Tappeh Hesār: A Major Manufacturing Centre at the Central Plateau

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Introduction

During the fourth and third millennia BC a number of sites began to develop into regional centres and small towns (Fig. 1). This development had inherent consequences which characterised this period as the most dynamic period in cultural history of human societies. Formation of state institutions, residential segregation and functionally different quarters, well-established far-distance trade, and highly developed metalworking are some of the manifestations of this new era, which we archaeologically call "Bronze Age".

As its name implies, introduction of specialised metalworking was one of the crucial aspects of the Bronze Age, which presumably had much influence on the interactions of cultural spheres. In this regard it would be worth to keep in mind the technological and economical importance of developed metalworking which could highlight the role of such capable regions in the cultural interaction. Some of the major Bronze Age centres of eastern Iran and Central Asia are Shahr-i Sokhta, Tappeh Yahya, Shahdad, Namazga Tappeh, Altyn Tappeh, Harappa, and Tappeh Hesār. Tappeh Hesār – situated on a well-established important route between east and west, and its supposed central position among the Bronze Age settlements of the region has an effective role for a better understanding of interactions between cultures and civilizations of the Iranian Central Plateau, Central Asia, South-Western Iran and Mesopotamia.

Environmental Considerations

The Iranian Central Plateau lies in the central northern part of Iran. Its exact borders are far to be defined clearly, but from archaeological point of view it can be defined as the region between the southern slopes of the Alborz Mountains in the north, the edge of the vast Dasht-e Kavir Desert in the east, the alluvial highland plains of Isfahan in the south, and the eastern hilly flanks of the Zagros Mountains in the west. As such, the Central Plateau is part of the great interior basins of Iran that is surrounded on three sides by several mountain ranges.

The Central Plateau, as part of the Volcanic Belt of Iran, is rich in metal deposits. In spite of lack of systematic archaeological investigations to locate the possible ancient mines in the Central Plateau, we have some information on some ancient mining districts like Veshnāveh (Holzer & Momenzadeh 1971) and Anarak, and also several "old working" (Bazin & Hübner 1969) (see this volume). The most important archaeometallurgical sites known in Iran lie in the Central Plateau, such as Arisman (Chegini et al. 2000) and Tappeh Hesār (Dyson & Howard 1989), or in southern part of the Volcanic Belt of Iran, such as Shahdad (Hakemi 1992) and Tal-I Iblis (Caldwell 1967; 1968).

As definite northern border of the Central Plateau of Iran, Alborz Mountains is one of the most obvious geomorphologic features of this vast region, which stretches curvy in east-west direction just south of the Caspian Sea. This mountain range is flanked by Koppeh Dagh range to the east and the Talesh range to the west. In this way these mountain ranges are a natural barrier which separates the Iranian Plateau from the northern lands. With numerous peaks above 4000 m, the highest point of Alborz Mountains is Mount Damavand with an elevation of 5670 m. Due to its high elevation, Alborz Mountains enjoys high precipitations which feed several streams and rivers flowing both northward to the Caspian Sea and southward to the northern part of the Central Plateau.

The modern climate of the Central Plateau is, in general, arid to semi-arid; nevertheless, there are several different climatic niches, too. The existence of several mountains and highlands in northern, western, and southern parts causes immediate areas in favour of more moderate climatic conditions than in the inner parts of the Central Plateau. These areas usually are extending in stripes along





Fig. 1: Major Bronze Age sites of the Iranian Plateau and nearby regions.

the mountain ranges. In addition to milder climate, these areas enjoy favourable conditions due to neighbourhood of the mountains. They also benefit from several streams and small rivers flowed down from the mountains before fading out in further, drier lands. According to current archaeological data the majority of the sites located in or near these favourable zones. One of the best known parts of the Central Plateau are the immediate southern flanks and plains of the Alborz Mountains comprising one of the most favourable and fertile land-stripes of the Central Plateau. Some of the better known and published sites are situated here – from west to east Tappeh Zagheh, Tappeh Ghabristan, Khurvin, Tappeh Ozbaki, Qare Tappeh, Cheshmeh Ali, and Tappeh Hesār.

