tools), metal (copper/bronze and iron), shell, bitumen and bone. Tables 1 and 2 give

TABLE 1. Site counts by period.¹⁰

Pottery Period	Probable Date Range	Site Count	Comments
Chalcolithic (cf. Sohz, Bayat, Middle Susiana 3, Djowi II, Bakun BII)	1st half of 5th millennium B.C.E.	1	BH56. A stray Chalcolithic sherd was also found at BH51. H200 not counted.
Lapui	Early 4th millennium B.C.E.	2	BH26, BH49
Early-Middle Banesh	c. 3500–3000 B.C.E	1	BH19. Dating slightly uncertain.
Mid to Neo Elamite	c. 1300–1000/900 B.C.E. or later	10	
Achaemenid-Parthian	c. 550–150 B.C.E.	32	
Sasanian	c. 200–650 C.E.	34	
Islamic, 8th–10th centuries C.E.	c. 700–1000 C.E.	9	
Islamic, 11th–14th centuries C.E.	c. 1000–1400 C.E.	7	
Islamic, 15th–18th/19th centuries C.E.	c. 1400–1800 C.E.	4	Some recent settlements also likely to have 18th/19th century components.
Recent	19th–20th centuries	7	Not an accurate representation of the actual number of recent settlements in the region.
Unknown		12	Mostly features with no associated pottery

breakdowns of the sites in terms of site type and period, while Table 3 is a brief Gazetteer.

General observations and site types

The most obvious observation is the preponderance of sites dating to between the Achaemenid and Sasanian periods in the study area (Table 1). Regarding the Sasanian period, this fits with what is known from Williamson's research, that Rishahr, on the Bushehr Peninsula, was the leading Sasanian port. In effect, the study area comprises the hinterland of the city of Rishahr. One of the reasons for the high number of Achaemenid-to-Sasanian sites is the dense cluster just north of the village of Deh Qa'ed, on the outskirts of Borazjan (BH29–BH44). This consisted of numerous separate mounds and features which were recorded individually but together represent a dispersed town. These matters are further discussed below. A better-known urban site was recorded to the north on the edge of the

River Shapur. This site, BH12, can be identified with the Umayyad town of Tawwaj (see below, Islamic Period).

Apart from the obvious predominance of Achaemenid-to-Sasanian remains, it would be unsafe to draw other conclusions regarding the intensity of occupation at any given time. These are results of a pilot survey undertaken in just three weeks, which left large areas of archaeologically promising land unseen or barely visited. The raw site counts should therefore not be taken as a precise measure and almost certainly do not tell the whole chronological story.

Table 2 gives a broad categorisation of the kinds of sites encountered. As is to be expected with this kind of survey, most of the sites identified consist of mounds, 16 of them being large and prominent man-made mounds of a type often designated *tell*, *tul*, *tapeh* or *tump*. None of these was exceptionally large, however, such as might be left by a town or village which was occupied and reoccupied for many centuries or millennia. Most the sites designated "prominent man-made mounds" are between 40 and 100 m. in diameter and 3–6 m. high.

TABLE 2. Site types (with site type code).

Site Type	Site Count	Description/Comments
ancient towns A	1 (2)	Tawwaj, aka Tuj, Taoke: BH12. Extensive collection of predominantly Umayyad mounds and structures, with earlier material (but not Sasanian). Another ancient town, of Achaemenid-to-Sasanian date, was found north of Borazjan, outside Deh Qa'ed village. This was a dispersed settlement and its elements were recorded individually (BH29–BH44).
prominent man-made mounds B	16	Large or steep-sided mounds of human construction, potentially containing large single structures, or sequences of buildings and deposits. Mainly 40–100 m. diameter.
large mound(s)/surface scatters C	3	Large mounds with surface cultural material, where it is unclear whether there are structures present, and to what extent the mounding is man-made. 100 m. in length or more.
low mound(s)/surface scatters D	18	Low mounds (or groups of low mounds) of any size with surface cultural material, where it is unclear whether there are structures present, and to what extent the mounding is man-made. Size range is wide, between 30–450 m. across.
mound(s) with structures E	8	Mounds (or groups of mounds) with surface cultural material and signs of structures, where it is unclear to what extent the mounding is man-made. Size range is 12–100 m. across.
structure(s) F	12	Miscellaneous archaeological structures (or groups of structures), with or without other cultural material, without signs of mounding. Size range is 15–200 m. across.
surface scatters G	6	Scatters of material on the surface without obvious signs of mounding or structures. The existence of structures below the surface is not precluded. Size range is 20–200 m.
rock-cut features H	3	Tombs, irrigation tunnels and other features.
modern/recent village I	6	Modern or recently abandoned settlements which were recorded in order to pick up ceramics for reference.

BH20	B	527136	3195343	44											X	
BH21	I	520266	3219148	63										X		
BH22	B	519941	3232169	91					X	X						
BH23	D	521697	3207774	55						X						
BH24	F	523685	3211060	47											X	
BH25	G	519626	3216852	37					X							
BH26	D	520265	3218695	106		X						X				
BH27	F	518351	3236536	90						X						
BH28	B	518879	3236483	46					X		X					
BH29	F	518587	3242713	63						X	X					
BH30	E	518441	3244563	56						X	X					
BH31	D	518329	3241808	49					X	X	X					
BH32A	D	518364	3242753	48							X	X				
BH32B	D	518089	3242514	46					X	X	X					
BH33	B	517967	3243197	44						X	X					
BH34	E	518181	3243569	49											X	
BH35	B	517818	3243306	59											X	
BH36	D	517709	3243377	46							X					
BH37	D	517481	3243532	45							X					
BH38	F	519759	3242625	36						X	X					
BH39	D	518792	3242964	72						X						
BH40	H	519075	3243092	52											X	
BH41	E	518573	3243106	54						X	X					
BH42	B	517729	3244412	60						X	X					
BH43	E	517838	3243999	54						X	X					
BH44	E	518350	3244277	47						X	X					
BH45	D	516328	3243795	56						X	X					
BH46	F	516165	3243580	38											X	
BH47	B	513456	3248026	36						X	X					
BH48	F	515848	3245449	43						X						
BH49	B	488613	3271424	41		X										
BH50	F	485863	3272889	58												
BH51A	B	485252	3269881	47						X						
BH51B	B	485229	3269738	49						X						
BH51C	B	485045	3269899	55					X	X		X	X			
BH52	H	449436	3276548	48											X	
BH53	F	487682	3215988	8										X		
BH54	D	488222	3215720	25							X		X			
BH55	D	488676	3215592	-1							X			X		
BH56	G	476771	3269572	-4		X										
Sum						1	2	1	10	32	34	9	7	4	6	12

Although some may well represent ancient villages, e.g. Tul-e Gol Pokhti (BH19), or Tul-e Sabz (BH49), others appear to be single monumental structures or complexes, e.g. Khegham Khoneh Jatut (BH47), which appears to be a large complex of the Achaemenid period; or the mudbrick platform at Isavandeh (BH18A). The smallest are three mounds at Seh Talu (BH51A–C), which have a diameter of only around 15 m. each, yet are sufficiently high and steep-sided to fall into this category.

As well as large mounds which were clearly man-made, there were a few which had cultural material but which probably took advantage of natural raised features (designated “large mound(s)/surface scatters”). They may have had layers of cultural deposits on the top of the natural prominence, perhaps including building remains, but this would have to be established through excavation. The same is true of numerous smaller and lower mounds, particularly in the hilly land of the dispersed Sasanian town (“low mound(s)/surface scatters”).

In some cases structures were visible at the surface of a mound, but it was uncertain whether or not the bulk of the mounding was due to the natural geology, in which case the site was designated “mound(s) with structures”. In other cases single structures were clearly evident, without mounding, except that created by their own collapse (designated “structure(s)”). These included water-mill structures (BH11D); dams (BH24); wells (BH14) excavated and bulldozed Achaemenid “palaces” (BH27 and BH48); a large square collapsed stone-built building (e.g. BH38); the colossal fortification of Tul-e Khandagh (BH29); and various other less-easily interpreted structures.

Some of the surface scatters were in ploughed areas (including that of the Chalcolithic site BH56), and in most cases it is likely that structural remains once existed there, or survive below the plough zone. It is feasible that other artefactual scatters were not immediately associated with settlements. In parts of the Middle East organically rich deposits were taken from settlements to be spread on the fields, leaving manuring scatters (Wilkinson 2003: 56–57).

Finally, several rock-cut features were found, including a pair of irrigation channels cut into bedrock at the edge of a dry river bed to catch flood run-off (BH40), a series of chambers cut into the vertical cliff-face of the River Shapur, probably rock-cut tombs (BH13), and a mysterious set of chambers and tunnels cut into bedrock near the sea at Ganaveh (BH52).

Site distribution

As noted in the geomorphology section of the Introduction, site location is partly determined by sedimentation in the lower reaches of the coastal plain, with very few or no sites earlier than the Sasanian period being found below the 20 m. contour (Fig. 2). In fact, few sites of any kind were found below the 20 m. line, apart from of the Sasanian and Islamic sites at Shif and those of the same date in the middle of the Angali Plain, *en route* to Shif. Other exceptions include a line of stone and brick wells revealed at the bottom of a 3–4 m. deep prawn-farming trench (BH14).¹¹ The tops of these had been removed so it was impossible to know from what level they were dug, but they raise the possibility that sites and man-made features exist at low elevations, but are buried by mud.

The site distribution also reveals that major settlement was concentrated along the rivers, examples being Tawwaj (BH12) and the nearby sites at Zirah on the River Shapur (BH11A–F, BH12, BH13), and the Achaemenid-to-Sasanian town outside Deh Qa’ed, at a bend on the River Dalaki. Availability of water may have been a significant factor, as well as the possibility of water transport at certain times of year. Both towns would have had to expend considerable labour in order to lift water from the rivers, however, which in the case of the Shapur is very deeply cut, and in the case of the Dalaki is around 12 m. below most of the structural remains. Virtually all other sites were found in a line along the edge of the foothills and at the base of gravel fans at the foot of the Zagros mountains, where ground water can be collected through wells. This tract is revealed as a line of green on the satellite imagery (Fig. 3). There are exceptions, one being BH56, the Chalcolithic site. The climate was wetter in parts of the Persian Gulf region during the Chalcolithic, as the Indian Ocean south-west monsoon advanced to a more northerly position (Parker *et al.* 2004: 673), perhaps relieving the reliance on groundwater. Other exceptions are found in and around a large area of aeolian dunes visible as a large brown feature. These sites include BH8A–C and BH18A–C, and the name of the area where the former are found (Khosh Ab: “good water”) indicates the reason for their location.

The area between the Shapur and the Dalaki is likely to have been intensively occupied for centuries. This area was not examined in any detail and numerous sites may exist or existed there. Several Achaemenid sites are

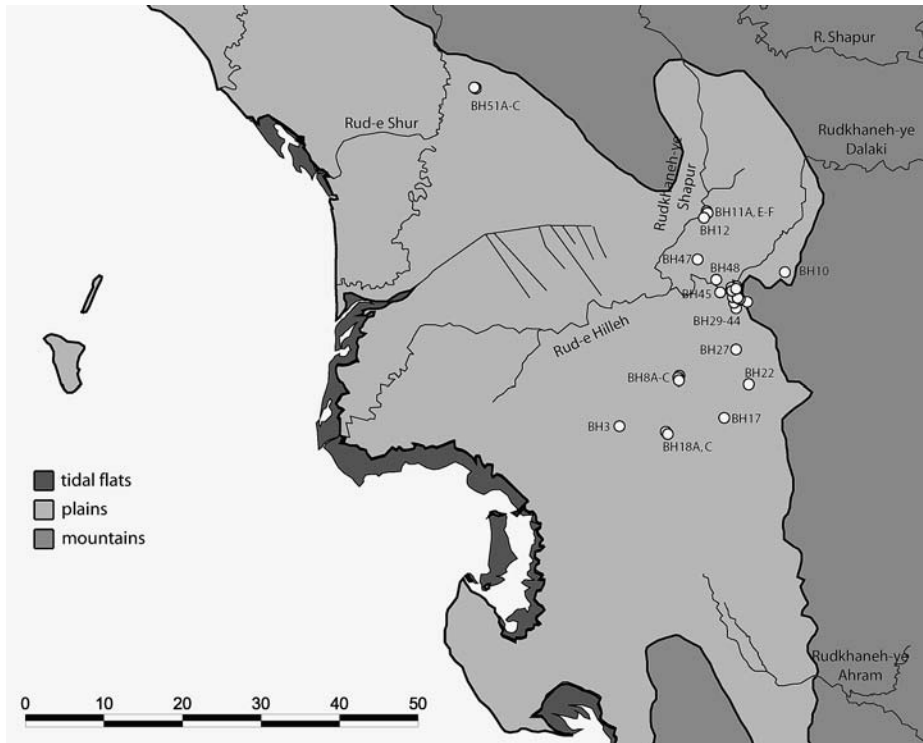


Fig. 5. Distribution of sites of the Achaemenid to Parthian Periods.

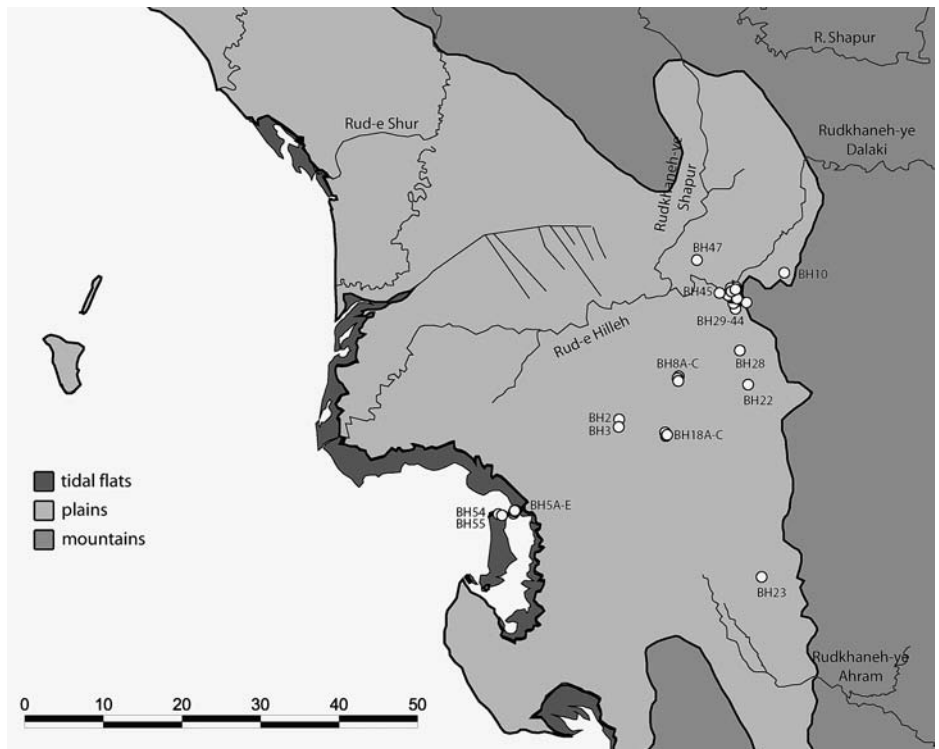


Fig. 6. Distribution of sites of the Sasanian Period.

reported, apart from those visited by the team (BH12, BH47, BH48). The region between the rivers is now heavily planted with dates,¹² which has damaged some

known sites, including Tawwaj (BH12) and the Achaemenid “palace” Khegham Khoneh Jatut (BH47). The marshy areas to the north of the River Hilleh, below

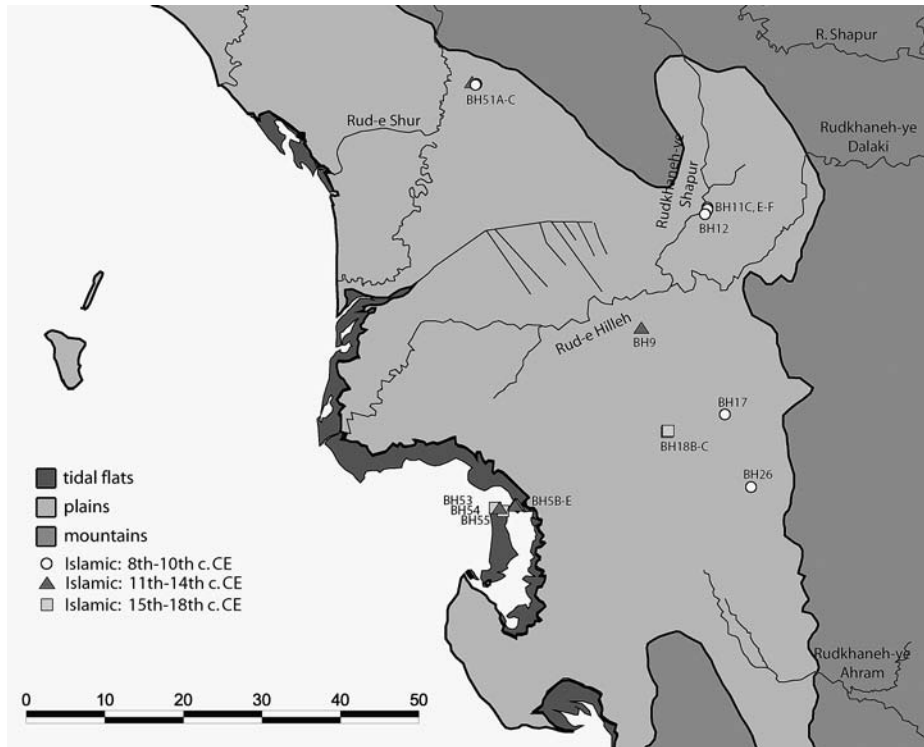


Fig. 7. Distribution of sites of Islamic Period (up to c. 1800 C.E.).

the junction of the Shapur and the Dalaki,¹³ may also have sustained ancient human occupation, but the combination of water action and extensive date plantation is likely to have removed any traces.

