Harappan Cities: Landscape and Surface Survey at Ganweriwala

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The surveying of archaeological sites is a fundamental method used to locate, identify and analyse the status of a site. This is also the most productive method for visually examining landscapes, settlement locations, distribution of artifacts on the surface and changes of settlement pattern at a regional level.[1] The present paper reports on a systematic surface survey of the Ganweriwala site which is regarded as the fifth largest urban center of the Indus Valley culture.[2] The results of the geophysical survey and discoveries are presented in this paper and the cultural and socio-economic roles of Ganweriwala are compared with those of other centres.

Introduction

The socio-economic and cultural elements of the Indus Valley culture (3300-1300 BCE) suggest that it was the most complex society in the Bronze Age world. Because of its intricate socio-economic system, urban lifestyle, architectural innovations, water management skills and undeciphered writing, the Indus Valley culture is popular with archaeologists. Some of its special features include large cities, advanced architectural planning and trade links with other Bronze Age societies.[3] The remains of the Indus Valley culture are found across a vast area in the territory of present-day India, Pakistan, Afghanistan and some parts of Iran. Since its discovery in 1856, archaeologists have conducted numerous projects, major excavations and surveys. Large-scale excavation projects were started by Sir John Hubert Marshall in 1912 and by Sir Mortimer Wheeler in 1944 before the partition of the Indian continent.[4] Later, several more explorative and excavation projects were conducted, and of these, Dr. Muhammad Rafique Mughal´s Cholistan regional explorative project from 1974 to 1977 is particularly pertinent for this research.

The Cholistan area in Pakistan is of special interest to archaeologists due to its rich density of Indus Valley sites dating from the pre-urban to post-urban periods (3300-1300 BCE). The large site of Ganweriwala seems to be contemporary with Mohenjodaro and Harappa as shown in Fig. 1.[5]

Present-day Cholistan is a desert encompassing an area of 26000 km^2 in the southern part of the Punjab Province in present day Pakistan.[6] It is located east of the Sutlej River along the western borders of the Thar Desert. Today the small population is constantly subjected to prolonged periods of drought in an arid wasteland. It seems, however, that in the period from the early fourth millennium BCE to about 1600 BCE, Cholistan was a prosperous area irrigated by the Ghaggar Hakra River as has been suggested by the discovery of numerous settlements belonging to Hakra, dating to the early, mature, late and post-urban periods of the Indus Valley civilization.[7] A total of 414 archaeological sites have been recorded in Cholistan.[8]