The Site and its Environment

Tappeh Hesār, about 2 km south of Damghan city, is located in the semi-arid, north-north-eastern part of the Central Plateau of Iran. It lies at the foot of an alluvial fan which pours out of the Alborz Mountains. The main surface water of the Damghan Plain is Damghan River which originats from the Cheshmeh Ali spring, about 35 km north-west of Tappeh Hesār. After entering the Damghan Plain this river branches into several streams, one of them passes near Tappeh Hesār.





Fig. 2: Topographic map of Tappeh Hesār (Dyson & Howard 1989).

The site of Tappeh Hesār comprises some disconnected hillocks with flat areas among them which totally measured about 12 ha. Original excavators gave different names to different parts of the site according to their topographies: North Flat, Main Mound, Painted Pottery Flat, Red Hill, Treasure Hill, South Hill, The Twins and Sasanian Mound (Fig. 2). Although the present area of the site is about 12 hectares, some geomorphologic observations suggest that some parts of the site have been eroded away by human and natural agents as well (Dyson & Tosi 1989, 5-6).



Tappeh Hesār was excavated for the first time in 1931 and 1932, for some eleven months during two seasons, by a team from The University Museum of the University of Pennsylvania directed by Erich F. Schmidt (1933; 1937) (Fig. 3). So far, Schmidt's excavation at Hesār is the most extensive one carried out among the sites of the Central Plateau of Iran. During his excavations, Schmidt ope-



Fig. 3: Work in the Hesār I settlements (Schmidt 1937, 21, Abb. 20).

ned more than 11000 m² on all parts of the site. In 1956 a brief examination of the site was carried out by Robert H. Dyson Jr. in search of the plain wares which should have occurred with the painted pottery. The results were unrecorded in the publication (Dyson & Howard 1989). In 1972 Grazia M. Bulgarelli made a limited survey of surface materials (1974). Then, in 1976 a joint team of The University Museum of the University of Pennsylvania, Turin University, and the Iranian Centre for Archaeological Research conducted a multiple fieldwork of re-examination of Schmidt's trenches, limited excavation, surface survey of the site, and a regional survey of the Damghan Plain (Dyson & Howard 1989). During the Restudy Project more than 2000 m² on the North Flat, Main Mound, South Hill, and Twins were opened. At any rate, they



Fig. 4: North Flat of Tappeh Hesār and newly constructed railroad passing through it.



could not reach the earliest deposits of the site. Finally, a rescue excavation (due to Tehran-Mashhad railroad constructions) directed by Esmaiil Yaghmaii of the Iranian Centre for Archaeological Research was made at the site in 1998 (Fig. 4).

Cultural Sequence

For several decades the known cultural sequence of Tappeh Hesār was, and in fact still is, relied on Schmidt's works on the site (Schmidt 1937). His extensive excavations at this site revealed three major strata or periods of I, II, and III, which divided into eight phases from down to top: IA, IB, IC, IIA, IIB, IIIA, IIIB, and IIIC. Schmidt identified two of these phases as transitional: IIA transition between Period I and II, and IIIA transition between Period II and III. The main criterion for this subdivision was a stylistic analysis of grave goods, especially pottery, rather than stratigraphy, whose rules were not yet understood sufficiently. It is interesting to note that much of Schmidt's efforts on excavations at Tappeh Hesār dedicated to dig out more than 780 graves of all periods.