PERIODISATION AND DISCUSSION

The Periodisation presented below is based almost entirely on the ceramic collections. A total of 3147 sherds were picked up from 64 collection points. The pottery was recorded during and at the end of the field season, and 112 pottery classes were defined, and 65 fabrics. All pottery was recorded in the database according to those criteria, and 417 sherds were drawn. The class codes are not discussed in this publication, but are listed in the tables accompanying the illustrations.

Again, it must be stressed that these results are provisional and that any future fieldwork would probably refine the dating and reveal undiscovered occupation horizons. Work on the ceramics is at a very preliminary stage, and date ranges of the sites and ceramic classes will certainly be changed pending a full analysis. For this reason, only broad ceramic horizons are presented. Figures 4–7 show the distribution of sites during the designated periods.

The Chalcolithic

Just one Chalcolithic site was identified, BH56 (Fig. 4). Wasters and kiln lining picked up from the surface indicate that painted buff ware was manufactured there (Fig. 8). Lithics, including a sickle-blade with sickle-gloss, were found as well as spindle-whorls. Preliminary indications are therefore that the site had a settled farming population. The site is situated near a local shrine (the Imamzadeh Amir al-Mo'minin) 2 km. to the west-northwest of the village of Chahar Rusta'i, and 4.5 km. to the west of the river Shur. It lies between the 24 m. and 26 m. contours, and is found on and close to the edge of what appears to be the ancient shoreline of a bay, which is now a muddy basin containing an impermanent stream. The site may therefore originally have bordered the sea. It is a priority for future research to examine and map the apparent raised shoreline, establish its exact elevation and probable date. At 20–25 m. it would appear to be too high to represent a shoreline relating to the Flandrian Transgression and may, therefore, be a very much older feature than the Holocene. The consequences of tectonic action in this region must, however, be explored.

The geomorphological reasons for the lack of Chalcolithic sites to the south of the River Hilleh have been discussed above, and it should be added that very

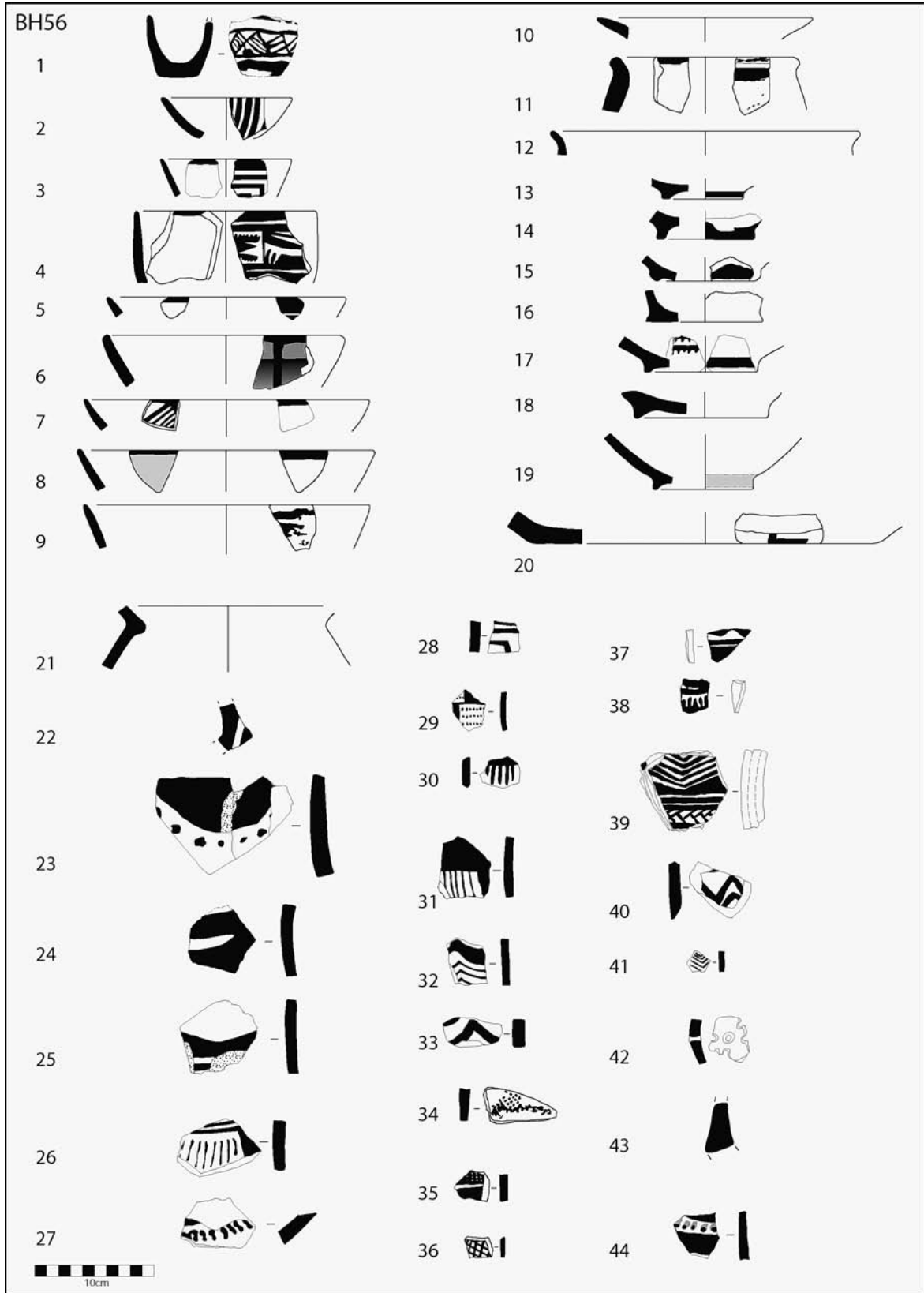


Fig. 8. Pottery of the Chalcolithic site, BH56 (near Chahar Rusta'i).

Fig.	Sherd	Class	Dia.	Decoration	Comments
8: 1	BH56-1	CHABU.G	5	fairly crude greenish/red-brown paint ext	Handmade. Complete cup.
8: 2	BH56-3	CHABU.R	11	dark brown-black paint ext	Handmade
8: 3	BH56-6	CHABU.R	11	maroon-black paint ext and int lip of rim	Wheelmade?
8: 4	BH56-2	CHABU.G	15	black paint ext and on int lip of rim	fine smooth fabric and surfaces
8: 5	BH56-9	CHABU.G	20	dark green-black paint ext and at lip of rim	
8: 6	BH56-11	CHABU.G	20	green and dark green-brown paint ext	paint like slip ext
8: 7	BH56-10	CHABU.G	24	green-black paint int and on ext lip of rim	Wheelmade?
8: 8	BH56-4	CHABU.R	25	dark brown-black paint int and at lip of rim	Wheelmade?
8: 9	BH56-5	CHABU.R	24	dark red-black ext, traces int at rim	Wheelmade?
8: 10	BH56-8	CHABU.G	18	traces black ext at rim	
8: 11	BH56-7	CHABU.R	15	brown-black paint ext and int at lip	Wheelmade?
8: 12	BH56-24	CHABU.UNP	26		
8: 13	BH56-15	CHABU.R	0	traces red-black paint ext	Wheelmade? V. fine.
8: 14	BH56-25	CHABU.R	0	ring base	Wheelmade?
8: 15	BH56-16	CHABU.G	0	black paint ext	Wheelmade?
8: 16	BH56-12	CHABU.R	0	maroon/black paint ext	
8: 17	BH56-13	CHABU.R	0	traces red-black paint, int ext	Wheelmade?
8: 18	BH56-17	CHABU.R	0	traces red-black paint ext	
8: 19	BH56-14	CHABU.R	0	traces reddish paint int and ext	Wheelmade?
8: 20	BH56-18	CHABU.G	0	black ext	Handmade
8: 21	BH56-22	CHABU.R	0	dark maroon/black paint ext	jar neck and shoulder
8: 22	BH56-21	CHABU.R	0	dark brown/black paint ext. piercing	Handmade.
8: 23	BH56-26	CHABU.R	0	red-brown ext	Handmade.
8: 24	BH56-29	CHABU.G	0	green ext	Wheelmade?
8: 25	BH56-31	CHABU.G	0	green-brown ext	
8: 26	BH56-32	CHABU.R	0	red-brown ext	Handmade
8: 27	BH56-33	CHABU.G	0	green-brown ext	Handmade
8: 28	BH56-39	CHABU.G	0	green-black int	
8: 29	BH56-40	CHABU.G	0	green-black ext	
8: 30	BH56-41	CHABU.R	0	dark red-brown int	
8: 31	BH56-34	CHABU.G	0	green ext	Handmade
8: 32	BH56-35	CHABU.G	0	green-black ext	fine and smooth
8: 33	BH56-36	CHABU.G	0	green ext	
8: 34	BH56-27	CHABU.R	0	red-brown int	eroded
8: 35	BH56-38	CHABU.G	0	brown-black ext	
8: 36	BH56-57	CHABU.G	0	black paint (int or ext?)	
8: 37	BH56-45	CHABU.G	0	green int	Waster
8: 38	BH56-46	CHABU.G	0	green-brown ext	Waster
8: 39	BH56-43	CHABU.G	0	green-black ext	Waster
8: 40	BH56-30	CHABU.R	0	red-brown int	
8: 41	BH56-37	CHABU.G	0	green-black ext	
8: 42	BH56-20	CHABU.UNP	0	multiply pierced	Handmade. Sieve
8: 43	BH56-56	CHACOAR	?		Handmade. Damaged rim?
8: 44	BH51C-9	CHABU.G	0	greenish black paint ext	good ID

little time was spent surveying the area to its north, where BH56 was found.¹⁴ It is possible that other Chalcolithic sites exist in this region, which will be more intensively explored if future seasons occur. It is already clear that the site did not exist in total isolation. Apart from BH56, another site (BH51C) yielded one Chalcolithic sherd in an assemblage which otherwise dates to the 9th century C.E.

A further Chalcolithic site, H200, was found in the 1970s near Halileh on the Bushehr Peninsula (Whitehouse and Williamson 1973: 35, n. 32; Oates 1983: 255–56). This assemblage was not published prior to the deaths of its finders, Andrew Williamson and Martha Prickett, and the site has not been relocated, but the pottery has recently been re-recorded.¹⁵ It can be confirmed that the assemblage of H200 relates to the Middle Susiana 2 (early Middle Susiana) of Khuzestan, and the Ubaid 2/Hajji Mohammed of southern Mesopotamia. It is thus slightly earlier than that of BH56, though elements are held in common and both are part of the broad “Ubaid-related” Chalcolithic painted buff ware tradition which developed a vast geographical distribution in the 6th and first half of the 5th millennium B.C.E.

The best parallels for the BH56 sherds indicate contemporaneity with the Sohz phase of the Behbahan-Zuhreh region of eastern Khuzestan, as well as Bakun BII, Djowi II, Bendebal II and Middle Susiana 3. The BH56 ceramics were mostly in a fine, slightly porous fabric with no visible temper and chalky-feeling surfaces. The colour was generally buff, tending to pale green and pale reddish according to firing. Most of the Buff Ware sherds collected in the (unsystematic) pick-up were painted (64%). The paint colour varied according to thickness and firing, from black to greenish brown or reddish brown. While some were clearly handmade, others had very even sides and diameters, and fine parallel markings, suggestive of use of the wheel. It is uncertain whether the potter’s wheel was used at this time, and the regularity may have resulted from careful manufacture by hand on a simple turntable. A crude, soft handmade ware with coarse vegetal temper was also present, comprising 5% of the pick-up, excluding stray Sasanian or Islamic sherds (Fig. 8: 43). This was pale brown in colour and was represented by shallow dishes, though no complete rim profile was obtained.

The painted and plain Buff Ware assemblage was dominated by bowls (Fig. 8: 1–9). No obvious jar rims were recovered, though three sherds may represent that

category (Fig. 8: 10–12). The presence of rounded body sherds, including examples with an inner ledge, indicates that jars with internal ledges at the rim were certainly present (Fig. 8: 21–22).

The assemblage has good parallels with Tepe Sohz, a site in the foothills of the Zagros, 125 km. to the north of BH56. This site and contemporary neighbouring sites around Behbahan provide excellent comparisons for most of the decorative motifs found at BH56, including: large circles surrounded by dots; rows of short parallel dashes around jar shoulders; bowls with right angle decoration; ring bases with short dashes descending from a horizontal line; and lines with right-angle turns and parallel chevrons or large zig-zags (Dittmann 1984: fig. 25: 6–9, fig. 2: 11, fig. 27: 15, fig. 3: 6, fig. 3: 23, fig. 4: 12). The latter design is of particular interest as it occurs at BH56 on a waster consisting of three body sherds fused together (Fig 8: 39). The other motif on this sherd, a narrow line of right-angle motifs or “variant chevrons” can be seen in the Deh Luran, said to be typical of the Bayat phase (Neely and Wright 1994: fig. IV.12: e; Hole *et al.* 1969: pl. 29: d) and in Central Khuzestan in the Djowi I/II transition (Dollfus 1983: fig. 26: 7). A distinctive bowl with thick horizontal lines above and below a middle register, containing a motif resembling outstretched wings or palm branches (Fig. 8: 4), is found at Behbahan (Dittmann 1984: fig. 38: 9) and also has an excellent Early Bakun parallel from Gap Level 17 in the Marv Dasht (Phase Gap 1a) (Egami and Sono 1962: fig. XXXIVB: 17).

