

Craft Specialization at Shahdad: Pottery Production during the Third Millennium BC

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(Received: 05/ 07/2012 ; Received in Revised form: 25/ 08/ 2012; Accepted: 02 /09/ 2012)

Many potteries have been discovered from excavations and a surface survey at Shahdad, but few works have been done to examine craft specialization in pottery production at this important site. Different types of potteries, some of which bearing potter marks demonstrate that craftsmen of the site had involved in manufacturing of centralized pottery production. A number of kilns and many waste of pottery could also support the above idea.

Therefore, the aim of this paper is to examine why of pottery manufacturing at Shahdad, which could be considered as craft quarter for pottery production. It seems that pottery production at Shahdad had been affected by its environmental conditions. This interaction between craftsmen and environment caused for manufacturing of special types of potteries at Shahdad. It is necessary to state that this interaction has also caused for standardization in pottery production at the site during the third millennium BC.

Keywords: *craft specialization; pottery production; Shahdad; Bronze Age*

Introduction

The significance of craft production to the emergence and development of early states in the Middle East was most explicitly stated by V. G. Childe in many of his writings on social evolution (Tosi 1984: 22), which his urban revolution was of most important. Based on his idea an urban society has ten traits of which craft specialization plays an important role. The above traits are permanent settlement in dense aggregations, centralization of surplus, monumental public buildings, social stratification, a ruling class, systems of recording and administration, exact and predictive sciences regulating the cycle of agriculture operation, craft specialization and conceptualized and sophisticated styles of art, long-distance trade and importing raw materials, and social organization based upon residence rather than kinship (Childe 1979: 16; Tainter 1988: 23). In the early 1950s, V. Gordon Childe identified the above traits, which for many years provided a checklist and fundamental ideas for archaeologists (Bogucki 1999: 331). These traits allow urban communities to be distinguished from earlier or contemporary settlement (Coningham 1995:55). Regarding craft production, Childe's

main assumption was that a further division of labor had fostered an increase in population density and led to the birth of cities as centers of industry and trade. The population of these centers would have been different from that of any settlement preceding them, because it was primarily composed of specialists. In more recent years these views have been considered by many to be unsound because overlook the fact that any significant increase in population has to be based on a growth in agricultural productivity, while craft specialist and the production of commodities in general would have accounted for a minimal fraction of the system (Tosi 1984: 22).

It is not mere chance that the study of the proto-urban centers in the third millennium BC, which in the case of Iran has focused on the excavation of important sites such as Hissar, Jiroft, Yahya, Iblis, Bampur, Shahdad and Shahr-i-Sokhta, has been directed towards the analysis of the environment, of modes of production, of craft activity and technology and of the socio-economic set-up, as well as towards the long-distance trade routes and systematic research into the sources for the supply of raw materials (Salvatori and Vidale 1982:5). To have a better understanding of the craft activities in ancient sites, it is necessary to study environment in which sites are emerged and developed.

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Location

The site of Shahdad, which is located north of Kirman in the oasis of Khabis (at the very edge of the Dasht-i-Lut) (fig. 1) (Hiebert and Lamberg-Karlovsky 1992: 8), ranged from 100 to 150 hectares during the third millennium BC (Salvatori and Vidale 1982). Hiebert and Lamberg-Karlovsky state that if this estimate proves to be correct, it would make Shahdad one of the largest known sites on the Iranian Plateau (Hiebert and Lamberg-Karlovsky

1992: 8). The site, which is also located at 30° 26' 07, 78" latitude North and 57° 45' 12, 01" longitude East, and 430 m above the sea level, was settled since at least the late fifth millennium BC up to the present day (Vidale et al 2012: 27). It was excavated by Ali Hakemi from late 1960s to the mid 1970s and continued by Mir Abedin Kaboli in the late 1970s and 1980s. Salvatori and Vidale carried out a short surface survey on the site between 5th and 10th January 1977 (Salvatori and Vidale 1982: 5-10).