During the Restudy Project directed by Dyson and Tosi in 1976, areas on the Main Mound, North Flat, South Hill, and Twins were examined; a major building with six stages, A to F from the top down, have been identified to clear the Hesār sequence. According to the new phasing the two lowest phases (F and E) belong to Terminal I, which is equivalent with Schmidt's IC/IIA phases. The Hesār II period is defined by phases C-D in the 1976 sequence. which includes buildings 1-3 on the Main Mound assigned by Schmidt as Period III (1937, fig. 86) and graves assigned by Schmidt as Hesār IIB (Dyson & Howard 1989). The Hesār III period (Middle Bronze Age) is defined by phases B-A of 1976. Based on stratigraphy the stage Hesar III can be divided into two phases. Early Hesār III consists of the Burned Building, which is roughly equivalent in time to Schmidt's IIIB graves. Late Hesar III is documented by levels overlying the Burned Building which contain clusters of artefacts, including a large number made of alabaster. This material is augmented by graves and hoards elsewhere in the upper levels of the site assigned by Schmidt to IIIC (Voigt & Dyson 1992, 170-171). As they could not reach to Schmidt's IA/B phases (the deepest layers of Hesār), they adopted Hesār I for Schmidt's Hesār IA/B.

The results of clustered and averaged radiocarbon determinations for Hesār Sequence according to samples collected during Restudy Project, are as follow (Voigt & Dyson 1992, Table 1):

Hesār III	2400-2170 BC (5 samples)
Hesār II	3365-3030 BC (20 samples)
Hesār IC/IIA	3980-3865 BC (6 samples)

As the main body of information about Hesār comes from Schmidt's extensive excavation at this site, in dealing with describing Hesār materials we follow the terminology established by Schmidt for cultural sequence of the site. In the following, the main aspects of three strata or periods of Hesār will be outlined.

Hesar I Period

The earliest deposits of the site (Period I) were reached at 18 plots, i.e. 1800 m2, mainly in the Main Mound and North Flat (Schmidt 1937, 22, Fig. 21). According to ceramic variations, three phases are identified in this period, from down to up A, B, and C. The architecture of Period I consists of unorganised clusters of houses, built of chineh or mud bricks.

Period I is the era of Painted pottery. Pottery of IA phase is handmade. The colour of the ground is reddish-brown with dark grey simple geometric designs. The common form of this ware is that of chalice vessels, in the shape of jars, bowls and goblets. Although the technique, designs, and ground colour of this ware changed during time, hence means for defining the sequence of Period I ceramic phases, the vessel forms, with minor elaborations only, persists as late as phase IIIA.

During phase IB, wheel-made pottery appears for the first time in the Hesār sequence. The ground colour of this ware is buff or light brown. In addition to the increased variety of geometric patterns, the motives of conventionalised birds, human beings, and ibexes appear in this phase. The most common motif of this ware is floral scrolls. The vessel forms of Hesār IB are almost identical to IA ones, which implies the continuation in cultural trend of the site.

The most sophisticated painted pottery of Hesār I appears in period IC. Pottery of this phase has a light greyish brown, often almost greyish white, ground colour with dark paintings. It is interesting to note that the ground colour of painted Hesār ware from phase IA to phase IC became increasingly lighter. The characteristic decorative patterns of this ware are ibexes and feline, while floral scrolls, human "dancers", and "birds' parades" have been disappeared. The forms of the vessels, though fundamentally still Hesār IA shapes, have become more varied and elegant, and geometrical patterns of a type not previously encountered increase the scope of the ornamentations.

Many stone objects and tools are found in the Hesar IC deposits: flakes and cores, flint arrowheads, axes, whetstones, pestles, polishers, weights, and miscellaneous objects. From the Hesār I and II strata only clay figurines found, while in the Hesār III Period figurines of metal, bone, and stone occurred as well. Painted clay figurines restricted only to IC and IIA phases. Simple button seals occurred mainly in Hesar IA, while great numbers of stemmed stamp seals were found in the graves of Hesar IB and particularly IC. Only simple geometric designs were applied on these seals. Cylindrical seals did not occur at Tappeh Hesār prior to Hesār IIIB. A large number of stamp-seal-shaped objects were found in the Hesār I graves, but for their high frequency in the same graves and considering the fact that in several cases seals, particularly spool-shaped button seals, were found graded in size, it seems they were used as ornaments rather than real seals (Schmidt 1937).

In earliest deposits of Hesār IA only simple copper points and some corroded copper lumps were found. But in later phases of

Period I more sophisticated items such as pins (IB), and daggers, knives and axes (IC) occurred. One of the best samples of Hesār I workmanship in copper is an axe (H 4176) found on the floor of a Hesār IC room.