Various other Early Bakun parallels are found with Tall-i Bakun (Bakun BII) and Tall-i Gap (Gap Ia–b). These sites are located *c.* 200 km. inland to the north-east in the Kur River Basin, not far from Persepolis. Apart from the ones mentioned above, another with descending lines (Fig. 8: 2) compares to one from Bakun B (Egami and Masuda 1962: fig. 16: 11). Rows of short lines below a horizontal line (Fig. 8: 26–27) are found at Bakun B and Gap phase Ia (Egami and Masuda 1962: fig. 14: 2; Egami and Sono 1962: fig. XXXVIII B: 1). Some elements also have parallels with the Late Bakun assemblage: the bowl with nested right-angles or squares (Fig. 8: 3) resembles a Late Bakun bowl or beaker from Gap level 9 (phase Gap IIB), while parallel loops or curved chevrons (Fig. 8: 32–33) have parallels at Gap level 5a (phase Gap IIB) (Egami and Sono 1962: fig. XXXIB: 3). The latter can also be compared to Early Bakun motifs from Bakun B (Egami and Masuda 1962: fig. 13: 7).

Connections are similarly evident with the Early Bakun tradition at Tol-e Nurabad, in the Mamasani region of Fars. The bowl with parallel lines descending from the rim (Fig. 8: 2) is similar to one from Tol-e Nurabad (Weeks *et al.* in press: fig. 3.86 TNP 1183), as is a bowl with internal diagonal lines and a horizontal line at the rim externally (Fig. 8: 7, cf. Weeks *et al.* in press: fig. 3.82: TNP 1327). Weeks *et al.* tentatively assign the former to the Early Bakun, while the latter is associated with other vessels assigned to the Early Bakun at Tol-e Nurabad. Less good comparisons can be made with the Middle Bakun pottery of Tol-e Nurabad, though various simple motifs are held in common, including rows of small dots, and thick bands of paint (e.g. Fig. 8: 24–25, 29, cf. Weeks *et al.* in press: fig. 3.91: TNP 1053–1055).

Parallels with material from Khuzestan and the Deh Luran are also found. The bowl with internal diagonal lines and a line externally (Fig. 8: 7) finds a possible parallel in the Middle Susiana at Chogha Bonut (Alizadeh 2003: fig. 22: B); a similar vessel is also found in the Deh Luran (Neely and Wright 1994: fig. IV:53: c), though this is assigned to an earlier phase (Chogha Mami Transitional). Nested right-angle lines similar to Fig. 8: 3 are seen at Bendebal Period II (Dollfus 1983: fig. 62: 4). Footed bases with a band of paint are also known from Middle Susiana sites in Khuzestan such as Chogha Bonut and Djowi Period II (Alizadeh 2003: fig. 21: G; Dollfus 1983: fig. 33: 14) as well as the Bakun assemblage at Tol-e Nurabad (Weeks *et al.* in press: fig. 3.83: TNP 1339–1341). The large disc surrounded by smaller circles (Fig. 8: 23) is found at Bendebal Period II (Dollfus 1983: fig. 75: 19).

Finally, it should be noted that some elements of the BH56 assemblage are directly comparable to the Mesopotamian Ubaid, for example reserve slip lines (Fig. 8: 5), denticulate decoration (Fig. 8: 37) and fine gridded decoration (Fig. 8: 34–35). Such elements are also found in the Ubaid-related Middle Susiana pottery of Khuzestan, as well as other contemporary Ubaid-related Chalcolithic Buff ware traditions, so on the current evidence it would be premature to suggest there were direct contacts with Mesopotamia.

The parallels with the Sohz phase, Bakun B, Gap Ia–b, Djowi Period II, Bendebal Period II and Middle Susiana 3 are all in chronological agreement (Dittmann 1984: 64, Tab. 11; Dollfus 1983: 167, tab. 41; Voigt 1993: fig. 2). In Mesopotamian terms BH56 would be contemporary with the Ubaid 3 according to conven-

tional regional synchronicities, though the absolute dates available for the Early Bakun imply that it overlaps with the Ubaid 4. According to radiocarbon dates from Tol-e Nurabad, the Neolithic tradition could theoretically end (and the Chalcolithic start) as late as 4700 or 4600 B.C.E. in Phase A19, and not earlier than 4940 B.C.E. (Weeks *et al.* in press: 68, tab. 3.2), while Phase 16, said to be Middle Bakun, has a range of 4730–4490 B.C.E. An absolute date in the first half of the 5th millennium is appropriate for BH56.

The qualitative comparisons reflect geographical proximity to neighbouring traditions, i.e. to the region directly to the north (the Sohz phase of Behbahan); the region directly to the east and north-east (the Bakun tradition of inland Fars); and the coastal area to the north and north-west (the Middle Susiana 3 Phase, i.e. Djowi II and Bendebal II) of the Khuzestan lowlands. A subjective assessment, based on the evidence of the surface pick-up only, is that the tradition manifested at BH56 is most closely related to that of the Behbahan region, followed by Bakun BII. Further research may change or refine this impression.

The Lapui Period

One site (BH26) was identified which definitely had Lapui pottery of the first half of the 4th millennium B.C.E. (Fig. 4). Another (BH49) was found which had a more varied assemblage, but which also appears to date to the Lapui Period. This is perhaps a little earlier in date, and will be discussed first.

BH49

BH49 (Tul-e Sabz) was on the north side of the Hilleh, 12 km. to the east-north-east of the Chalcolithic site BH56. It was a prominent mound *c.* 60 m. x 60 m., 5 m. in height that had at some point been ploughed. Only a brief pick-up was possible, and the site merits closer inspection.

The assemblage of BH49 was varied compared to that of BH26, and lacked a distinctive red/black slipped and burnished Lapui Fine Ware which dominated the assemblage of the latter (see below). Instead, the commonest ware at BH49 was a burnished gritty earthenware, probably hand-made but possibly turned at the rim (Fig. 9: 12–17). The grits consisted of flat angular platelets with some white inclusions, and a red-brown slip may have been present in some cases (not shown on

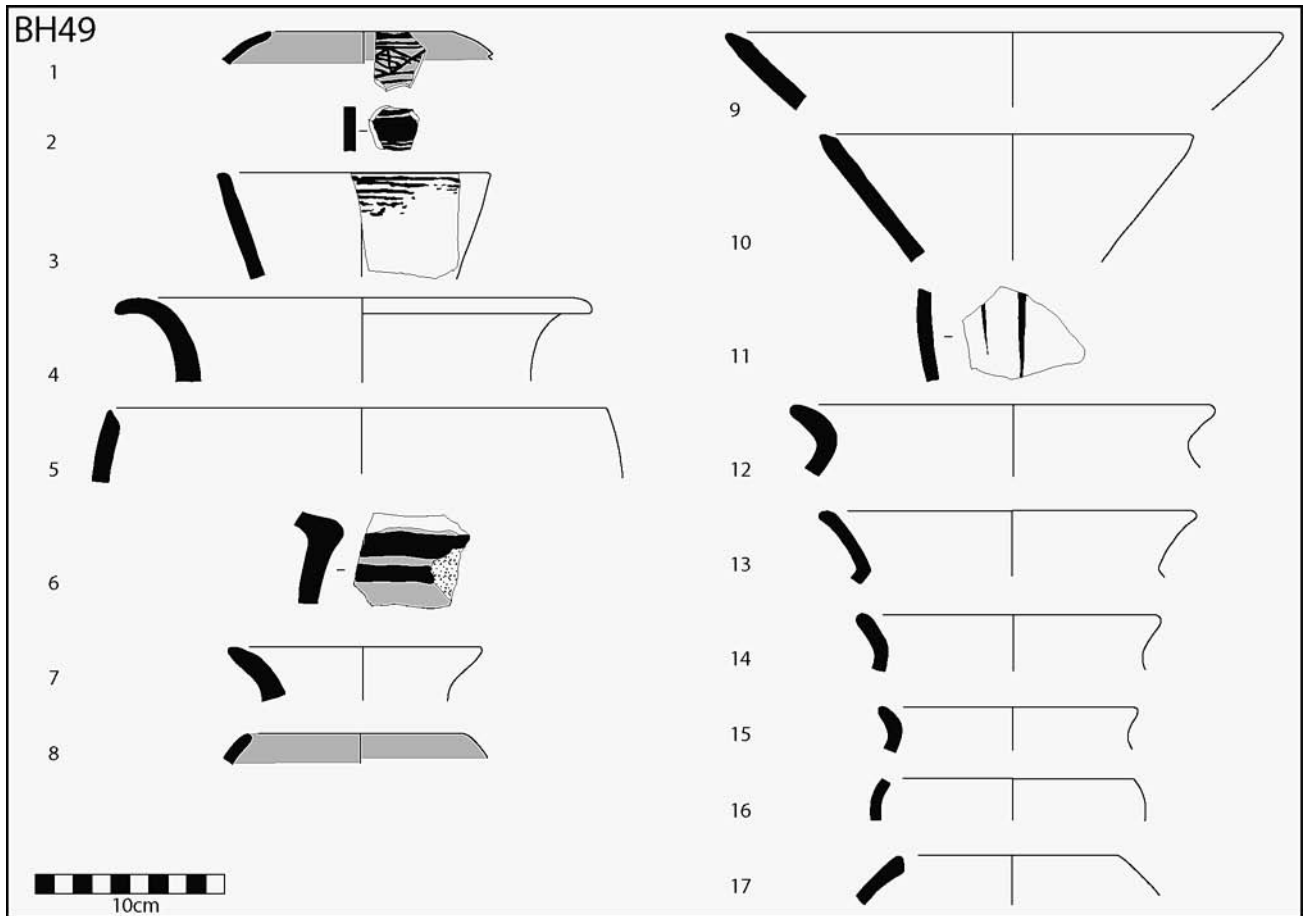


Fig. 9. Pottery of the Lapui(?) Period (BH49).

Fig.	Sherd	Class	Dia.	Decoration	Comments
9: 1	BH49-1	RED.N-ID	10	red-br slip(?) int and ext; red-br paint ext	hard to tell if slipped
9: 2	BH49-2	RED.N-ID	0	red-brown slip int and ext, dark purple paint	
9: 3	BH49-3	RECH.1	14	purple paint ext	slightly eroded ext
9: 4	BH49-4	RECH.1	26		
9: 5	BH49-5	RECH.1	26		odd angle - distorted?
9: 6	BH49-6	RECH.1	0	red slip ext, purple paint ext	quite eroded
9: 7	BH49-7	SMOC	14		
9: 8	BH49-8	FRED	12	red-brown slip, int and ext	a few fine grits in this one
9: 9	BH49-18	CW.N-ID	30		fine brown fabric
9: 10	BH49-9	BUCH	20		
9: 11	BH49-10	BUCH	0	dark brown paint	
9: 12	BH49-11	BUGR	23	brown slip?	
9: 13	BH49-12	BUGR	20	cream surfaces, not clear if slip	a bit strange
9: 14	BH49-13	BUGR	16	red-brown to grey slip int and ext? turned?	
9: 15	BH49-15	BUGR	14		
9: 16	BH49-16	BUGR	14	grey slip ext?	
9: 17	BH49-17	BUGR	12		

illustrations due to uncertainty). It may be similar to Sumner's Lapui Common Ware in the Kur River Basin, a coarse gritty type which shares the same range of forms as Lapui Fine Ware (see below) (Sumner 1988: 27). Shapes were simple, consisting of flaring jar rims and some holemouths. The former (Fig. 9: 12–15) compare to vessels from Tol-e Spid, in Mamasani (Petrie *et al.* in press-a: fig. 4.51: TS 2148; fig. 4.55: TS 2044). The holemouths (Fig. 9: 16–17) have excellent comparisons with numerous grit-tempered, roughly burnished vessels from the same site (e.g. Petrie *et al.* in press-a: fig. 4.51: TS 2114; fig. 4.53: TS 2012).

The next commonest class was a red earthenware in a smooth chalky-feeling fabric with small white inclusions, in some instances with a red slip and purplish paint (Fig. 9: 3–6). The highly curved everted jar rim (Fig. 9: 4) has good parallels in Phase 22 at Tol-e Spid (Petrie *et al.* in press-a: fig. 4.54: TS 2089). A distinctive holemouth with a bevelled inner edge (Fig. 9: 5) has numerous excellent parallels at Tol-e Spid, though with grittier fabrics (Petrie *et al.* in press-a: fig. 4.50: TS 2159; fig. 4.51: TS 2141; fig. 4.54: TS 1993), similar forms also being found at BH26 (see below). Regarding the painted examples, technical similarities might possibly be found with “bichrome purple on red” decorated pottery from Lapui levels at Tol-e Spid (Petrie *et al.* in press-a: fig. 4.51: TS 2116, TS 2131).

Also found was a jar rim in a smooth cream ware (Fig. 9: 7), and a holemouth in a very fine orange-red ware with an orange slip, possibly with a fine burnish (Fig. 9: 8). Non-classified gritty red sherds with paint were also recorded (Fig. 9: 1–2). Of these, a painted holemouth may have had a red-brown slip internally and externally (perhaps “self-slipped”), and barely-visible red-brown paint with a bisected hatched lozenge decoration. It resembles “Soghun Ware”, which is found contemporary with Lapui material at Tepe Yahya, mainly in Period VI. Both Red-Painted and Bichrome Soghun Ware are restricted to holemouths and open bowls, and decoration is typified by rows of hatched lozenges below the rim (Beale 1986: fig. 4.13: g, fig. 4.15: d). Soghun Red-Painted and Bichrome pottery is not slipped, however, though a red wash is found over a thick buff slip in “Soghun Mottled Purple Ware”. A similar design to the BH49 sherd was found in surface layers at Bakun B, in a “reddish brown painted” ware (Egami and Sono 1962: 5, fig. 24).

A black-on-buff sherd was found at BH49, though the pattern is insufficient to assign it to any particular

tradition (Fig. 9: 11). The fabric was porous, grainy and buff with small chalky inclusions, and appeared to be handmade; a flaring bowl rim shared the same fabric (Fig. 9: 10). A few painted buff ware sherds are found in Lapui levels at Tol-e Spid, assumed to be residual from the Chalcolithic, while painted buff ware sherds are associated with the deeper Lapui levels at Tol-e Nurabad. It is possible that painted buff ware and Lapui Ware coexisted during the early part of the Lapui horizon.

The notable variability of the BH49 assemblage when compared to that of BH26 has several alternative explanations. It may mean that the two sites relate to different phases of the Lapui Period, or the variability of BH49 may reflect other chronological differences, i.e. prolonged or multi-period occupation. The presence of Soghun-like ceramics, which coincides with the earlier part of the Lapui horizon at Tepe Yahya (Beale 1986: 40, fig. 4.1), would suggest that BH49 is slightly earlier than BH26. This hypothesis is supported by the prevalence at BH26 of red/black slipped and burnished Lapui Fine Ware, which becomes more common as the Lapui period progresses (see below). It is also feasible that the differences in the two assemblages result from specific local patterns of ceramic production and exchange. For example, BH26 may have been close to a local production site of the fine red/black slipped pottery, or may even have been a production site itself.

BH26

BH26 consisted of a low mound with a recently rebuilt Imamzadeh at its top and an Islamic graveyard on its flanks, densely packed with burials. The cultural material, largely pottery but also including lithics (a long flint blade with gloss, plus small tools and flakes), was scattered among the graves. It is possible that much of it was thrown up by grave-digging activities. No obvious archaeological structures were evident.

The pottery was largely in fine ware which had a fine buff or pale brown fabric and a red-brown to dark grey slip inside and out (Fig. 10: 1–21). The slip was very distinctive, sometimes combining both red and grey streaks. External burnishing was occasionally obvious (Fig. 10: 8, 20), and may have been present on other sherds. Like comparable examples from Tol-e Nurabad, the vessels appeared to be wheel-made, though Sumner doubts the use of the wheel at that time in the Kur River basin (Sumner 1988: 25–26). The class is comparable to Sumner's Lapui Fine Ware in the Kur River Basin,

Petrie's Fine Red-Slipped Buff Ware at Tol-e Spid and Weeks' Slipped and Burnished Ware at Tol-e Nurabad.