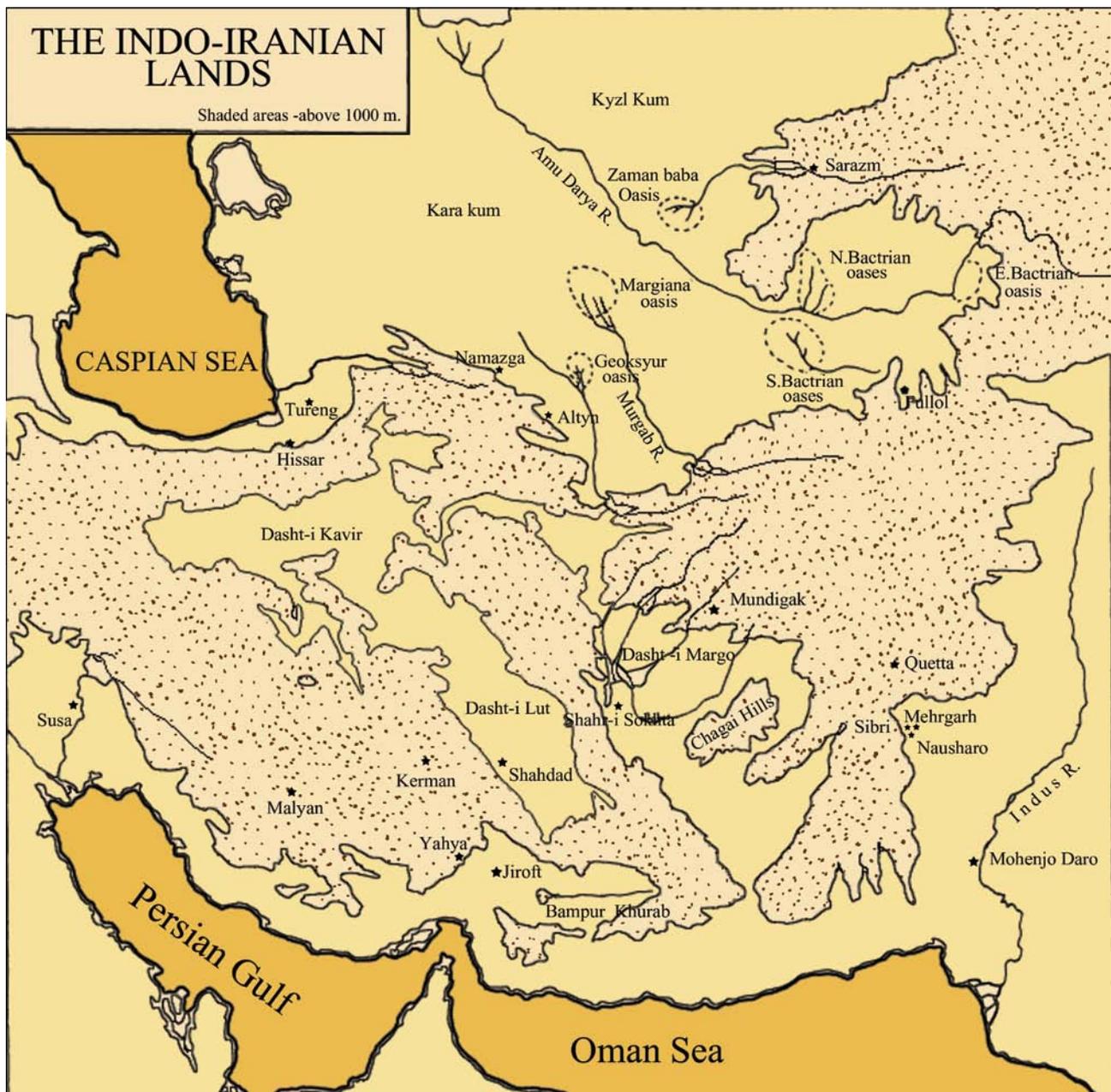


Fig.1: Map showing Shahdad located close to Dasht-i-Lut desert (After: Hiebert and Lamberg-Karlovsky 1992).