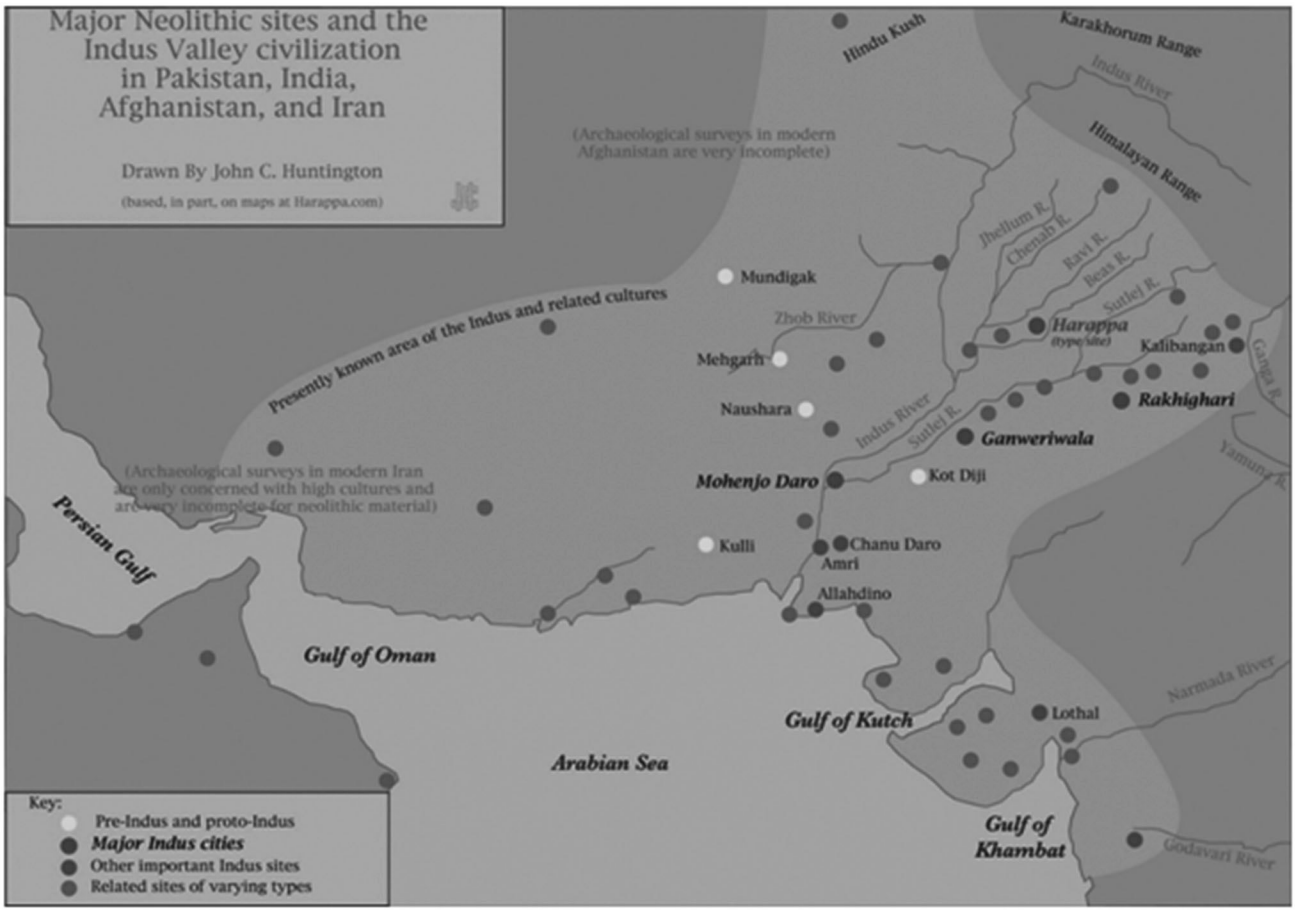

Figure 1: *Urban sites of the Indus Valley culture, including Ganweriwala* (*courtesy of J. C. Huntington*).

The largest and most significant is the Ganweriwala site (28.5000° N, 71.0667° E), which is thought to be the fifth largest urban site of the Indus Valley after Mohenjodaro, Harappa, Dholavira and Rakhigarhi.[9] This site is located about 27 km southwest of Derawar Fort, 195 km northeast of Mohenjodaro and 180 km southwest of Harappa—almost equidistant from the latter two urban centres.[10]

Previous Studies

The archaeological site of Ganweriwala belongs to the Indus Valley culture and might have played an active role in the socio-economic development of society during the urban phase (2600-1900 BCE). This is suggested by the size of the site and its material cultural assemblage. Earlier studies reported that the remains of Ganweriwala covered an area of 81.5 hectares.[11] Unfortunately, the method of measurement has not been reported anywhere in the literature and the site was not documented geophysically. Muhammad Hassan, Director of the Harappa Museum, confirmed that during a field project in 1974-1977, the site was measured by inches tape, and later a jeep was driven around the mound. The size of the site was estimated by recording the metre reading of the jeep.[12] With this method the site was reported to be 81.5 hectares. There is lack of published reports on the geophysical features and landscape of Ganweriwala and no

excavations have been conducted in the several decades since its discovery.[13] Because of this problem, a preliminary scientific geophysical survey is the most fundamental step needed in order to continue further scientific investigations. In 2007, a team of archaeologists from America, Japan and Pakistan investigated Ganweriwala and artifacts were randomly collected from the surface of the site. This collection is stored in the reserve collection of the Harappa Museum. Another team of archaeologists investigated the site under the supervision of Dr. Mughal in 2011 and the artifacts collection is stored in the Lahore Fort.