Common forms included slightly closed vessels whose rims have bevelled inner edges and/or beaded outer edges (Fig. 10: 11, 15, 16), comparable to vessels from Tol-e Spid (Petrie *et al.* in press-a: fig. 4.51: TS 2141, fig. 4.54: TS 1993). A similar form with a more out-turned rim (Fig. 10: 14) is paralleled in the Kur River Basin (Sumner 1988: fig. 2: D). Another vessel with a more curving rim is comparable to vessels from Tol-e Spid (Fig. 10: 21, cf. Petrie *et al.* in press-a: fig. 4.58: 1958). One distinctive form has an inturned lip; it may represent a shallow bowl rim or an incomplete jar rim (Fig. 10: 1–2). These compare to examples from Tol-e Nurabad, though not Tol-e Spid (Weeks *et al.* in press: fig. 3.102: TNP 752, TNP 695). Various other simple shapes can be compared to Lapui pottery from Tol-e Spid, Tol-e Nurabad and Kur River Basin, including wide flaring bowl rims with straight sides (Fig. 10: 8, 9, cf. Sumner 1988: fig. 2: L–N; Petrie *et al.* in press-a: fig. 4.58: TS 1957; Weeks *et al.* in press: fig. 3.102: TNP 638, TNP 715); and everted jar rims (e.g. Fig. 10: 19, 22, cf. Sumner 1988: fig. 2: E–F; Petrie *et al.* in press-a: fig. 4.57: TS 1956, TS 1954, TS 1963; Weeks *et al.* in press: fig. 3.98: TNP 917). General comparisons can also be made with Lapui Ware from Tepe Yahya, which shares similar flaring bowl rims, slip and burnish, but is said to be hand-made (Beale 1986: 55–57).

A small proportion of the pottery picked up from BH26 had coarser fabrics. A coarse red earthenware with an external slip (Fig. 10: 24) was represented by a jar rim. Its fabric had flat angular grits and white inclusions. An identical form in a coarse gritty fabric with limestone inclusions was found at Tol-e Spid (Petrie *et al.* in press-a: fig. 4.55: 2044). A cruder ware with similar grits and a grey slip was also found, in the shape of a holemouth with a beaded rim (Fig. 10: 25). This is similar to an unslipped vessel in a grit-tempered fabric at Tol-e Nurabad (Weeks *et al.* in press: fig. 3.101: TNP 808). This may relate to Sumner's Lapui Common Ware (Sumner 1988: 27 and fig. 3). Finally a large rim with an extended flattened top was picked up, in a hard red fabric with a grey core and medium-coarse vegetal temper (Fig. 10: 26); this may belong to a later occupation. Early Islamic pottery and gravestones with *kufic* script were also present at the site.

Regarding relative chronology, BH26 appears to date to the middle of the Lapui Period. At Tol-e Nurabad

and Spid holemouths with incurving sides in grit tempered slipped and burnished ware and other gritty wares are particularly associated with the earlier Lapui phases; these are not found at BH26, but are known from BH49 (see above). Moreover, at Tol-e Spid, where Phases 24–20 are designated Lapui, fine slipped and burnished buff ware (cf. the dominant red/black slipped and burnished Lapui Fine Ware at BH26) increased in frequency from Phase 21 onwards (Petrie *et al.* in press-a: 129). At both Tol-e Nurabad and Tol-e Spid, the Slipped and Burnished Ware is associated with bevelled-rim bowls in its later levels (Phases 11–10), and then continues into the Banesh Period. Bevelled-rim bowls were not identified at BH26 which implies a date before the late Lapui.

Regarding absolute chronology, at Tepe Yahya, Lapui Ware is found in periods VIB and VA, being common in VC-VA.2. This gives it a range between c. 3800 B.C.E. and 3300 B.C.E. The parallels with Sumner's material belong to the Middle Lapui, which Sumner dates to c. 3700 B.C.E. (Sumner 1988: 30). Recent calibrated radiocarbon dates from Tol-e Spid confirm that the Lapui Period spanned a period from 3980 B.C.E. or earlier up to 3510 B.C.E. or 3380 B.C.E. (Petrie *et al.* in press-a: 124). The date of BH26 is therefore likely to be in the first half of the 4th millennium B.C.E., with BH49 perhaps dating to the early 4th millennium or even earlier.

The Banesh(?) Period

One of the most interesting and well preserved sites was Tul-e Gol Pokhti (BH19),¹⁶ a prominent mound south of Ahram with abundant bone, pottery and flint eroding from its sides (Fig. 4). Apart from recent sherds and small Achaemenid and Sasanian components, the pottery consisted of a group of crude earthenwares which probably relate to the Banesh Period.

The commonest variety was a distinctive very gritty earthenware with uneven firing and surfaces (Fig. 11: 2–5). Colour ranged from brown to brick-red to grey, and the poorly sorted inclusions consisted of flat angular grits and white particles. Despite its apparent crudity, it was largely wheel-made, with an external slip. A handmade variety also existed, without a slip (or with a slip that was hard to distinguish), and sometimes with fine textile impressions (Fig. 11: 1). These variants both showed distinctive uneven, cracked and pitted surfaces.

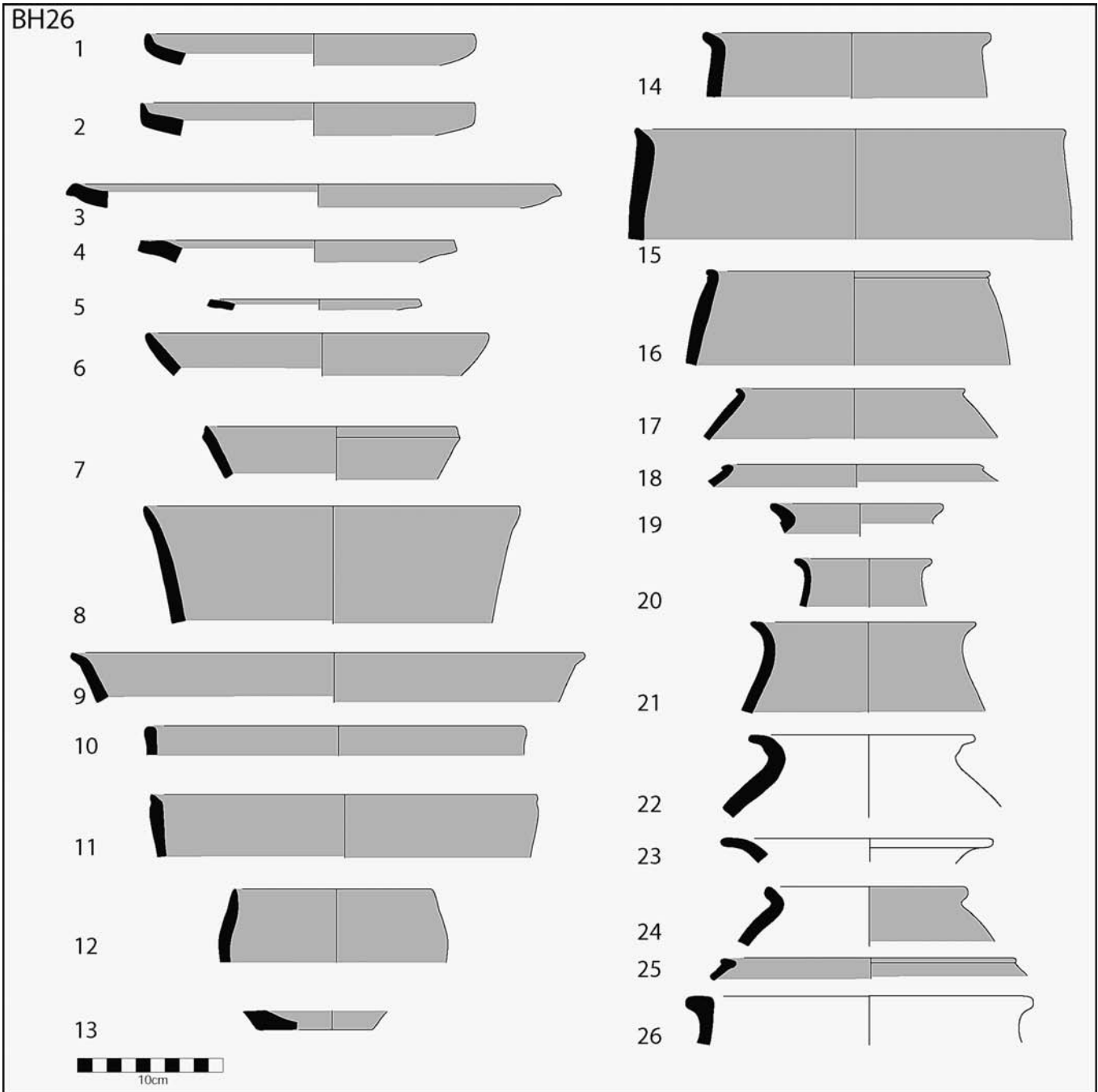


Fig. 10. Pottery of the Lapui Period (BH26).

Fig.	Sherd	Class	Dia.	Decoration	Comments
10: 1	BH26-6	REDBLA	23	red-brown slip int ext	
10: 2	BH26-8	REDBLA	24	red-brown slip int ext	
10: 3	BH26-11	REDBLA	34	red-brown and black streaked slip int ext	
10: 4	BH26-25	REDBLA	24	red-brown slip int ext	
10: 5	BH26-10	REDBLA	15	red-brown slip int ext	
10: 6	bh26-7	REDBLA	22	maroon slip int ext	
10: 7	BH26-17	REDBLA	18	red-brown slip int ext	
10: 8	bh26-1	REDBLA	26	red-brown slip int, ext. Burnished ext	
10: 9	BH26-14	REDBLA	36	red-brown and grey streaked slip int ext	the only kind of base
10: 10	BH26-13	REDBLA	30	red-brown slip int ext	
10: 11	BH26-23	REDBLA	28	red-brown slip int ext	
10: 12	BH26-16	REDBLA	14	red-brown slip int ext	
10: 13	BH26-15	REDBLA	0	black slip int; red-brown and grey streaky ext	
10: 14	BH26-4	REDBLA	20	red-brown slip int ext	
10: 15	BH26-2	REDBLA	30	red-brown slip int ext	
10: 16	BH26-5	REDBLA	20	red-brown slip int ext	dia unreliable
10: 17	BH26-20	REDBLA	16	grey slip int ext	
10: 18	BH26-9	REDBLA	18	red-brown slip int ext	
10: 19	BH26-21	REDBLA	12	red-brown slip int ext	
10: 20	BH26-26	REDBLA	10	streaky slip int ext; burnished ext?	
10: 21	BH26-3	REDBLA	16	red-brown slip int ext	
10: 22	BH26-55	FINBU	16		black staining inside
10: 23	BH26-56	FINBU	20		
10: 24	BH26-62	CRED.2	14	red-brown slip ext	
10: 25	BH26-64	PGRIT.N-ID	20	grey int, ext?	pale grey fabric
10: 26	BH26-66	CW.N-ID	24		hard, red; grey core

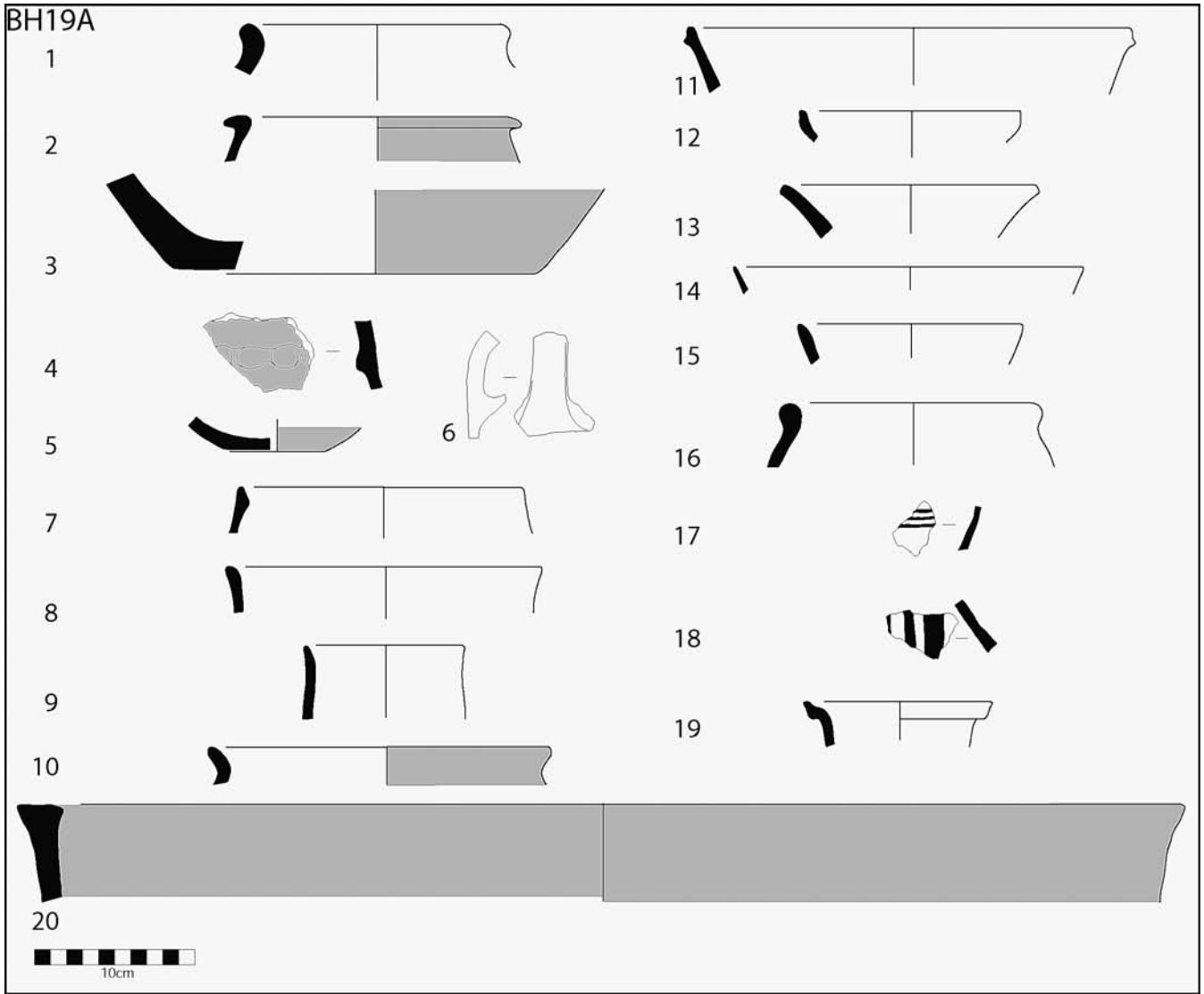


Fig. 11. Pottery of the Banesh(?) Period (BH19).