Environment and Pottery Production

Regarding human-environment interaction, there are two main questions, including how and why of pottery production. To examine how of pottery production, a fairly detailed understanding of the natural environment in which it functions, is required. On the other hand, production system should not be studied in isolation from its environmental factors. Different factors such as clay, fuel, wind and water are needed to form a manufacturing center for pottery production. The simplest potter is aware of the vast differences in clays, in sandiness and plasticity, in the color and degrees of hardness and strength they attain on firing in properties that determine how they must be handled and how useful they will be when fired. Just as the soils of the earth run a gamut of texture and fertility that enables man to find those especially adapted for each of his crops (Shepard 1956: 10). Clay, which has been used by humankind since the Neolithic, was a very important part of the ancient Shahdad culture. It was easy to find clay around Shahdad, which has clay and alluvial soil (Kardovani 1971: 10, 14), as Dasht-i-Lut is real "sea" of clay, gravel and salt (Hakemi and Sajjadi 1988: 143). Although all arable soils of Shahdad are fine-textured, they are different in terms of composition and texture in different parts of Shahdad. Soils of orchards and farmlands of northern and southwestern Shahdad are heavier than fine texture and alluvial soils of northeastern and eastern Shahdad. There are some clay soils in southeastern Shahdad; after the clay soils, sandy soils, which include mixed fine sand and gravel, slowly appear. Under this layer a thick clay layer, which has been moved and accumulated due to Chahar Farsarkh Valley flooding, could be seen (Kardovani 1971: 10, 14).

The environment of Shahdad is desertic (Dasht-e-Lut), and the climate continental, i.e. hot and arid in summer, very cold and windy in winter. The landscape is spotted by desert Shrub vegetation on thick alluvial layers dissected by the wind into Yardangs, with buried soils truncated by erosion and topped by crusts of evaporitic salts and carbonates. Yardangs cover the third millennium BC settlement, but not the emerging fourth millennium BC mounded area (Tepes I and II, towards the

eastern limits of the site (Vidale *et al* 2012: 27). Geomorphological studies indicate that direction of the prevailing wind is from northwest to southeast. South-east of the Pacific Northwest. Therefore it is the main factor shaping Yardang (Kalut), and watercourses (Mashhadi *et al* 2002: 29). Yardangs are reliable evidence of richness of clay sources around Shahdad for pottery manufacturing.

To examine why of pottery production at Shahdad, which is the main aim of this paper, it is also necessary to have a better understanding of human-environment interactions in this site during the third millennium BC. Because environmental conditions may have caused for production of special pottery forms, such as jars for water reservation or grain storage. Generally agricultural land around Shahdad, which has poor organic materials, is not fertile. Lack of water resources has affected agricultural activities in the site. According to the research carried out by the Tehran University mission, the Lut Desert contains the hottest, most arid and depressed areas of the whole Iranian plateau. The gradual disappearance of almost all vestiges of the ancient settlements is mainly due to erosion caused by atmospheric agents such as seasonal desert winds and heavy floodwaters from the mountains. The combined effect of these phenomena has been to bring about the gradual disappearance of all flora and fauna and the total destruction of the ecosystem of the entire region (Hakemi and Sajjadi 1988: 143).

Although Shahdad is located between the peaks of Dahaneh-ye- Ghar, Kuh-e-Joftan and Sirch (4000 m above the sea level) and the Takab plains, at the edges of the endoergic fan of Derakhtangan river (Vidale *et al* 2012: 27), the only permanent river in the region (Kardovani 1971: 5; Hakemi 1973: 2; Madjidzade 1997: 151), its environment is completely fragile and uncertain. Unlike the lack of water resources, Shahdad was located within caravan routes and functioned as crossroad and intermediary between different regions and located near important mineral resources (Vidale *et al* 2012: 27). These environmental potentials persuaded craftsmen and traders of Shahdad to manufacture special forms of jars in order to function as intermediary and exploit mines around Shahdad.



Although the site was involved in the production of pottery, it was essentially self-supporting, and in view of its geographical isolation it provides an excellent opportunity to study the balance between population and environment in this region of South-west Asia in this stage of technology.

Pottery Production

Production is the transformation of raw materials and/or components into usable objects. In explaining craft specialization in an ancient site, it is necessary to look for evidence for the organization of the production of pottery in a social context. Certain aspects of the production process itself are main keys to understand the organization of production (van der Leeuw 1977). This could be seen in three board sources of evidence (Orton 2012).