In December 2015 a careful examination of the current topography and physical geography of Ganweriwala within a scientific framework was conducted by the author with her team.[14]

Material and Method

Different types of surface survey can be used for various investigations such as finding site boundaries and studying the distribution of artifacts.[15] By examining the cultural material and surface features, archaeologists can gain primary knowledge about a site and can adopt a better pre-excavation strategy. Surveys can include exhaustive historical research, map reading, geomorphologic and geographic analysis, aerial photography, geospatial surveys such as Light Detection and Ranging (LIDAR), and ground-level surveys including geophysical surveying techniques.[16] Depending on the site, three types of survey are often conducted before excavation; land survey, topographic or surface survey; and ongoing excavation survey.[17] The site survey of Ganweriwala reported in this paper focuses in particular on topographical features in contrast to previous explorative studies by Sir Aurel Mark Stein and Muhammad Rafique Mughal.[18]

A major obstacle we faced was the limited access to the site due to its geographical location, which, being very close to the Indian border, is under the control of the Pakistan armed forces. The harsh environmental conditions of the desert location brought other challenges. Due to these factors this site has not been scientifically explored and excavated since its discovery in 1970. I adopted a pre-survey strategy which included gaining permission to conduct the survey from Punjab Archaeology, Government of Pakistan, in addition to having several verbal discussions with Malik Maqsood, Afzal Khan and Muhammad Hassan about logistics, scientific methods and previous work.[19] We collected maps and pin-pointed all important locations. We travelled from the Harappa Museum to Bahawalpur University by car. From Bahawalpur we hired a 4x4 Jeep and travelled towards Derawar Fort. Ganweriwala is located about 28 km southwest from here. We started the work to perform a visual inspection of cultural material on the surface and divided the site into four zones named a, b, c, d. The findings demonstrated the archaeological significance of Ganweriwala. Future excavations here have the potential to contribute to our understanding of Indus urban identity, urban morphology, socio-economic systems and even the Indus script.[20]

The surface investigation, or visual inspection of the site was conducted systematically by foot. It entailed a preliminary reconnaissance of site boundary limitations and the spread of artifacts. The site boundary to map the Ganweriwala site is defined as following: 'as far as we can see the spread of cultural material on the surface'.[21] The topographic survey was carried out using modern instruments and state of the art techniques, including permanent control points, benchmarks, global coordinates, traversing and levelling for detailed topographic mapping. The following survey works have been carried out: establishing the control network using GPS; establishing 03 Bench Marks at designated places in the area; conducting a detailed topographic survey of the whole site at a scale of 1:1000. A handheld GPS was used for establishing preliminary control points. Three benchmarks were established for the survey work and the coordinates for the main control points were derived from the GPS observations. The elevations of the control points were also derived by using GPS. Temporary control points were introduced.

For the topographic survey, Sokkia model 630 RK Electronic Total Station was used. With Total Station, two reflectors were used, with the same target height. All man-made physical features and natural topography was surveyed using the EDM (Electronic Distance Measurement) tachometry method. All permanent and temporary features have been mapped using different symbols on the drawings. All line and point features were drawn in AutoCAD software. The contours were established with a 1 m contour interval; with every fifth contour being identified as an index contour. Heavy lines have identified the index contours. The drawings have been generated at a 1:1000 scale.