Fig.	Sherd	Class	Dia.	Decoration	Comments
11: 1	BH19A-1	CRUGR.1	26		
11: 2	BH19A-3	CRUGR.2	18	greyish red-brown slip ext	speckly limy fabric
11: 3	BH19A-6	CRUGR.2	0	purplish red slip(?) ext	large base
11: 4	BH19A-4	CRUGR.2	0	grey slip ext	
11: 5	BH19A-5	CRUGR.2	0	grey-brown slip ext	
11: 6	BH19A-2	CRUGR.3	0		handle
11: 7	BH19A-7	PGRIT.N-ID	18		more like CRUGR.2 than 1
11: 8	BH19A-8	PGRIT.N-ID	20		more like CRUGR.2 than 1
11: 9	BH19A-9	PGRIT.N-ID	10		more like CRUGR.2 than 1
11: 10	BH19A-10	PGRIT.N-ID	24	red-brown slip ext?	more like CRUGR.1 than 2
11: 11	BH19A-11	COARVEG	24		
11: 12	BH19A-12	COARVEG	12		
11: 13	BH19A-13	COARVEG	18		
11: 14	BH19A-14	COARVEG	14		
11: 15	BH19A-15	COARVEG	16		
11: 16	BH19A-16	COARVEG	20		
11: 17	BH19a-17	BUPA	0	thin red-brown paint ext	
11: 18	BH19A-18	BUPA	0	thin red-brown paint ext	
11: 19	BH19A-19	GRIVEG.2	12		probably Achaemenid
11: 20	BH19A-22	GRIVEG.2	68	dark grey slip int, ext?	possibly Achaemenid

Similar surface attributes are attributed to Lapui Coarse Ware by Sumner (Sumner 1988: 26–27) but there is little else in this assemblage to indicate a Lapui attribution. The description of the standard grit-tempered ware at Malyan (TUV) is similar to the gritty wares at BH19, with varying combinations of white, black and reddish grits, occasionally with straw temper found there. There is a white-gritted version (Nicholas 1990: 58), similar to a variant at BH19 (Fig. 11: 6). Banesh/Proto-Elamite parallels for the chain-ridged sherd (Fig. 11: 4) are found in a “protoelamite” collection from the Izeh Plain in north-eastern Khuzestan (Sajjidi 1979: fig. 35: h), though chain-ridges alone are not particularly diagnostic.

Several sherds with similar gritty fabrics, but without the distinctive pitted surfaces, probably belonged to related wares or represent variations (Fig. 11: 7–10). One, a holemouth with an inner thickening at the rim (Fig. 11: 7), resembles a Banesh Period vessel from Phase A6 at Tol-e Nurabad (Weeks *et al.* in press: fig. 3.108: TNP 481), while a slender beaker (Fig. 11: 9) resembles a vessel from Susa (Le Brun 1971: fig. 45: 8). Some less distinctive forms (e.g. Fig. 11: 10) are comparable to grit-tempered pottery from Malyan (TUV operation) and Tol-e Nurabad Phase 7 in layers dating to the Banesh Period, including simple everted and flaring rims (Weeks *et al.* in press: fig. 3.107: TNP 517–518; Nicholas 1990: pl. 16). Various crude and simple rims in Grit Tempered Ware from the Banesh Period Phase 18 at Tol-e Spid also compare to the BH19 material (e.g. Fig. 11: 7, cf. Petrie in press: fig. 4.64: TS 1765; Fig. 11: 2, cf. Petrie in press: fig. 4.64: TS 1774).

Another common earthenware had a buff to pale brown fabric and coarse vegetal temper with no slip or decoration evident (Fig. 11: 11–16). A flaring triangular jar or bowl rim with an outer indentation (Fig. 11: 11) is identical to straw tempered “goblet rims” from Malyan, and a similar form is found at Tol-e Nurabad Phase A6 (Sumner 2003: fig. D8: 22; Alden 2003: fig. 9.2: 2nd row on left, 3rd row on right; Weeks *et al.* in press: fig. 3.108: TNP 478). This has another parallel with a jar rim from the Izeh plain collection (Sajjidi 1979: fig. 35: e). Simple flaring rims in vegetal tempered fabrics (Fig. 11: 13–15) also have Banesh/Proto-Elamite parallels at Tol-e Spid and Tol-e Nurabad (Petrie *et al.* in press-a: fig. 4.63: TS 1840, TS 1841; Weeks *et al.* in press: fig. 3.107: TNP 489, 483, 513).

Two painted sherds were found in a similar but finer buff vegetal-tempered fabric (Fig. 11: 17–18). These

were wheel-made and had thin reddish paint in bands. Bands of paint are found on Banesh pottery at Susa Acropole (Le Brun 1971: fig. 46: 15–16), though it is not a particularly distinctive motif, and like the chain ridges mentioned above it is not restricted to the Banesh Period.

A final variety of distinctive pottery had a combination of flat angular grits and vegetal temper (Fig. 11: 19, 20). It was wheel-made, with cream surfaces. The larger of the two appeared to have a grey slip, though it may have been salts. Both these sherds may belong to later horizons, their fabric and shapes resembling material of the Achaemenid or later periods (Petrie *et al.* in press-a: fig. 4.104: TS 415).

Taken individually, the sherds and their comparanda are not distinctive enough to be certain of the date of the site. Taken together, a Middle Banesh Period date seems most likely. The Tol-e Spid Phase 18 parallels suggest a Middle Banesh date, in the later 4th millennium (Petrie *et al.* in press-a: 126, 130), though the Tol-e Nurabad parallels relate to both the Middle Banesh (Phase A7) and the Late Banesh (Phase A6) (Weeks *et al.* in press: 76). Two characteristic elements of the Banesh assemblage are missing, however: bevelled-rim bowls (BRBs) and “Banesh trays”, both of which are common at Susa, Malyan and Tol-e Spid, with BRB’s being common but trays absent at Tol-e Nurabad. Further work is required to confirm the date.

The Middle and Neo-Elamite

The Elamite occupation is reasonably prominent in the region (Fig. 4), perhaps on account of the Middle Elamite centre at Liyan (Tul-e Peytul). The pottery of the sites in question largely corresponds to Middle Elamite assemblages. Some elements may relate to later periods, i.e. the end of the 2nd to mid 1st millennium B.C.E., which would encompass the Neo Elamite.

This broad ceramic phase was distinguished by the presence of several classes of grit and vegetal tempered earthenware, generally buff or pale brown in colour, sometimes accompanied by a finer chalky red ware. At least 10 sites or sub-sites contained this family of wares. They include a cluster of mounds and structures in the village of Zirah, near Tawwaj (BH11A, BH11B, BH11C); a ploughed field scatter near Golangun (BH25); a very large mound on the outskirts of Borazjan known as Tul-e Mor (BH28), and mounds and scatters

on the outskirts and within the Achaemenid-Sasanian town at Deh Qa'ed (BH31, BH32B, BH33, BH45). Tawwaj itself (BH12) also appears to contain this horizon, though occurrences of the relevant classes are found amongst material which is otherwise Achaemenid-Hellenistic and Islamic. A couple of the sites at Khosh Ab (BH8A, BH8B) have isolated occurrences of a Large-Grit Tempered Ware elsewhere associated with the Middle-Neo Elamite horizon, but this has been considered insufficient evidence to assign elements of these sites to that phase. It is possible that some of the classes continued into use into the Achaemenid period. The dating of one or two of the sites included in the Elamite horizon is admittedly tentative.¹⁷ The difficulties experienced in trying to date these wares and separate these horizons may reflect continuity of occupation at these sites.

Whitcomb published "Elamite" survey collections from the mainland of Bushehr Province. Of Whitcomb's sites, two are located in the same areas as the Elamite sites of this survey and may therefore be the same sites: Whitcomb's B3 may equate to this survey's BH31 or BH45, while his A7 may be BH25 (Whitcomb 1987: figs. B, E-G, I). Whitcomb also noted the Elamite occupation at Tawwaj, and two Elamite sites which were not relocated during this survey, B9 and B7, both c. 10 km. from Tawwaj (Whitcomb 1987: 330 and fig. B). As far as the pottery is concerned, a few parallels can be made between Whitcomb's material and that presented here, including large flaring rims with extended ends or bands (e.g. Fig. 12: 11, cf. Whitcomb 1987: fig. F: f), as well as smaller simpler forms such as everted jar or cooking pot rims. It would be necessary to compare the two sets of material at close hand to confirm any direct relationship.

Appropriate comparisons with much of the material can be found in Middle Elamite, and perhaps also Neo-Elamite, contexts. A form of jar rim which curves outwards towards the horizontal and has a squarish profile, like an over-extended band rim (Fig. 12: 6, 20-21, 28, 30) is found in Middle Elamite Malyan in vegetal-tempered and grit tempered wares (Carter 1996: fig. 22: 16, fig. 28: 9). Similar Neo-Elamite rims are known from the Ville Royale II, Susa (de Miroschedji 1981a: fig. 37: 4, 9), and in Phase B8 at Tol-e Nurabad (Weeks *et al.* in press: fig. 3.123: TNP 2458, TNP 2447), tentatively dated to the Neo Elamite or Middle-Neo Elamite transition (Weeks *et al.* in press: 77). The same form is identified as "Elamite" at Izeh in eastern

Khuzestan (Sajjidi and Wright 1979: fig. 42: 9-10). A vertically elongated band rim (Fig. 12: 3, 7) is also found at Malyan and the Ville Royale II at Susa (Carter 1996: fig. 23: 13; de Miroschedji 1981a: figs. 13: 1-13, 24: 3-4), as well as the shorter version seen at BH33 (Fig. 12: 19, cf. Carter 1996: fig. 23: 7). The Ville Royale levels are 11-10 and 9, dated respectively to the later Middle Elamite and the Neo-Elamite. Another jar rim from BH33 has a Middle Elamite parallel from Tol-e Spid Phase 14 (Petrie *et al.* in press-a: 131 and fig. 4.86: TS 1132). Collar rims similar to those found at Tawwaj (Fig. 12: 10, 12) are found at Malyan (Carter 1996: fig. 10-11), also in a buff ware. The broad cordons seen at BH25 (Fig. 12: 18-19) have a parallel at Tol-e Nurabad Phase B7b, dated to the Neo-Elamite or Middle-Neo Elamite transition (Weeks *et al.* in press: fig. 3.124: TNP 2374). Triangular jar rims (Fig. 12: 1, 9), while not being particularly diagnostic, are represented at Malyan (Carter 1996: fig. 23: 15), as are simple everted rims in a "cooking pot" ware similar to that found at BH31 (Fig. 12: 16-17, cf. Carter 1996: fig. 28: 2-10).

Regarding absolute dating, Elizabeth Carter dates the Middle Elamite layers at Malyan to the last centuries of the 2nd millennium B.C.E. Further comparisons suggest contemporaneity with de Miroschedji's Middle Elamite II (1300-1100 B.C.E.), but perhaps also the Neo-Elamite I (c. 1000-900 B.C.E.) or even the Neo-Elamite II (c. 900-600 B.C.E.). It is quite possible that material is present which covers the whole span between the start of the Middle Elamite and the Achaemenid. It would be significant if Neo-Elamite material were represented as well as Middle Elamite pottery, given the current uncertainty over the presence of Neo-Elamite sites outside lowland Khuzestan (Petrie *et al.* in press-b: 168). Moreover, context would be provided for historical events during the Middle and Neo-Elamite periods, when the coastal region from Bushire to southern Khuzestan is believed to have been referred to in the Mesopotamian texts as Pashime, against which the Assyrians campaigned during the first half of the seventh century B.C.E. (Petrie *et al.* 2005: 52).

The Achaemenid to Parthian Periods

A pre-Sasanian component was visible at 32 sites (Fig. 5), making it the second best represented horizon. Some elements certainly date to the Achaemenid period while others may relate to the post-Achaemenid period.

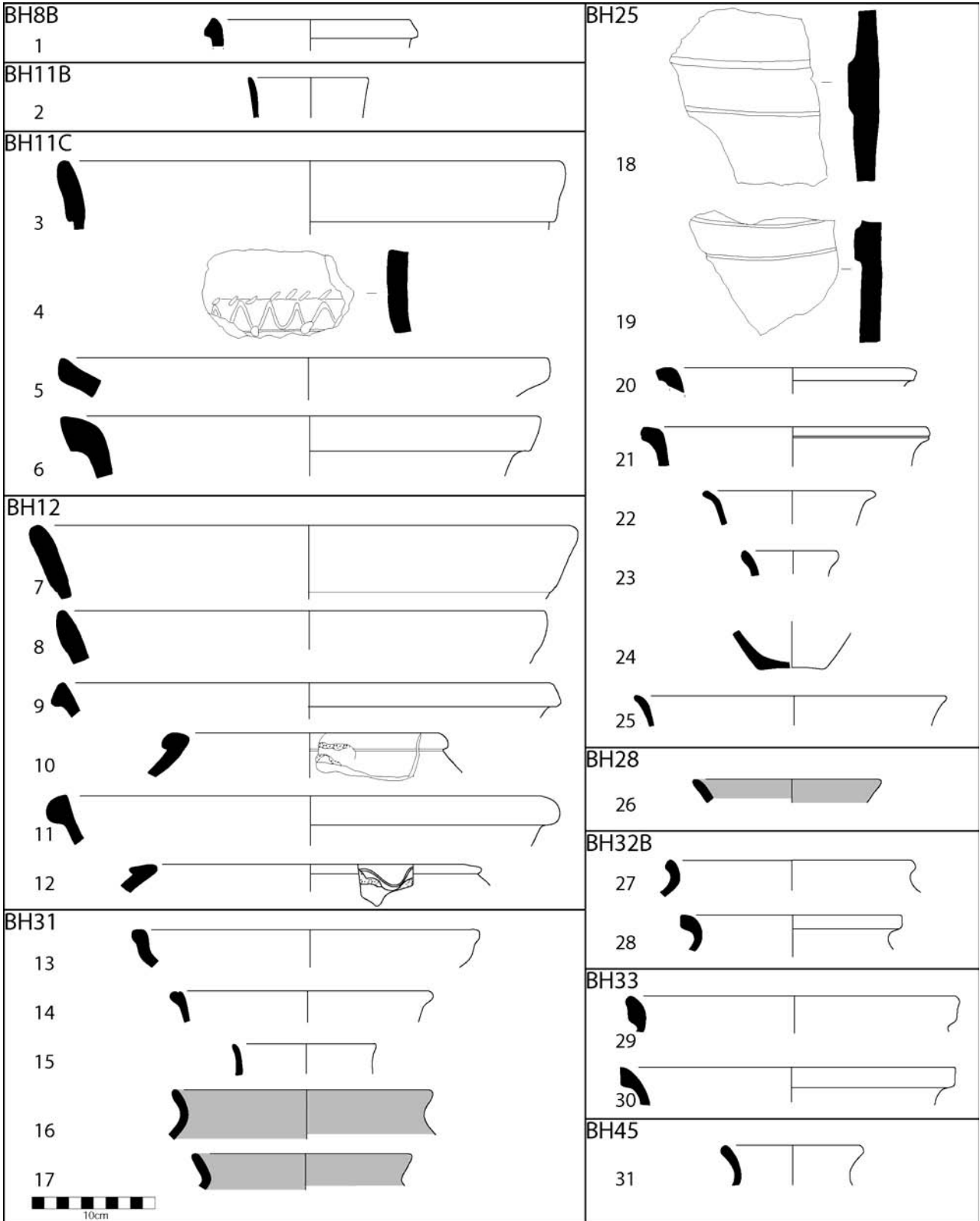


Fig. 12. Pottery of the Middle (and Neo?) Elamite Period (various sites).

Fig.	Sherd	Class	Dia.	Decoration	Comments
12: 1	BH8B-12	LAG	16		
12: 2	BH11B-1	BUFIN	10		tentative ID
12: 3	BH11C-1	LAG	40		
12: 4	BH11C-2	GRIVEG.1	0	incised lines	very grey
12: 5	BH11C-3	GRIVEG.2	40		border-line GRIVEG.1
12: 6	BH11C-4	GRIVEG.2	40		uncertain diameter
12: 7	BH12-50	LAG	44		unreliable dia
12: 8	BH12-51	LAG	40		unreliable dia
12: 9	BH12-1	BUFIN	40		
12: 10	BH12-2	BUFIN	28	handle stump	
12: 11	BH12-3	BUFIN	40		
12: 12	BH12-4	BUFIN	46	wavy line on rim	unreliable dia
12: 13	BH31-3	RECH.2	28		
12: 14	BH31-4	RECH.2	22		
12: 15	BH31-5	RECH.2	12		tentative ID, very buff
12: 16	BH31-6	BROGR	22	brown slip ext?, int	
12: 17	BH31-7	BROGR	18	brown slip ext, int at rim	
12: 18	BH25-1	GRIVEG.2	0	flat cordon	
12: 19	BH25-2	GRIVEG.2	0	flat cordon	
12: 20	BH25-4	RECH.2	22		
12: 21	BH25-5	RECH.2	24		
12: 22	BH25-6	RECH.2	14		
12: 23	BH25-7	RECH.2	8		
12: 24	BH25-3	RECH.2	0	whitish surfaces - salts?	
12: 25	BH25-8	SMAG.B	26		
12: 26	BH28-2	BROGR	16	brown slip	
12: 27	BH32B-10	LAG	20		
12: 28	BH32B-11	LAG	18		
12: 29	BH33-16	LAG	26		unreliable dia.
12: 30	BH33-17	LAG	28		may not be this class
12: 31	BH45-10	BUFIN	11		



Fig. 13. Pottery of the Achaemenid to Parthian Periods.