1- Structural Evidence

Permanent kilns and ancillary structures are two of the clearest forms of evidence for production level beyond the household level. Salvatori and Vidale have discovered about 24 pottery kilns for the firing of pottery vessels (fig. 2), which were localized on northeast of the site. It seems that these kilns are dated to the end of the fourth and third millennia BC. They believe that Shahdad has perhaps provided the largest corpus of central Asian materials in Southeastern Iran (Salvatori and Vidale 1982: 7). In 1969, Ali Hakemi, the first excavator of Shahdad had also discovered two pottery kilns dated to the early of the third millennium BC. These kilns were located close to the main workshop (Hakemi 1973: 182). Salvatori state that the second aim of their research project at Shahdad was to locate building structures connected with specifies activities such as the pottery production. He continues that relevant traces of this activity are massed over a wide area to the northeast of the necropolis (Salvatori 1977). Test trenches at one of Salvatori's activity areas have detected a large area of kiln and furnaces, dating to the middle of the third millennium BC (Tosi 1984: 30). Finally, the waste found in Shahdad is of various materials especially fine pottery (Mariani 1984: 118).

2- Scale of Production

The actual numbers of vessels being produced may give us an idea of how they are produced, with industrial production more prolific than craft production, which in turn is more prolific than domestic production (Orton 2012). Hakemi states that during his excavation at Shahdad he was able to find thousand of pottery sherds (Hakemi 1997: 75). In the eastern part of the area which was visited by Salvatori and Vidale a certain amount of materials, especially pottery, was found which leads to a widening of the chronological horizons of the Shahdad site. In this paper, 2725 vessels ranging in five colors including Buff, Red, Orange, Gray and Buff greenish, were studied. It is interesting to state that of the above total vessels, about 2451 vessels (90%) belong to red vessels (Table. 1), which mostly dated to Tak III, mid-third millennium BC. Moreover, 85.1% of the total of red vessels belong to red jars of Tak III (Table. 2). Red jars are categorized into two groups including wide and narrowed rims.

As stated, the majority of the pottery vessels discovered by Ali Kakemi are red jars. Although these vessels, which were used in a long span period, were certainly produced in different workshops and by different craftsmen. It is interesting to state that there is a close similarities between these vessels, which could testify to centralized production of pottery during mid-third millennium BC.

3- Standardization vs. Diversity

The more concentrated and centralized the production of pottery, the more 'standard' (or less diverse) the product should be. Diversity should therefore be capable of indicating the level of industrial and/or craft pottery as against domestic potting (with the domestic being the more diverse). The problems with this approach are the level at which diversity is to be measured, and how it is to be measured. Ideally, diversity can be measured by the number of different types in an assemblage, or by their relative proportions. This approach gives rise to both theoretical and practical problems (Orton 2012). The many pottery vessels discovered during the excavation at Shahdad are of various