In sum, 209 burials were excavated from the Hesār I deposits. Forty-one of them belong to IA, twelve to IB, and 91 to IC. The dead of all Hesār Periods were buried in the mound area. With few exceptions, the Hesār I dead lay on the right side.

<u>Hesār II Period</u>

Schmidt reached this period in 34 plots, i.e. 3400 m². The excavations were mainly focused on the area of Painted Pottery Flat, South Hill, and Red Hill (Schmidt 1937, 103, Fig. 61). The appearance of Grey Ware was the main criterion for defining this period. Period II of Tappeh Hesār divided into two phases from down to up, A and B, again on the basis of stylistic variations of pottery. Deposits of Period II are thinner than the preceding and succeeding periods, hence indicating shorter occupations. In terms of architecture there is no major difference between Period I and II: rows of rectangular rooms with use of mud bricks or chineh constructed in a haphazard manner, although chineh is used much less than Period I.

The predominant pottery of Period II is grey ware. Although the paste and ground colour of this ware differ from painted ware of Period I, some forms such as bowls, jars, and goblets are exactly than before. Forms like neckless jars, tall-stemmed bowls or goblets, and un-stemmed bowls and jars are newly introduced. Painted ware continues to its existence alongside with grey ware during phase IIA. While some motives of this ware are identical with motives of different phases of Period I, some suggest being characteristic of Period II, such as long-necked gazelles. Schmidt classified all the graves with both painted ware and Grey ware to Hesār IIA, and presence or absence of painted ware was the sole criterion for identifying phases IIA and IIB.

In phase IIA, clay human figurines as well as painted animal figurines appeared for the first time. Seals or seal shape ornaments collection of Period II show no major difference with Period I, though the typical seal of this period is made of copper. In Hesār IIB exceptionally large copper seals appear.

Period II shows great advances in both quantity and quality of copper objects. The copper mace heads and ring-shaped ornaments such as bracelets, finger rings, and earrings occur during this time for the first time and pins with elaborate coiled heads are frequent. There are only a few blades of Hesār II in the collection. They closely resemble the blades of Hesār I. The mace heads of Hesār IIB are the most attractive metal objects of their time. In some cases, the remains of wooden handles were still found in those. While in Period I no objects of silver were found, Hesār II produced several items, all ornaments. Silver objects include "double scroll" pendants, earrings, a finger ring, an oblong bead, and a curious ladle-shaped pendant. Most of these items have copper parallels, too. Silver objects of Hesār are among the earliest occurrences of this metal in the Central Plateau of Iran.

Hesār III Period

Deposits of Hesār III period were excavated in 85 plots, i.e. 8500 m². It is astonishing that the rather associated humble architecture of this period stands in clear contrast to its rich grave goods. The deposit's thickness of this period is much more than in preceding periods and could be divided into three phases by Schmidt, from down to top A, B, C. The most elaborate and the best preserved building of Period III is the "Burned Building", attributed to Phase B by Schmidt (1937) (Fig. 5). It is a complex measured about 23 x 10 m with a main living room, several storerooms, a kitchen, and several other installations such as staircases, chambers, a fireplace, and a latrine. Skeletal remains of several killed people and many precious artefacts in situ suggest that the building and its residents had been attacked by an enemy. Also, the large dimension of the building, its several spaces with various functions, large number of high value objects found in it, and its unique plan indicate that it should be considered as an unusual building of some particular functions. In apparent absence of religious aspects of the Burned Building, Schmidt inclined to attribute it to the most high-ranked person of the Hesār IIIB society (1937, 164).

While the appearance of plain grey ware, followed by the disappearance of painted pottery (except for sporadic surviving types), marked the arrival of Hesār II, characteristic form changes distinguish Hesār II and III. The stemmed vessel disappears except of braziers, and new shapes define the last ceramic epoch of Tappeh Hesār. Bottle-pitchers, vase-cups, and, toward the end, attractive canteens are the principle forms of Hesār III. In terms of time, Hesār IIIA is the phase of transition from Hesār II to III. In terms of space, it is a layer deposited during that phase and containing material with both Hesār II and III characteristics. The stemmed vessels of Hesār II type were found in the transitional layer of Hesār IIIA.