Results and Discussion

The results confirm that the Ganweriwala site belongs to the Indus Valley culture and flourished during the urban phase (2600-1900 BCE). Material assemblage studies suggest that human occupation at Ganweriwala had continuous development beginning with the Hakra phase and continuing until the urban phase. During the post-urban phase, the town expanded over a large area, which might have been occupied by a trading community or educated community or elites of the Indus Valley. As can be seen from the contour map in Fig. 2 the total area of the site measured in the present fieldwork is about 66.7 hectares, which is 14.8 hectares smaller than the earlier reported value of 81.5 Hectares. The measurement is concerned with the physical remains of mounds but also the actual size and architecture of settlement associated with excavations or new methods used in field archaeology for example LIDAR. It was an important urban centre during the urban period of the Indus valley and might have controlled regional economic affairs of Cholistan.[22] The results of the stylistic ceramics study suggests that all of the major Indus Valley centres shared similar socio-economic and cultural ideologies between 2600-1900 BCE. As can be seen from our drawing in Fig. 2, the site has two closely situated mounds like other Indus Valley ancient cities. These two mounds are approximately 28 feet high. On top of the mound, a jeep track has been created by armed forces for military exercises. The jeep track creates a division of mounds into four parts as mentioned in Fig. 2. We arbitrarily named two mounds as Mound 1 and 2 in our present discussion as labelled in Fig. 2 with blue squares. We further named the four parts of the whole site as a, b, c and d, separated by the jeep track as discussed in a blog post by the author.[23] Mound 1 is situated in the southern side and Mound 2 in the northern side, surrounded by many small and irregular clusters of artifacts nearby as discussed below and shown in the contour map in Fig. 2.

Mound 1

Mound 1 has a rich density of material remains. There is a very large quantity of artifacts scattered on the surface covering an extensive area. Mound 1 is divided into two parts, which we have named a and b, representing the eastern and southern part of the mound, respectively. Part a covers the largest area of the site with material remains on the surface, accompanied by many large and small clusters of artifacts. We randomly collected a variety of artifacts from this area, for example, baked bricks, and perforated potsherds, pieces of toy cart and one grinding stone. Below, we present a couple of interesting artifacts belonging to the urban phase from part a.

A twisted clay tablet with seven writing marks of Indus script as shown in Fig. 5 has been discovered from Mound 1, part a. Detailed information on this discovery is published in the Current World Archaeology magazine.[24] Part b of this mound also has rich density of artifacts consisting largely of household potsherds like cooking pots and storage jars. The assemblage of artifacts from this part is slightly different from part