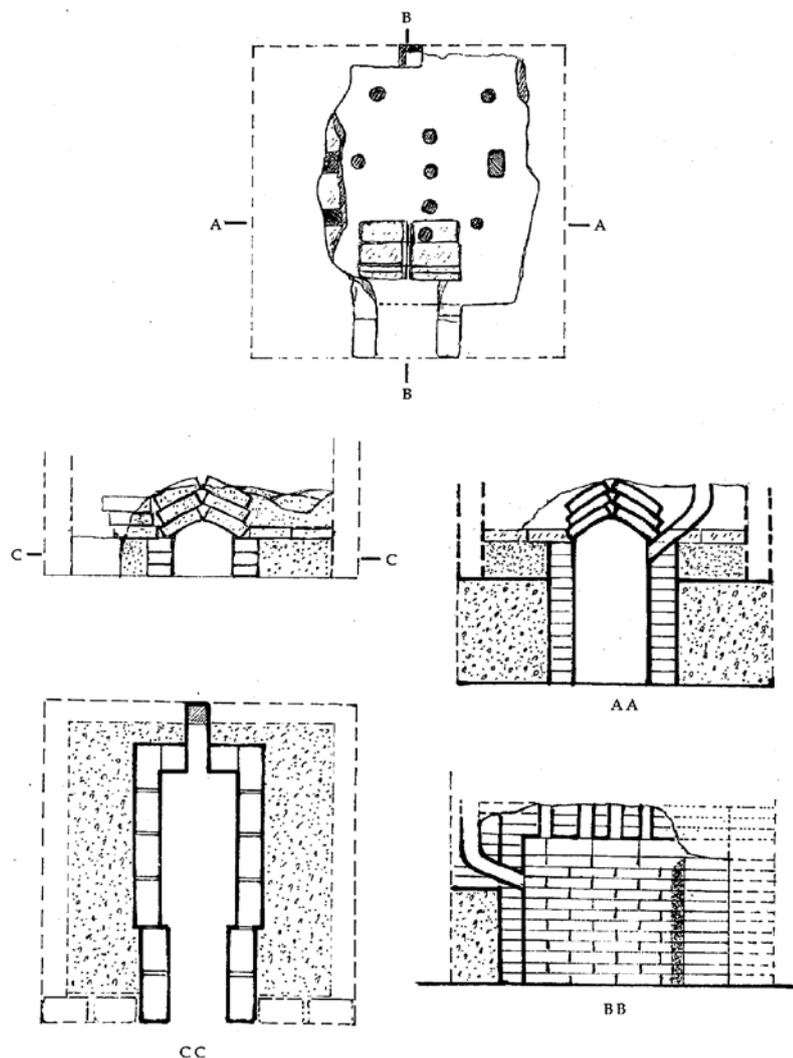


Fig.2: Sample of kiln for pottery production discovered from Shahdad (After: Hakemi 1997).

Color	Frequency	Percent	Valid Percent	Cumulative Percent
Red	2451	90.0	90.0	90.0
Grey	19	.7	.7	90.7
Buff	217	8.0	8.0	98.6
Orange	27	1.0	1.0	99.6
Buff Greenish	10	.4	.4	100.0
Total	1724	100.0	100.0	

Table.1: Frequency of vessels with different colors.



Red Vessels			Period			Total
			IV	III	II	
Form	Jar	Count	68	2012	7	2087
		% within Form	3.3%	96.4%	0.3%	100.0%
		%within Period	85.0%	85.1%	100.0%	85.1%
		% of Total	2.8%	82.1%	0.3%	85.1%
	Bowl	Count	12	326	0	338
		%within Form	3.6%	96.4%	0.0%	100.0%
		%within Period	15.0%	13.8%	0.0%	13.8%
		% of Total	0.5%	13.3%	0.0%	13.8%
	Spouted Jar	Count	0	4	0	4
		%within Form	0.0%	100.0%	0.0%	100.0%
		Within Period	0.0%	0.2%	0.0%	0.2%
		% of Total	0.0%	0.2%	0.0%	0.2%
	Cup	Count	0	22	0	22
		%within Form	0.0%	100.0%	0.0%	100.0%
		%within Period	0.0%	0.9%	0.0%	0.9%
		% of Total	0.0%	0.9%	0.0%	0.9%
	Total	Count	80	2364	7	2451
		Within Form	3.3%	96.5%	0.3%	100.0%
%within Period		100.0%	100.0%	100.0%	100.0%	
% of Total		3.3%	96.5%	0.3%	100.0%	

Table 2: Form and Period Cross tabulation of red vessels.



classes and types. The first class is the buff ware found in the eastern part of cemetery A; the second is plain red ware discovered in the northwestern and in the southwestern parts of the cemetery; the third consists of painted ware found all over the cemetery. Vessels of various shapes and sizes were found in the graves of cemetery B. examples include small jars with narrow mouths and necks. All the vases are unpainted; some of the jars are decorated with incised parallel curved lines. Some of the unpainted vases are comparable with late third millennium BC pottery from Shahr-i-Sokhta IV, Yahya IV a, Mundigak V and sites in Pakistan, Afghanistan and Central Asia. The cemetery C graves contained buff, red and gray ware vessels. The pottery of this cemetery is neither varied nor fine. The buff ware jars are coarse, with bodies thicker than those of the bowls; the jars are very similar to the buff ware from cemetery B. it is notable to state that cemetery A dated to the end of the third millennium BC, cemetery B is also dated to early of the second millennium BC and finally cemetery C is dated to the middle of the second millennium BC (Hakemi 1997: 49, 69, 74). The pottery found in the Shahdad graves may be divided into two groups including painted and unpainted (fig. 3). Of the later type, red pottery occurs more frequently than buff and gray ware and though it does not vary much in shape. However unpainted vessels are very popular during Tak III (fig. 4). They almost feature marks carved