The characteristic vessel of Hesār IIIB is the "bottle-pitcher". In several instances incised or burnished patterns of parallel cross-hatched lines or herringbone designs ornament parts of the vessel. The surface colour is dark grey or grey, usually with faint greybrown shades. The paste is grey or grey-brown, and medium to fine, as a rule. The majority of the bowls are conic or roughly hemispherical, resembling the stemmed forms of Hesār II.

The last phase of Hesār III contains some new pot forms in addition to other features, such as alabaster vessels, copper wands, and the like, unknown during the preceding phases. It is a significant fact that in the uppermost burials of the mound, in phase IIIC, a few plain red vessels were found mingled with the prevailing grey ware and the alabaster vessels typical of this period. These red vessels may indicate the beginning of a new era characterised by red ware. The principle guide vessel of Hesār IIIC is the canteen





Fig. 5: Hypothetical reconstruction of the Burned Building (Schmidt 1937, 170, Fig. 94).

with an oval, oblong, or at times almost globular body, and a bottle neck. Two suspension handles with narrow perforations are on opposite sides of the shoulder or upper body. The bodies of some specimens are partly or totally covered with burnished herringbone patterns. The surface of these vessels is grey, usually with brownish tints, and somewhat polished. The paste is grey, medium to fine. Spouted pitchers are frequent in Hesār IIIC. The globular vessel with burnished herringbone pattern and long beak-spout is typical for this phase (H 3511). Bi-conic jars, at times supplied with neck ridges, still occur in Hesār IIIC, though they are more frequent in the preceding phases (Schmidt 1937).

During the second season of excavation at Hesār two assemblages of objects were found in the plots DH 05, CH 95, and DH 07. These assemblages, called Hoards by Schmidt, include several items of various materials: alabaster objects, weapons, tools, and vessels of copper, and ornaments of gold, silver, and other materials (Schmidt 1937, Figs. 96-99) (Fig. 6). These hoards, dated to Phase IIIC, have been deposited in the late Hesār II and early Hesār III layers.

In Hesār III deposits several different types of figurines of various materials were found: human figurines of backed clay, alabaster and bone, animal figurines of backed clay, stone and copper, mouflon heads of gold, animal effigy vessel of pottery, effigy lid of copper, human effigy vessel of pottery and copper wands or symbols.

Wands occur during all sub-phases of Hesār III. The more elaborate symbols were found in phase IIIC. The wands are usually found in graves, but several plain specimens occurred in loose refuse.

The characteristic seal of Hesār III is made of copper. Stamp seals occur in phases IIIB and IIIC. Medallion seals were found in the best equipped graves of phase IIIC only. There are, however, stamp seals of lead, alabaster, serpentine and backed clay, and seal impressions in clay.

Metallurgy in Period III far surpasses the preceding eras. There are a large number of various copper objects, and objects of other metals as well, of high craftsmanship in Hesār III deposits which imply the flourish of metallurgy in this period. Of copper objects we could mention daggers, lances, spearheads, knives, mace heads, arrowheads, axes, mattocks, chisels, pins, tacks, needles, points, bracelets, finger rings, earrings, double-scroll pendants, tubes, diadems, mirrors and vessels. In addition to copper objects, several items of lead, silver, and gold were found in the Hesār III deposits. Lead does not occur at Tappeh Hesār prior to period III. All the lead vessels are confined to the last phase of Hesār III. While in period II only a few silver ornaments were found, the series of Hesār III silver objects is large: pendants, tacks, bracelets, buttons, earrings and a diadem. Also silver vessels, such as pitchers and jars, were found in the Hesār III deposits. Gold items found in





Fig. 6: Ornaments from Hoard I on the Treasure Hill (Schmidt 1937, 228).