Fig.	Sherd	Class	Dia.	Decoration	Comments
13: 1	BH32A-31	SMAG.B	10		
13: 2	BH43-10	SMAG.B	9		
13: 3	BH30-7	SLIP.HR	10	slip int	
13: 4	BH30-6	HARGE	10		
13: 5	BH43-7	SLIP.HR	10	slip ext	
13: 6	BH12-27	SLIP.HB	12	slip ext	
13: 7	BH12-28	SLIP.HB	9	slip ext	
13: 8	BH32A-30	SMAG.B	8		
13: 9	BH17-25	CORC.B	10		
13: 10	BH17-23	CORC.B	12		
13: 11	BH41-32	SMAG.B	11		
13: 12	BH8A-8	HARGE	12		unreliable dia.
13: 13	BH12-23	SLIP.HR	38	slip int	
13: 14	BH39-1	SLIP.HR	34	slip int	
13: 15	BH41-30	CORC.A	32	black slipped int.. Paint(?) ext	
13: 16	BH39-5	CORC.A	32		
13: 17	BH32B-17	SLIP.HR	32	slip int	
13: 18	BH32A-1	CONG.G	40		
13: 19	BH8B-19	CONG.G	32		
13: 20	BH32A-5	CONG.G	38		
13: 21	BH32B-2	CONG.G	38		
13: 22	BH45-4	CONG.G	48		
13: 23	BH18A-2	CONG.G	34		
13: 24	BH45-5	CONG.G	30		
13: 25	BH17-13	CORC.A	30		
13: 26	BH17-14	CORC.A	22		
13: 27	BH8B-15	CONG.G	48		
13: 28	BH33-4	CONG.G	40		
13: 29	BH32A-11	CONG.G	42		
13: 30	BH11F-2	SLIP.HB	32	slip degraded	large grits
13: 31	BH12-31	CONG.RG	38	slip int	unreliable dia.
13: 32	BH12-34	SLIP.HB	32	slip int	

Exclusively Parthian ceramics were not noted: either there was a gap in occupation of the region at this time, or the ceramics of that period maintained older traditions and were not distinguished during this preliminary analysis. The latter is quite likely, so it is currently best to describe this horizon as Achaemenid-Parthian. Some of the classes associated with Achaemenid shapes were used as late as the Sasanian Period, and so are likely to have covered the Parthian. The Achaemenid-Parthian assemblage of this region is therefore tentatively defined, and the current site count should be regarded with a degree of caution.

The distribution of sites (Fig. 5) is very similar to that of the succeeding Sasanian horizon (Fig. 6). If the identification of Achaemenid-to-Parthian sites is accurate, this would be significant, and indicates strong continuity between the late 1st millennium B.C.E. and the first half of the 1st millennium C.E. At this early stage of research, it is possible that some of the material deemed to be Achaemenid-Parthian is in fact Sasanian, in which case the current number of Achaemenid-Parthian sites may be an overestimate. As it is currently understood, the Achaemenid-to-Parthian horizon is concentrated in a cluster of sites just outside Deh Qa'ed, to the north of Borazjan (Fig. 14). These sites should probably be regarded as elements of a single large settlement or town, which is dominated by the massive fortification of Tul-e Khandagh (BH29). Tul-e Khandagh has a diameter of 180 m., is c. 15 m. high and is clearly visible on the satellite picture. The whole of this "town" also manifests a Sasanian occupation, and it is currently unclear whether the fort should be assigned to the Achaemenid, post-Achaemenid, Parthian or Sasanian periods.

The pottery (Fig. 13) shows several Achaemenid forms, including a sharply carinated S-shaped profile, represented in these collections in a thin grey ware (Fig. 13: 1–2). This shape is well-known from Pasargadae (Stronach 1978: fig. 107: 7–10), from Achaemenid survey collections of the Persepolis Plain, Central Fars (Sumner 1974: 158; Sumner 1988: fig. 1: O); from Susa (de Miroschedji 1987: fig. 7: 11–12) from the Mianab Plain in Khuzestan (Moghaddam and Miri 2003: fig. 16: 4–5); from Chogha Mish in Khuzestan (Delougaz and Kantor 1996: pl. 74: D); and from Period IVc–d layers at Qala'at al-Bahrain (Højlund and Anderson 1994: figs. 1022, 1160, 1202). Note that there is a commoner variety of carinated bowl which is absent from the Bushehr sites. This has a strait flaring rim above the carination, rather than the sinuous S-shape, and is seen at the Iranian sites mentioned above and Qala'at al-Bahrain.

Another bowl, also with an S-shaped profile but with thicker walls was fairly common, both slipped and unslipped (Fig. 13: 3–4). This too finds good parallels on the Persepolis Plain and the Qala'at al-Bahrain Periods IVc–d, and also the Mianab Plain (Højlund and Anderson 1994: fig. 1074; Højlund and Anderson 1997: fig. 396–97, 484, 531; Moghaddam and Miri 2003: fig. 18: 13; Sumner 1986: fig. 2: O). A distinctive vessel with a rounded body and two or three lines incised below an everted rim (Fig. 13: 12) is typical of Qala'at al-Bahrain IVc–d, being particularly associated with snake burials in the floor of the Achaemenid palace (Højlund and Anderson 1997: figs. 630, 666–67).

A distinctive fine jar rim with an out-turned top and a ridge on the neck (Fig. 13: 5–10) has Achaemenid and post-Achaemenid parallels at the Ville Royale II and Ville

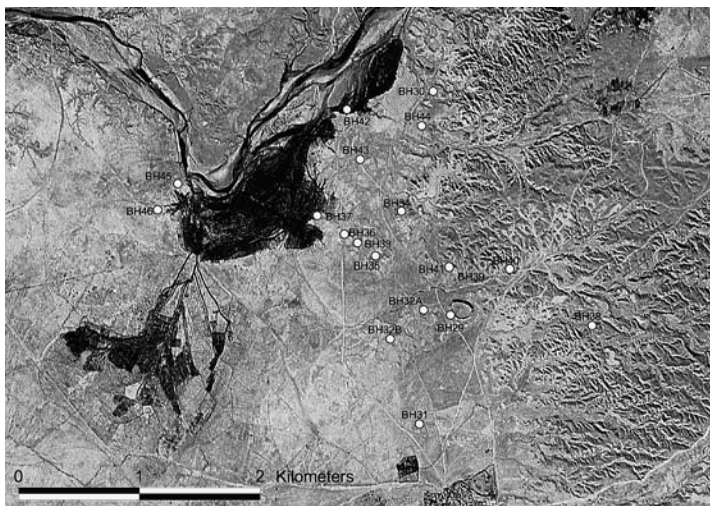


Fig. 14. The Achaemenid-Sasanian town near Deh Qa'ed. Note Tul-e Khandagh (BH29).

Royale Ouest at Susa and Qala'at al-Bahrain, though at the latter site the top of the rim is usually more thickened (Boucharlat 1987: fig. 56: 8; de Miroschedji 1987: fig. 14: 4; Højlund and Anderson 1994: fig. 1014, 1200). A version with a vertical rather than an out-turned rim is also found (Fig. 13: 11, cf. Boucharlat 1987: fig. 56: 11; de Miroschedji 1987: fig. 14: 5). The ones from Ville Royale Ouest are from the very end of the Achaemenid period, while the Bahraini examples are Period IVc–d.

Larger bowls with flat-topped rims extended outwards above a groove or slight carination were fairly common in the Bushehr survey (Fig. 13: 23–24), and are well represented in Achaemenid collections from the Persepolis Plain and at Susa (Sumner 1986: fig. 1: E–J, fig. 2: D–G; de Miroschedji 1987: fig. 11: 6).

Other larger vessels also find parallels in Period IVc–d assemblage of Qala'at al-Bahrain, including vats with ridges below the rim (Fig. 13: 27–28) (Højlund and Anderson 1997: figs. 428, 539; de Miroschedji 1987: fig. 20: 11). Similar vessels are found at Tol-e Spid in the Achaemenid Phase 12 (Petrie *et al.* in press-a: fig. 4.98: TS 506, TS 477). Vats with rims with approximately triangular cross-sections (Fig. 13: 18–20) also find IVc–d (Achaemenid) parallels at Qala'at al-Bahrain (Højlund and Anderson 1997: fig. 504). Note that similar vats with more pronounced triangular rims with grooves beneath them (Fig. 13: 21–22), in the same ware, also have Neo-Elamite parallels at the Ville Royale II at Susa, and a late 2nd millennium/early 1st millennium parallel in Phase 13 at Tol-e Spid (de Miroschedji 1981a: fig. 20:1–6; Petrie *et al.* in press-a: fig. 4.91: TS 616), as does a vat with an incurved band rim (Fig. 13: 29) in the same ware (de Miroschedji 1981a: fig. 20: 7). The former variety also has good post-Achaemenid parallels at Susa and in survey material from the Khuzestan plain, which should probably be preferred (Boucharlat 1987: fig. 58: 17–21; de Miroschedji 1981b: fig. 59: 7; de Miroschedji 1987: fig. 21: 6–7).

Distinctive large jar or bowl rims with an extended square profile above a pronounced ridge (Fig. 13: 30–32) are a distinctive part of the assumed Achaemenid-to-Parthian assemblage, and occur in more than one class. They may be a local development, as they find just one parallel at Qala'at al-Bahrain (Højlund and Anderson 1994: fig. 997). A comparable form is known from the North Jazirah of northern Iraq, assigned to the Late Assyrian, i.e. shortly prior to the Achaemenid (Wilkinson and Tucker 1995: fig. 73: 16). This is a rather distant parallel, and may not be significant.

One group of ceramics, mostly found at a single site in conjunction with Samarra horizon pottery of the 9th–10th centuries C.E., may date towards the end of the Achaemenid/post-Achaemenid horizon, having good parallels with Hellenistic material from Qala'at al-Bahrain. This includes wide bowls with band rims (Fig. 13: 16–17) (Højlund and Anderson 1994: fig. 1265, 1333–34). Similar vessels with slightly different rims are associated (Fig. 13: 13–14), which have parallels with Achaemenid or post-Achaemenid material from the Mamasani survey in Fars (Zeidi *et al.* in press: fig. 5.22: MSP 1754–MSP 904). A kind of club-rimmed holemouth with an indentation or angle in the inner side of the rim is particularly distinctive (Fig. 13: 25), and is associated with the Hellenistic horizon at Qala'at al-Bahrain (Højlund and Anderson 1994: figs. 1284–86, 1350, 1506, 1589–600).

On the whole, the parallels with Qala'at al-Bahrain IVc–d are good for this group of classes, hinting at a reasonably high level of integration in the Gulf region during the Achaemenid and post-Achaemenid periods.

The Sasanian Period¹⁸

A detailed presentation of the ceramic horizons and their parallels for the Sasanian and Islamic periods is not given here, as the information would largely duplicate that already available (Kennet 2004; Priestman forthcoming). Moreover, work is ongoing on the hugely varied Sasanian pottery picked up on survey. Some general comments may be made on Sasanian site distribution and communications. The Sasanian period was of particular interest because of the potential relationship between the urban scale settlements of Sasanian date on the Bushehr peninsula, and rural settlement on the adjacent mainland. As noted in the introduction, the major port of Rishahr/Rev Ardashir on the Bushehr Peninsula may have required external provisioning, in which case its hinterland was likely to have been located on the alluvial plains and foothills which comprise the study area of this project. Additionally, infrastructure may have existed to allow communication and the transportation of goods between the core centres of the Sasanian administration in inland Fars, e.g. Bishapur, Firuzabad and Istakhr, and the coastal port and centre of Sasanian maritime economy at Rev Ardashir (Whitcomb 1984: 333; Daryae 2003: 6).

Accordingly, it is not surprising that, at 36, the Sasanian period represented the highest number of sites

of any period during the pilot survey. The distribution of Sasanian sites closely mirrors that of the Achaemenid-Parthian horizon, with a strong clustering at the “town” found north of Borazjan (Fig. 6, Fig. 14). Indeed, most of the sites with Achaemenid-Parthian pottery also bore Sasanian material. The scale of Achaemenid to Sasanian settlement across all areas of the survey area is implied by the constant background of Achaemenid-Parthian and Sasanian coarse and slipped wares on most of the archaeological sites that were recorded, even where an earlier or later period represented the main period of occupation or use. A number of large, predominantly Sasanian sites were noted. The most significant of these are included in the “town” at Deh Qa’ed (BH29–44), the mounds at Khosh Ab (BH8A–C) and Isavandeh (BH18A–C) and large monumental structures or complexes at Tul-e Shahid (BH22) and Shif (BH5A). There was an Achaemenid-to-Parthian presence at all the mounds at Khosh Ab, but BH8B–C were dominated by later Sasanian pottery. At Isavandeh a single large archaeological mound was noted with several courses of mudbrick architecture and a plaster floor exposed in one of its eroding sides (BH18A). Pottery from the site was mostly later Sasanian in date and the structure was of monumental proportions and construction. There was a significant background of later Sasanian finds in the surrounding area (BH18B–C), among pottery of earlier and later date. At Tul-e Shahid (BH22), a large archaeological mound had already been extensively damaged, revealing substantial brick-built architecture. The thin pottery scatter appeared to include material of both Achaemenid-to-Parthian and Sasanian date, but a large fluted column base found nearby was not of Achaemenid style and may be Sasanian.

At Shif, a large mound of Sasanian date was found (BH5A), along with lower mounds relating to the Islamic Period (12th–14th centuries C.E.). Its presence there, and the presence of Sasanian pot scatters in the centre of the Angali Plain at Mokhi (BH2, BH3), raises interesting questions regarding communication with the Bushehr Peninsula during the Sasanian period. A line clearly visible on the satellite images of the area, which is here interpreted as a road, runs between the “town” at Deh Qa’ed and the Sasanian mound at Shif, directly through Mokhi. It therefore seems highly likely that during the Sasanian period, communication with and provisioning of Bushehr could have occurred along this routeway and that it would have served to link Bushehr to the town at Deh Qa’ed, and thence other towns in

inland Fars by first following the Dalaki river valley, and then changing to the Shapur river valley some 30 km. to the north-east of Deh Qa’ed, at an intermontane valley which is now the location of the town of Konar Takhteh.

The apparent presence of Achaemenid-Parthian pottery at Mokhi in the Angali Plain raises the possibility that this routeway to Bushehr was in use before the Sasanian Period. Little is known of the pre-Sasanian occupation of the Bushehr Peninsula, and there is little evidence that it was significant during the Achaemenid and post-Achaemenid periods. Further work is required to establish whether the relevant classes at Mokhi continued to be used in the Sasanian Period.