or impressed on the body, on the inner and outer rim and, in particular, on the base. Over 1100 red ware pots have so far been unearthed, bearing 606 different marks, some of them repeated several times on the items under examination (Hakemi and Sajjadi 1988: 145). The most important point is that different forms and types of vessels, which bearing different marks, have similar techniques; this means that in spite of different craftsmen, technology of pottery production at Shahdad had followed standardization process during the 4th and 3rd millennium BC.

As stated, Jars, which are mostly seen in Tak III (fig. 5), are divided into two groups based on the width of their rims, wide and narrow rims (fig. 6). Table. 3 shows that majority of jars during Tak III belong to narrow rim, which were probably used for reservation of water in arid environment of Shahdad. Frequency of wide rim jars in the same period is related to the fragile character of Shahdad environment. It is postulated that wide rim jars may have been used for grain storage. Fig. 7 shows that with increase of the width of rims, heights of the jars are also increase. It is interesting that in both narrow and wide rims, relation between increase of height of the vessels and width of the rims are equally visible. it means, there are jars with same height, but they are different in the width of rims.

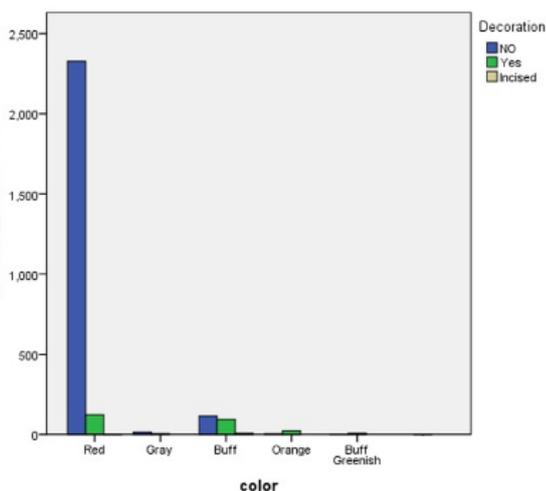


Fig. 3: Frequency of vessels with different colors and decoration variable.

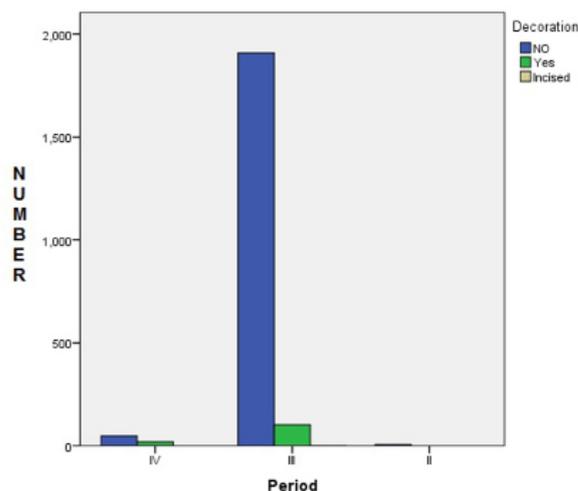


Fig. 4: Showing high number of unpainted red vessels during Tak III.



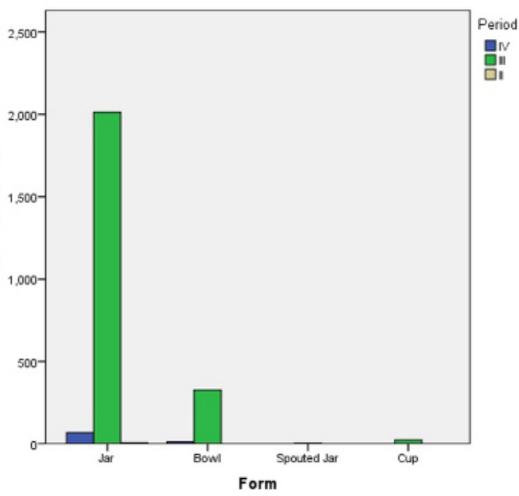


Fig. 5: Showing high number of Jars in Tak III in compare with other forms and periods.