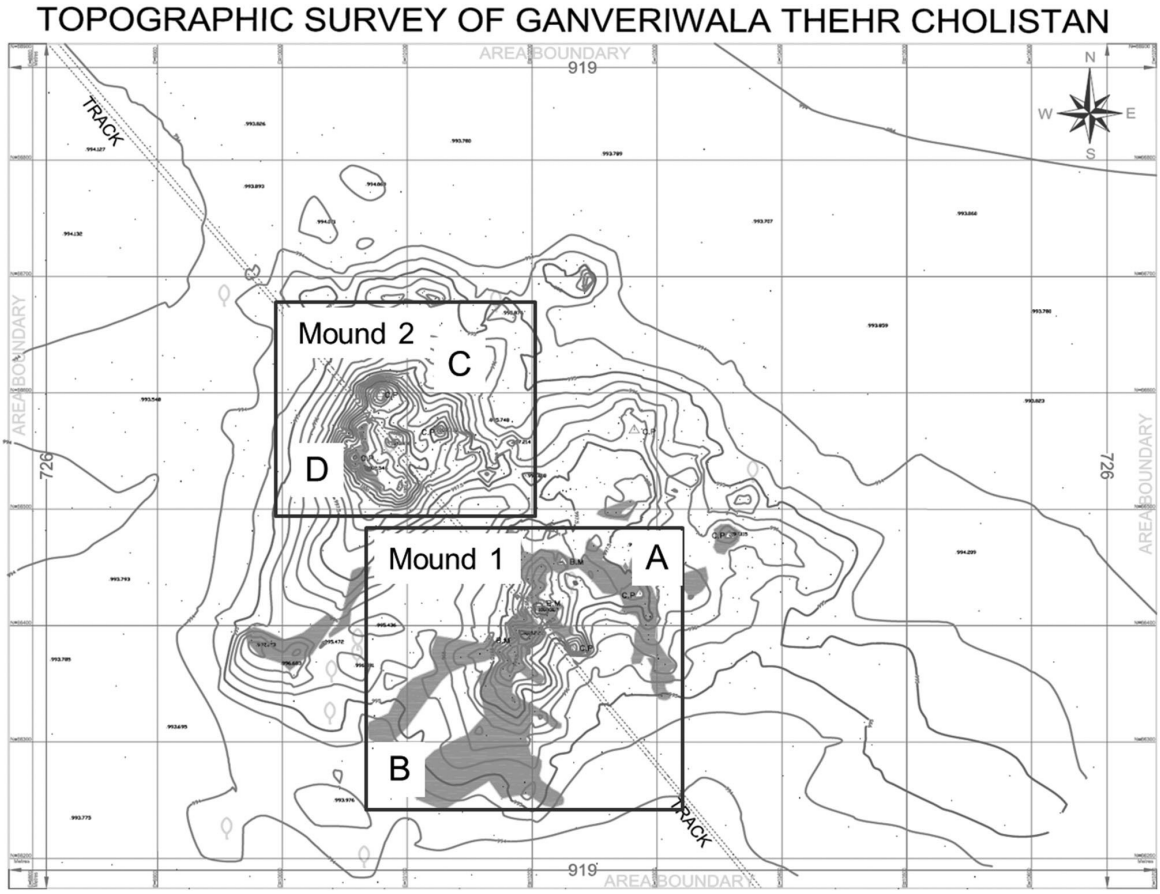

Figure 2: *Contour map of the Ganweriwala site. The squares represent the two mounds at the site divided into four parts by a dirt track as discussed in the text. Note that the scale is given in metres.*

a. Part b mostly contains household artifacts as compared to part a which contains both industrial and household goods.

Mound 2

Mound 2 situated on the northern side of the site has fewer clusters of artifacts. Part c has a lower density of artifacts and other visual remains on the surface; indeed, there are almost no clusters of artifacts. Part d also has some clusters of artifacts but less dense than parts a and b of Mound 1. Part d has been eroded from the top towards the lower elevation. A straight alignment of baked bricks following a south-north trajectory was visible on the surface, and might be a drain path. One such brick is shown in Fig. 6. It measures 26.5 × 13.5 × 6.5 cm and weighs 3243

Figure 3: *Black on red slip pot sherd.*

grams, which follows standard size brick used in Mohenjodaro and Harappa city.

Final thoughts

Many questions remain about the Indus Valley civilization, for example, how many urban centres they constructed; how large these centres were; what the relationship was between urban expansion and economic growth; how individual centres functioned socio-economically; what impact urban growth had on the environment and what this can tell us about climate change.[25] These questions cannot be answered satisfactorily without applying advanced methods in field surveys and excavations. Further scientific investigations are needed to solve the puzzle of the Indus socio-economic system. The homogeneity between materials from Ganweriwala and other Indus Valley sites, the scale of the site and its location, equidistant from Mohenjodaro and Harappa, demonstrate that it was a significant urban center from a strategic point of view. The results of the present survey show that Ganweriwala´s actual size is 66.7 hectares, which is 14.8 hectares less than the earlier reported size. Yet, though not as large as Mohenjodaro, Ganweriwala might have been a control centre of regional economic activities in the Cholistan area and an exporter of goods to other major cities. Ganweriwala has already brought new dimensions towards our understanding of Indus Valley urban culture and holds the promise of yielding more knowledge in the future.

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Figure 4: *Base of a pot with potter's mark.*

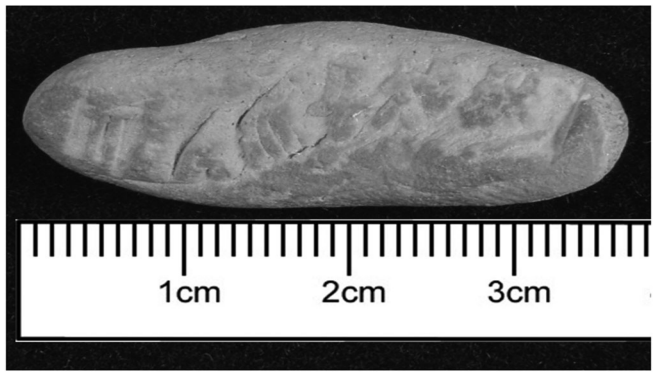

Figure 5: *Twisted clay tablet with Indus script.*

Figure 6: *Brick of urban period measuring 26.5 × 13.5 × 6.5 cm* (*l:2:3*).

Notes

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