The putative Sasanian routeway across the Angali Plain to Shif was used as a route to Bushehr in recent centuries, as noted in the introduction. It is visible as a linear feature on CORONA satellite images from the 1960s, and is the basis for Whitcomb’s “Angali Canal” (Whitcomb 1987). The feature was examined on the ground at several locations during the 2004 season. The lack of any traces of a canal along the linear feature, in the form of ditches, hydraulic works or linear upcast mounds argues against his interpretation, as does the absence of any sign of an aqueduct to take the water from Shif across the tidal flats to Bushehr, not to mention the difficulty in raising sufficient quantities of water 12 m. up from the deeply cut bed of the Dalaki to the surrounding land surface. There are other objections which can be raised against Whitcomb’s hypothesis.¹⁹

The presence of Sasanian pottery at Mokhi (BH2, BH3) is significant to the question of rural settlement behind the Bushehr peninsula. The pottery was heavily fragmented and badly abraded, and no settlement remains were noted. The scatters may therefore have been manuring scatters, typically associated with intensive agriculture (Wilkinson 2003: 55–57), though recent and modern ploughing of a settlement would have had a similar affect. Further exploration of the alluvial plain, away from the routeway, would be useful to establish whether such field scatters are widespread and whether significant areas of the Angali Plain were brought under cultivation during the Sasanian period.

The Islamic Period

The sites from the Islamic period, although well dated and crucial to an understanding of the long-term

development of the region, currently represent an incoherent selection and, as a result, few useful conclusions can be drawn from their dating and distribution. They appear to be less common than sites of the previous period and their number declines through the Islamic period (Table 1, Fig. 7). This is in contrast to the pattern in inland Fars, which sees a progressive rise in the number of Islamic sites between the Sasanian and the recent period (Sumner and Whitcomb 1999: 314, tab. 2; Zeidi *et al.* in press: 139, tab. 5.1). It has been suggested by Williamson that the Bushehr area saw a decline in habitation following the end of the Sasanian Period, a phenomenon connected to the rise of Siraf, 220 km. to the south-east. These preliminary results back up this assertion.

By the late Sasanian/Early Islamic period, settlement on the Bushehr peninsula had reached its peak. Shortly afterwards there was a major settlement collapse across the peninsula, probably during the late 8th/early 9th centuries C.E. The study recently undertaken of the Williamson Collection proves this point conclusively (Priestman forthcoming), indicating a drop of over half the number of sites between the 6th–9th to 9th–11th centuries C.E. Williamson himself recognised this trend, having recorded just seven sites of the 9th–14th centuries C.E. period across the Peninsula, with a combined area of 15 ha., compared with 450 ha. previously (Prickett and Williamson 1970). This pattern was confirmed by a brief inspection of Hazar Mardom on the Bushehr Peninsula during the 2004 season, and casual examination of ceramics from Rishahr. Both sites appear to be devoid of common Abbasid period indicators, such as appliqué decorated Alkaline-Glazed Ware or Samarra Horizon wares.

The sudden collapse of one of the major entrepôts of the Persian Gulf is remarkable, especially after an apparently long and sustained period of growth. Interestingly, at the same time as the major settlement and maritime centre of Bushehr fell into decline, the town north-east of Deh Qa'ed was also abandoned: no glazed wares of the Umayyad period were noted there. If these two centres were intimately linked, as has been proposed, then it appears that it was not just the settlement on the peninsula that collapsed, but the whole of the regional infrastructure. Closely following these events, probably not earlier than the 8th century C.E., there appears to have been a major reoccupation of the site of Tawwaj (BH12), which had previously been occupied during the Elamite and Achaemenid-Parthian

periods but not the Sasanian. When activity on the site was resumed, it appears that it was across the whole site simultaneously. This corresponds with the historical information that a planned city was laid down after the Arab conquest (Whitcomb 1987: 333). From the very close follow on in the ceramic sequence between the abandonment of the city at Deh Qa'ed and the take-up of the sequence at Tawwaj, and based on the proximity of the two sites (*c.* 10 km. apart), it seems probable that the decline and rise of these two sites was a linked event and it may well have been that a substantial part of the population from the Sasanian town moved to the new site.

The distribution of sites during the following period appears to be thin. A series of low archaeological mounds at Shif bore abundant 12th–14th centuries C.E. pottery (BH5B–E), as well as Sasanian material presumably relating to or originating from the large Sasanian mound at BH5A. A site on Shif Island also had Islamic material of this date (BH54). It appears therefore that the route through the Angali Plain to Bushehr via Shif was reactivated after a gap of several centuries. Settlement on Shif Island was also attested to during the next horizon (15th–18th centuries C.E.). Shif was therefore reinstated on the route to the Bushehr Peninsula well before the 17th–19th centuries C.E.

Sites of unknown date

There were 12 sites not dated, either because of paucity of pottery or because they were not of a type likely to be associated with pottery (e.g. rock-cut features).

CONCLUSIONS

The survey revealed a rich archaeological heritage in the Bushehr hinterland, going back at least to the Chalcolithic period. Given the briefness of the survey, it is almost certain that the actual number of sites is higher in most of the areas which were visited. There are apparent gaps in the sequence (the Neolithic, Kaftari horizon, the Parthian period). The absence of the Kaftari horizon is remarkable given the known occupation on Bushehr at Tul-e Peytul/Liyan. These lacunae should not be considered proven until more work has taken place, however. Further surface pick-ups and research on the existing pottery collections is needed to clarify

the ceramic chronology, particularly between the Achaemenid and Sasanian periods. This would be highly significant with regard to the chronology of the Achaemenid-Sasanian town near Deh Qa'ed. It may, for example, be established that the classes associated with the Achaemenid-to-Parthian were still in use during the Sasanian Period, in which case many of the sites currently assigned to both the Achaemenid-Parthian and Sasanian horizons may date solely to the latter. This would result in a sharp drop in the number of Achaemenid-Parthian sites.

As far as prehistoric findings are concerned, the survey recorded the first Bakun BII/Sohz Phase Chalcolithic site in the region, and the first evidence for the Lapui and possibly the Banesh horizons. Research will continue to focus on Chalcolithic coastal occupation, and the evidence for communications with neighbouring areas, whether maritime or overland, through trade and pastoral migration.

Regarding Sasanian Bushehr, the extensive background spread of Sasanian pottery indicates an agricultural hinterland supporting urban settlement on the Bushehr Peninsula. The presence of the town near Deh Qa'ed suggests that the relationship between Bushehr and its hinterland was indirect. Bushehr may well have acted primarily as a port and entrepôt, while the inland town lay within the heart of an agricultural landscape surrounded by other Achaemenid to Sasanian sites, some of which also attained considerable proportions. The town may have been highly significant in co-ordinating the provision of subsistence or surplus commodities to Bushehr and the redistribution of goods from the port to the major centres in inland Fars. A recent study of Borazjan reveals its historical role to have included the provisioning of the Bushehr Peninsula (generally via Shif) during the 19th and early 20th centuries C.E. (Floor 2005). This was not only through redistributing the agricultural produce and craft products of its surroundings (Dashtestan), but also by linking Dashtestan and Bushehr to Shiraz with its caravans, by providing an important staging post (a fine caravanserai) and by enforcing the safety of the caravan routes (Floor 2005: 186–87). A similar situation may have pertained in the Sasanian Period and perhaps earlier, with the Deh Qa'ed town playing the role of Borazjan.

The decline in settlement which follows the Sasanian period is also significant. Traditionally the foundation of Tawwaj and the fall of the Bushehr ports has been attributed to the Arab conquest. More recently

the processes involved in the spread of Islam to Persia have been viewed in a less destructive way. In relation to the Bushehr question, one of the important elements in the change that occurred was the growth of the new port city of Siraf at exactly the same time that the major ports on Bushehr, and its hinterland, were falling rapidly into decline. One of the explanations that has been given for the growth of Siraf were the events occurring in southern Iraq. In particular, the economic decline of Basra during the later 9th and earlier 10th centuries, during which the city sustained a number a separate attacks causing large-scale disruptions to the area's trade (Whitehouse 1975: 263–64). The events in Basra may well themselves have been symptomatic of wider processes occurring in southern Iraq at the time, as the whole region appears to have fallen into a pattern of significant economic decline during the 10th century (Adams 1965: 84; Wilkinson 2003: 92). These changes were preceded by a significant realignment of trade within the Indian Ocean at the very end of the 8th or beginning of the 9th century, driven primarily by merchants from the Persian Gulf.

Further survey in Bushehr Province would contribute greatly to a more specific understanding of these changes. It would also clarify aspects of communication, exchange, settlement distribution and political control which are relevant not only to the later historical periods, but also to the Chalcolithic, the Bronze Age and the Elamite periods.

Notes

- ¹ The survey was a collaboration between ICAR (Iranian Center for Archaeological Research), the Bushehr Cultural Heritage and Tourism Organisation, Durham University, and the University of Pennsylvania. Permission to work was kindly granted by ICAR (Iranian Center for Archaeological Research), under the directorship of Dr Massoud Azarnoush. Support was provided by the Bushehr Cultural Heritage and Tourism Organisation, and many thanks are due to Mr Mohammadi and his staff. The Iranian part of the team was led by Mr Hossein Tofighian (ICAR) and included Mr Hameed Zareh and Mr Biladi (both of the Bushehr Cultural Heritage and Tourism Organisation). The British part of the team was led by Dr Robert Carter (Oxford and Durham University), and included Seth Priestman (Durham University), Dr Ben Horton and Andy Kemp (both University of Pennsylvania). The team was

under the joint directorship of the Iranian and British directors.

- 2 Presumably Lorimer's "Qaid (Dih)", a village of Dashtistan 7 miles NNW of Borazjan (Lorimer 1908: 387). Whitcomb refers to this village, or perhaps a nearby one, as Mohammadabad (Whitcomb 1987: fig. C).
- 3 Site BH3. At least one of the types of pottery found there appears to be associated with both the Sasanian and earlier periods, up to the Achaemenid. Further work is required to establish conclusively whether BH3 is exclusively Sasanian or includes an earlier component.
- 4 Prior to this, sea-level was lower, the level of the Gulf having been rising since around 14,000 years ago, when it was completely dry except for rivers and freshwater lakes and marshes (Lambeck 1996: 52–54; Zarins 1992: fig. 5).
- 5 Lorimer states that the innermost attainable anchorage, 3 miles north-north-west of Bushehr Town, had a depth of 3–4 fathoms (c. 5.5 m.–7.5 m.), but that the water in the approach to this area was only 15–17 feet deep (4.5 m.) (Lorimer 1908: 339–40).
- 6 Zone 5 was visited by the geomorphologists but not the archaeologists.
- 7 The scene (ID LE716404000314450) was acquired on the 24th May 2003 and covers the south-eastern part of the Bushehr Peninsula, centred on Farakeh. Landsat ETM images possess eight spectral bands, from visible blue (band 1) to thermal infrared (band 7) and a panchromatic band (band 8). Spatial resolution is 30 m. for bands 1–5, 7, 60 m. for band 6 and 15 m. for the panchromatic band 8.
- 8 The images were from mission 1052-1 acquired on the 27th September 1969. They provide stereo images with a nominal spatial resolution of up to 6 ft. (2 m.) each image covering a ground area of approximately 10.6 x 144 miles (17 x 232 km.). In order to use Corona imagery in the project digital GIS, the film stock was digitised and the digital images rectified and georeferenced to real world coordinates. In order to capture faithfully the full resolving power of the original film stock, digitising at a minimum of 4000 dots per inch (dpi) was undertaken. Digital images stored in tif format were produced by scanning the negative stock, bit size was limited to eight bits per pixel (256 shades of grey) to constrain the resulting image file size. The rectification of the digital imagery involved the removal of distortion in the image produced by a number of factors, including the curvature of the earth's surface and the optics of the camera system used, while georeferencing involves the translation of pixels from image coordinates to a real world coordinate system. Both processes require a number of ground control points (GCP) for which real world coordinates in the form of latitude and longitude are already known.
- 9 SRTM consisted of a specially modified radar system that flew onboard the Space Shuttle Endeavour during an 11-day mission in February of 2000 (Rabus *et al.* 2003). SRTM data for the entire study area were acquired from the NASA JPL (<ftp://e0srp01u.ecs.nasa.gov/srtm/>). Data were pre-processed using Visualization Software's 3DEM to fill holes in the SRTM DTM and then incorporated into the project digital GIS.
- 10 Some comments must be made regarding Table 1:
 - The total site count here is greater than the number of sites recorded, as some sites were occupied during more than one period.
 - Date ranges have been rounded off to the nearest 50 years.
 - Pottery of the earliest century of Islam cannot be readily distinguished from Sasanian, and a small number of sites of this period may be included in the Sasanian horizon.
 - The division between Achaemenid-Parthian and Sasanian assemblages is also blurred, and some sites may be reassigned in the future.
- 11 A local villager named the area as Sakhreh, "stones", hinting that there had once been other features. Stones are not found naturally near the Hilleh delta, where anything other than mud is cause for comment.
- 12 Date plantation is particularly damaging to archaeology, as very large trenches and bunds are machined in order to direct and retain water.
- 13 The rivers join at Abpakhsh ("spreading water"), the crossing point where the only permanent bridge across the Hilleh is found.
- 14 It was over two hours drive from Bushehr to this area, and flooding completely prevented access towards the end of the season.
- 15 The H200 pottery was relocated in the Williamson Collection with the help of Seth Priestman and Derek Kennet, and recorded in 2004 by Robert Carter. The collection was curated by the Ashmolean Museum, Oxford, but was then housed at Durham University. The precise location of H200 is unknown. Since the 1970s the village at Halileh has become a town with a nuclear power station. It is unlikely that the site survives, and if it does access would be impossible.
- 16 Two collections were made, one from the mound (BH19A) and one from the bed of the adjacent river (BH19B). The latter is not counted as a separate site in this report.
- 17 The dating of Tul-e Mor is difficult, due to paucity of pottery. BH31 is also tentatively dated. Some material is

Achaemenid and later, and it could even have a Lapui component.

- ¹⁸ The identification of Sasanian pottery and sites was carried out by Seth Priestman, using a typology developed during his analysis of the Williamson Collection. Priestman also defined the classes associated with the Achaemenid-Parthian and Islamic horizons.
- ¹⁹ These include the lack of textual evidence: there is no reason to assume that Arrian's text is corrupt (*contra* Whitcomb 1987: 331). Whitcomb did not consider other possible origins of the linear feature, such as ancient and recent trackways to Shif, and the early 20th century railway.