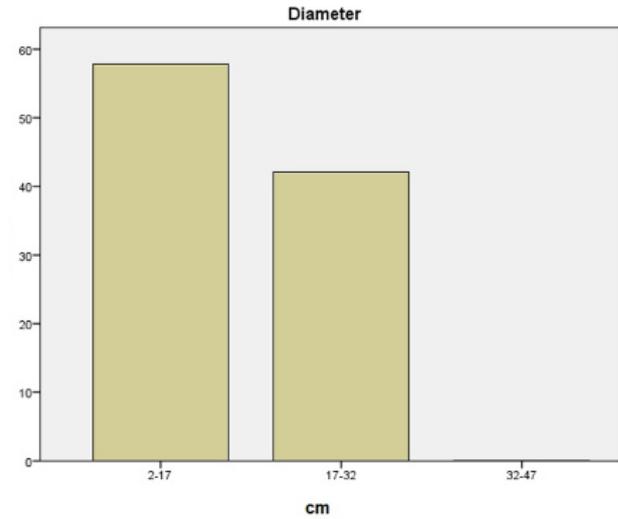


Fig. 6: Showing two different groups of red Jars in Tak III, wide and narrow rims.

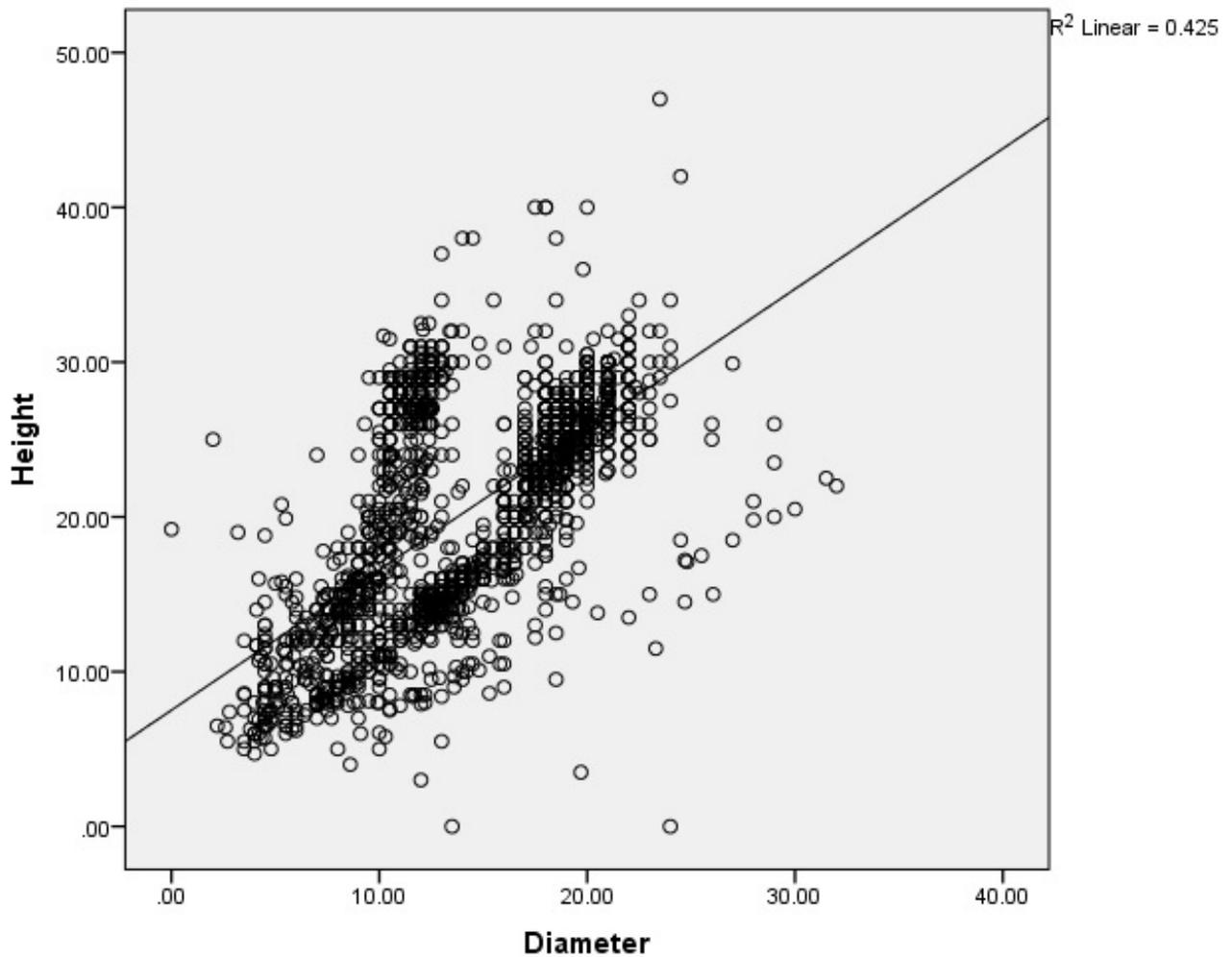


Fig. 7: Showing correlation between height and rim diameter of Red Jars dated to Tak III.



Red Jars		Frequency	Percent	Valid	Cumulative
Tak III				Percent	Percent
	2-17	1163	57.803	57.832	57.832
Valid (cm)	17-32	847	42.097	42.118	99.950
	32-47	1	.050	.050	100
	Total	2011	99.950	100	
Missing	system	1	.050		
Total		2012	100		

Table 3: Frequency of red jars with different rim diameter.

Craft Specialization

According to archaeological data it is not known how exactly a pottery workshop had looked like. The technology of ancient pottery can be explored by studying the numerous vessels and fragments that have survived. The preserved pottery kilns, moulds, as well as pictures on the vases and written sources are considered as important sources of information in this respect (Dimitrova 2008: 108). Moreover, descriptive and inferential statistic studies could be used to examine craft specialization, especially to have a better understanding of the scale of production and standardization of outputs.

Results of the statistical studies shows that craftsmen of Shahdad had experienced to manufacture special types of vessels, which seems to be output of interaction between Shahdad people and their surrounded environment. It should not be forgotten that Shahdad importance is closely related to its suitable situation both as intermediary function of the site and its easily accessibility of raw materials for metals and semi-precious stones. Therefore, this importance caused for the development of craft specialization of pottery production during the third millennium BC. On the other hand, it could be stated that aridity and fragility of Shahdad's environment may have caused for the emergence of craft specialization of pottery production. It is noteworthy to state that this kind of

craft specialization is the most characteristic aspect of Shahdad economy.

The context of production describes the affiliation of the producers and sociopolitical component of the demand for their vessels (Costin 1991: 11). It seems that pottery producers at Shahdad were independent specialists, who produce for a general market of potential customers. In fact, their activities are governed basically by the general principals of supply and demands. Customers of this group of specialists could have been from different groups of people, including rich and poor. Haggett and Smith believe that the main difference between independent and attached specialist is that a sufficiently large demand must be available to support the independent specialists (Haggett 1966 and Smith 1975). Because they produce different types and forms of vessels for a large number of population. On the other hand, they produced subsistence and essential household goods for large number of public population at Shahdad. A highly influential statement was Earl's distinction between attached and independent productions. He made the fundamental distinction between production of special, high-value goods for elite consumption and production of utilitarian goods for broad distribution (Costin 1991: 11).



Conclusion

In this article it was attempted to examine craft specialization of pottery production at Bronze Age site of Shahdad. Unfortunately, excavations at this site presented little information about pottery production, although many fieldworks have been carried out at this site. Shahdad with its rich mineral resources is one of the most important sites in southeast Iran, which may have functioned as intermediary between different sites during Bronze Age. Many potteries discovered from cemeteries A, B and C demonstrate that the site was involved in manufacturing of pottery during the third millennium BC. It seems that the craft activity at Shahdad with marked concentration of facilities, high technology, standardization and huge number of pottery discovery, had played an important role in economy of Shahdad during the above period.

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