Bibliography

- Adams, R.M. 1965. *The Land Behind Baghdad. A History of Settlement in the Diyala Plain*. University of Chicago Press, Chicago.
- 1981. *Heartland of Cities*. The University of Chicago Press, Chicago and London.
- Alden, J.R. 2003. "Sherd Size and the Banesh Phase Occupation in the ABC Operation at Malyan, Iran", in Miller, N.F. and Abdi, K. (eds.), *Yeki Bud, Yeki Nabud. Essays on the Archaeology of Iran in Honour of William M. Sumner*. Cotsen Institute of Archaeology at UCLA, in association with the American Institute of Iranian Studies and the University of Pennsylvania Museum of Archaeology and Anthropology, Los Angeles: 109–20.
- Alizadeh, A. 2003. *Excavations at the Prehistoric Mound of Chogha Bonut, Khuzestan, Iran. Seasons 1976/77, 1977/78 and 1996*. Oriental Institute Publications, Chicago.
- Allan, J. and Richards, T. 1983. "Use of Satellite Imagery in Archaeological Surveys", *Libyan Studies* 14: 4–8.
- Altmaier, A. and Kany, C. 2002. "Digital surface model generation from CORONA satellite images", *ISPRS Journal of Photogrammetry and Remote Sensing* 56/4: 221–35.
- Beale, T.W. 1986. "Chapter 4: The Ceramics", in Lamberg-Karlovsky, C.C. (ed.), *Excavations at Tepe Yahya, Iran. 1967–1975*. Peabody Museum of Archaeology and Ethnology, Cambridge, Massachusetts: 39–89.
- Beech, M., Elders, J. and Shepherd, E. 2000. "Reconsidering the 'Ubaid of the Southern Gulf: new results from excavations on Dalma Island, U.A.E.", *Proceedings of the Seminar for Arabian Studies* 30: 41–47.
- Boucharlat, R. 1987. "Les niveaux post-achéménide a Suse, secteur nord. Fouilles de l'Apadana-Est et de la Ville Royale Ouest (1973–1978)", *Cahiers DAFI* 15: 145–312.
- Carter, E. 1996. *Excavations at Anshan (Tal-e Malyan): The Middle Elamite Period*. The University Museum of Archaeology and Anthropology, Philadelphia.
- 2002. "Ubaid-period boat remains from As-Sabiyah: excavations by the British Archaeological Expedition to Kuwait", *Proceedings of the Seminar for Arabian Studies* 32: 13–30.
- 2003. "Restructuring Bronze Age Trade. Bahrain, Southeast Arabia and the Copper Question", in Crawford, H.E.W. (ed.), *The Archaeology of Bahrain. The British Contribution*. BAR International Series 1189, Oxford: 31–42.
- Challis, K., Priestnall, G., Gardner, A., Henderson, J. and O'Hara, S. 2004. "Corona Remotely-Senses Imagery in Dryland Archaeology: The Islamic City of al-Raqqa, Syria", *Journal of Field Archaeology* 29: 139–53.
- Comfort, A. 1997. "Satellite remote sensing and archaeological survey on the Euphrates", *AARGnews* 14: 39–46.
- Daryaei, T. 2003. "The Persian Gulf trade in late antiquity", *Journal of World History* 14: 1–16.
- De Meyer, M. 2004. "Archaeological research using satellite remote sensing techniques (CORONA) in the valleys of Shirwan and Chardawal (Pusht-i Kuh, Luristan, Iran)", *Iranica Antiqua* XXXIX: 43–103.
- de Miroschedji, P. 1981a. "Fouilles du chantier Ville Royale II à Suse (1975–1977). I. Les niveaux élamites", *Cahiers DAFI* 12: 9–136.
- 1981b. "Prospection Archéologiques au Khuzistan en 1977", *Cahiers DAFI* 12: 169–92.
- 1987. "Fouilles du Chantier Ville Royale II a Suse (1975–1977). II. Niveaux d'époques achéménide, parthe et Islamique", *Cahiers DAFI* 15: 11–144.
- de Planhol, X. 1990. "Bušehr", in Yarshater, E. (ed.), *Encyclopaedia Iranica Vol. IV, Volume IV: Bayju-Carpets*. Routledge and Kegan Paul, London and New York: 569–72.
- Delougaz, P. and Kantor, H. 1996. *Chogha Mish, Volume I. The First Five Seasons of Excavations, 1961–1971. Part 1: Text*. Oriental Institute Publications, Chicago.
- Dittmann, R. 1984. *Eine Randebene Des Zagros in der Frühzeit. Ergebnisse des Behbahan-Zuhreh Surveys*. Deitrich Reimer Verlag, Berlin.
- Dollfus, G. 1983. "Djowi et Bendebal. Deux Villages de la Plaine Centrale du Khuzistan (Iran) (5e millénaire avant J.C.). Travaux de 1975, 1977, 1978", *Cahiers DAFI* 13: 17–276.
- Egami, N. and Masuda, S. 1962. *Marv Dasht I. Excavation at Tall-i-Bakun, 1956*. The Institute for Oriental Culture, Tokyo.
- Egami, N. and Sono, T. 1962. *Marv Dasht II. Excavation at Tall-i-Gap, 1959*. The Institute for Oriental Culture, Tokyo.

- Floor, W. 2005. "Borazjan, A Rural Market Town in Bushire's Hinterland", *Iran* 42: 179–200.
- Gropp, G. 1991. "Christian maritime trade of Sasanian age in the Persian Gulf", in Schippmann, K., Herling, A. and Salles, J.-F. (eds.), *Golf-Archäologie: Mesopotamien, Iran, Kuwait, Bahrain, Vereinigt Arabische Emirate und Oman*. Verlag Marie L. Leidorf, Buch am Erlbach: 83–88.
- Højlund, F. and Anderson, H.H. 1994. *Qala'at al-Bahrain volume 1. The northern city wall and the Islamic fortress*. Aarhus University Press, Aarhus.
- 1997. *Qala'at al-Bahrain volume 2. The Central Monumental Buildings*. Aarhus University Press, Aarhus.
- Hole, F., Flannery, K. and Neely, J. 1969. *Prehistory and Human Ecology of the Deh Luran Plain*. Memoirs of the Museum of Anthropology, University of Michigan, Ann Arbor.
- Inizan, M.-L. 1988. *Préhistoire à Qatar: mission archéologique française à Qatar vol. 2*. CNRS, Paris.
- Jasim, S.A. 1996. "An 'Ubaid Site in the Emirate of Sharjah (U.A.E.)", *Arabian Archaeology and Epigraphy* 7: 1–12.
- Kennedy, D. 1998. "Declassified satellite photographs and archaeology in the Middle East: case studies from Turkey", *Antiquity* 72: 553–61.
- 2004. *Sasanian and Islamic Pottery from Ras al-Khaimah. Classification, chronology and analysis of trade in the Western Indian Ocean*. Archaeopress, BAR International Series, Oxford.
- Lambeck, K. 1996. "Shoreline reconstructions for the Persian Gulf since the last glacial maximum", *Earth and Planetary Science Letters* 142: 43–57.
- Le Brun, A. 1971. "Recherches Stratigraphiques a l'Acropole de Suse", *Cahiers DAFI* 1: 153–216.
- Lockhart, L. 1960. "Bushahr", in Gibb, H.A.R., Kramers, E., Levi-Provencal, E., Schacht, J., Lewis, B. and Pellat, C. (eds.), *The Encyclopaedia of Islam. New Edition. Volume I, A–B*. Luzack and Co., E.J. Brill, London and Leiden: 1341–42.
- Lorimer, J.G. 1908. *Gazetteer of the Persian Gulf, Oman and Central Arabia. Volume 2, Geographical and Statistical*. Calcutta.
- Masry, A.H. 1974. *Prehistory in Northeastern Arabia. The problem of interregional interaction*. Field Research Projects, Miami.
- McCauley, J. 1982. "Subsurface valleys and geoarchaeology of the Eastern Sahara revealed by Shuttle radar", *Science* 218: 1004–20.
- McHugh, W., Breed, C., Schaber, G., McCauley, J. and Szabo, B. 1988. "Acheulian sites along the 'Radar rivers', southern Egyptian Sahara", *Journal of Field Archaeology* 15: 361–79.
- Moghaddam, A. and Miri, N. 2003. "Archaeological Research in the Mianab Plain of Lowland Susiana, South-Western Iran", *Iran* XLI: 99–137.
- Neely, J.A. and Wright, H.T. 1994. *Early Settlement and Irrigation on the Deh Luran Plain. Village and Early State Societies in Southwestern Iran*. University of Michigan Museum of Anthropology Technical Report 26, Ann Arbor.
- Nicholas, I.M. 1990. *The Proto-Elamite Settlement at TUV. Malyan Excavation Reports Volume I*. The University Museum of Arch and Anthropology, Philadelphia.
- Oates, J. 1978. "'Ubaid Mesopotamia and its relation to Gulf Countries", in De Cardi, B. (ed.), *Qatar Archaeological Report: Excavations 1973*. Oxford University Press, Oxford: 39–52.
- 1983. "Ubaid Mesopotamia Reconsidered", in Young, T.C., Smith, P.E.C. and Mortensen, P. (eds.), *The Hilly Flanks and Beyond: Essays in the Prehistory of Southwestern Asia presented to Robert J. Braidwood*. The Oriental Institute of the University of Chicago, Chicago: 251–81.
- Davidson, T.E., Kamilli, D. and McKerrel, H. 1977. "Seafaring Merchants of Ur?", *Antiquity* 51: 221–34.
- Parker, A.G., Eckersly, L., Smith, M.M., Goudie, A.S., Stokes, S., Ward, S., White, K. and Hodson, M.J. 2004. "Holocene vegetation dynamics in the northeastern Rub' al-Khali desert, Arabian Peninsula: a phytolith, pollen and carbon isotope study", *Journal of Quaternary Science* 19(7): 665–76.
- Petrie, C.A., Chaverdi, A.A. and Seyedin, M. 2005. "From Anshan to Dilmun and Magan: the spatial and temporal distribution of Kaftari and Kaftari-related ceramic vessels", *Iran* 43: 49–86.
- Petrie, C., Asgari Chaverdi, A. and Seyedin, M. in press-a. "Excavations at Tol-e Spid", in Potts, D.T. and Roustaei, K. (eds.), *The Mamasani Archaeological Project Stage One: A report on the first two seasons of the ICAR—University of Sydney Joint Expedition to the Mamasani District, Fars Province, Iran*. Iranian Center for Archaeological Research, Tehran: 89–134.
- Petrie, C.A., Weeks, L.R., Potts, D.T. and Roustaei, K. in press-b. "Perspectives on the Cultural Sequence of Mamasani", in Potts, D.T. and Roustaei, K. (eds.), *The Mamasani Archaeological Project Stage One: A report on the first two seasons of the ICAR—University of Sydney Joint Expedition to the Mamasani District, Fars Province, Iran*. Iranian Center for Archaeological Research, Tehran: 157–84.
- Pézar, M. 1914. *Mission à Bender-Bouchir. Documents Archéologiques et Épigraphiques*. Ernest Leroux, Paris.
- Philip, G., Donoghue, D., Beck, A. and Galiatsatos, N. 2002. "CORONA satellite photography: an archaeological application from the Middle East", *Antiquity* 76: 109–18.

- Piacentini, V.F. 1985. "Ardashir i Papakan and the wars against the Arabs: working hypothesis on the Sasanian hold of the Gulf", *Proceedings of the Society for Arabian Studies* 15: 57–78.
- Potts, D. 1999. *The Archaeology of Elam*. Cambridge University Press, Cambridge.
- 2003. "Anshan, Liyan, and Magan circa 2000 B.C.E.", in Miller, N.F. and Abdi, K. (eds.), *Yeki Bud, Yeki Nabud. Essays on the Archaeology of Iran in Honour of William M. Sumner*. Cotsen Institute of Archaeology at UCLA, in association with the American Institute of Iranian Studies and the University of Pennsylvania Museum of Archaeology and Anthropology, Los Angeles: 156–59.
- Prickett, M. and Williamson, A.G. 1970. *Survey on the Persian Gulf Coast*. Ashmolean Museum, Oxford.
- Priestman, S. 2003. "The Williamson Collection Project: Sasanian and Islamic Survey Ceramics from Southern Iran: Current Research", *Journal of Persian Studies* XLI: 345–48.
- forthcoming. *Settlement and Ceramics in Southern Iran: An Analysis of the Williamson Collection*. PhD dissertation, Department of Department of Archaeology, Durham University, Durham.
- and Kennet, D. 2002. "The Williamson Collection Project: Sasanian and Islamic pottery from Southern Iran", *Iran* 40: 265–67.
- 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.
- Sajjadi, M. 1979. "The Protoelamite Period on the Izeh Plain", in Wright, H.T. (ed.), *Archeological Investigations in Northeastern Xuzestan, 1976*. Museum of Anthropology, The University of Michigan. Technical Reports Number 10, Ann Arbor: 93–98.
- and Wright, H.T. 1979. "Test Excavations in the Elamite Layers at the Izeh East Face", in Wright, H.T. (ed.), *Archeological Investigations in Northeastern Xuzestan, 1976*. Museum of Anthropology, The University of Michigan. Technical Reports Number 10, Ann Arbor: 106–13.
- Sarfaraz, A. 1971–72. "Un pavillon de l'époque de Cyrus le Grand", *Bastan Chenasi va Honar-e Iran* 7–10: 22–25.
- 1973. "Survey of Excavations 1971–72", *Iran* 11: 188.
- Simpson, S.J. forthcoming. *Bushire and Beyond: Some Early Archaeological Discoveries in Iran*.
- Stein, A. 1937. *Archaeological Reconnaissances in North-Western India and South-Eastern Iran*. MacMillan and Co. Ltd., London.
- Stronach, D. 1978. *Pasargadae*. Oxford University Press, Oxford.
- Sumner, W.M. 1974. "Excavations at Tal-i Malyan, 1971–72", *Iran* XII: 155–80.
- 1986. "Achaemenid Settlement in the Persepolis Plain", *American Journal of Archaeology* 90: 3–31.
- 1988. "Prelude to Proto-Elamite Anshan: The Lapui Phase", *Iranica Antiqua* XXIII: 23–43.
- 2003. *Early Urban Life in the Land of Anshan: Excavations at Tal-e Malyan in the Highlands of Iran. Malyan Excavation Reports Volume III*. The University Museum of Archaeology and Anthropology, Philadelphia.
- and Whitcomb, D. 1999. "Islamic Settlement and Chronology in Fars: an Archaeological Perspective", *Iranica Antiqua* XXXIV: 309–24.
- Uerpmann, H.-P. and Uerpmann, M. 1996. "Ubaid pottery in the eastern Gulf—new evidence from Umm al-Qaiwain (U.A.E.)", *Arabian Archaeology and Epigraphy* 7: 125–39.
- Ur, J. 2003. "CORONA Satellite Photography and Ancient Road Networks: A Northern Mesopotamian Case Study", *Antiquity* 77/295: 102–15.
- Voigt, M. 1993. "The Chronology of Iran, ca. 8000–2000 B.C.", in Ehrlich, R. (ed.), *Chronologies in Old World Archaeology*. Vol. 1: 122–78; Vol. 2: 125–53.
- Weeks, L., Alizadeh, K., Niakan, L., Alamdari, K.T.A., Khosrowzadeh, A. and Zeidi, M.T.B. in press. "Excavations at Tol-e Nurabad", in Potts, D. and Roustaei, K. (eds.), *The Mamasani Archaeological Project Stage One: A report on the first two seasons of the ICAR—University of Sydney Joint Expedition to the Mamasani District, Fars Province, Iran*. Iranian Center for Archaeological Research, Tehran: 31–88.
- Whitcomb, D. 1984. "Qasr-i Abu Nasr and the Gulf", in Boucharlat, R. and Salles, J.-F. (eds.), *Arabie Orientale, Mésopotamie at Iran Méridionale de l'âge du Fer an début de la Période Islamique*. Editions Recherche sur les Civilisations, Paris: 331–37.
- 1987. "Bushire and the Angali Canal", *Mesopotamia* 22: 311–36.
- Whitehouse, D. 1975. "The decline of Siraf", in Bagherzadeh, F. (ed.), *Proceedings of the 3rd Annual Symposium on Archaeological Research in Iran*. Iranian Centre for Archaeological Research, Tehran: 263–70.
- and Williamson, A.G. 1973. "Sasanian Maritime Trade", *Iran* 11: 29–49.

- Wilkinson, T.J. 2003. *Archaeological Landscapes of the Near East*. The University of Arizona Press, Tucson.
- and Tucker, D.J. 1995. *Settlement Development in the North Jazira, Iraq. A Study of the Archaeological Landscape*. British School of Archaeology in Iraq and Department of Antiquities and Heritage, Baghdad, Baghdad.
- Williamson, A.G. 1971–72. *Rishahr and the development of trade from the 3rd to the 7th centuries A.D. Chapter 5 in The Maritime Cities of the Persian Gulf and their Commercial Role from the 5th Century to 1507*. PhD dissertation, Department of Ashmolean Museum Archive, Oxford University, Oxford.
- Zarins, J. 1992. “The Early Settlement of Southern Mesopotamia: a review of recent historical, geological, and archaeological research”, *Journal of the American Oriental Society* 112.1: 55–77.
- Zeidi, M., McCall, B. and Khosrowzadeh, A. in press. “Survey of Dasht-e Rostam-e Yek Dasht-e Rostam-e Do“, in Potts, D. T. and Roustaei, K. (eds.), *The Mamasani Archaeological Project Stage One: A report on the first two seasons of the ICAR—University of Sydney Joint Expedition to the Mamasani District, Fars Province, Iran*