Hesār III consist of a long plain diadem, beads, ear pendants, a finger ring, and a cup. But the most beautiful objects of gold are five mouflon heads, which occurred in the Hesār IIIC hoard I in the Treasure Hill.

Stone vessels occurred at Tappeh Hesār solely in the uppermost phase (IIIC). They are guide specimens of their time, and some of them belong to the most attractive group of objects obtained at the site. The most striking alabaster vessels are plates with short or tall stems, and the most frequent alabaster and common vessels are cups of various shapes. The usual forms are slightly varied inverted truncated cones and hemispheres.

Variety of form and attractiveness of the raw materials carefully selected for their ornamental effect are distinctive features of the Hesār III beads. Banded chalcedony and amber (only found in Hesār IIIC) are the most important new materials. Ivory and lead were not found in the strata preceding Hesār III.

Tappeh Hesār still stands as the most important excavated site of the Bronze Age in the Central Plateau of Iran. Cultural sequence of

the 5th to 2nd millennia BC of the Central Plateau relies heavily on the excavated materials of this site. Ceramic comparisons of Hesār sequence with Sialk, Cheshmeh Ali, and Ghabristan suggest the correlations between Hesār IA phase with Sialk III1-3, Cheshmeh Ali IB, and Ghabristan I. Hesār IB is comparable with Sialk III4-5 and Ghabristan II. The ceramic tradition of Hesār IC/IIA has close affinities with Sialk III6-7b, and to a lesser extent with Ghabristan III and IV. The ceramic of Hesār II and III has been compared with Sialk IV and Sagzabad, respectively (Dyson 1991, Table 34). Nevertheless, there is no single excavated site with comparable phases with Hesār II and III in the Central Plateau, and the reasonable parallels wait to be established in the future.

One of the main aspects of Tappeh Hesār has been clarified due to the results of the Restudy Project to a reasonable extent. It is the role in production of several items found there, most of them yet to be documented on the other sites of the Central Plateau. The 1976 surface survey of Tappeh Hesār showed that industrial activities such as metal working, manufacturing items of lapis lazuli and semiprecious stones, limestone and soapstone bead-making, and pottery making were actively in progress at certain areas of the site at different periods (Tosi 1989) (Fig. 7). Although according to geology of Hesār/Damghan region most of the raw materials for industrial activities mentioned above are accessible locally, we have not yet solid data on the possible types and extent of the available raw materials in the region. Nevertheless, this deficiency can not affect the importance of Tappeh Hesār as the major manufacturing centre of various items in the Central Plateau during Bronze Age. In addition to Hesar's strategic position on a well-known important route between east and west this aspect highlights the role of Tappeh Hesār as a possible major trading centre too. Part of this latter aspect of the site had been suggested previously by Bulgarelli's surface survey on the site: This work succeeded in defining the role of Tappeh Hesār in the ancient lapis lazuli trade from east to west (Bulgarelli 1974).

Although Schmidt published a large number of metal objects of the Tappeh Hesār (1937), the importance of this site to the study of ancient metallurgy remained somewhat obscure until the investigations carried out by the Restudy Project. The importance of the Hesār in the Bronze Age archaeometallurgical technology in the Central Plateau is greatly enhanced by the fact that excavations in 1931-1932, and especially those in the 1976, have revealed a small but important collection of artifacts directly associated with metal smelting and casting. The Hesar metal finds comprise in one of the largest collections of artefacts from an excavated context on the Central Plateau of Iran (Pigott 1989; 1999). The discovery of pieces of mould (Fig. 8) and furnaces, and also large extent of scattered slag on this site which cover more than 9% or 11,000 m² of the preserved site, indicate the intensity of archaeometallurgical activities in the antiquity at Hesār. The slag analyses suggest the smelting of arsenical ores of copper as well as perhaps lead-silver ores (Pigott 1999). One of the astonishing aspects of the Hesar metallurgy is the remarkable technological conservatism in using arsenical ores of copper during the entire existence of the site from later fifth to early second millennium BC, which may typify the character of copper production on the Central Plateau of Iran before the Iron Age. The discovery of certain quantity of litharge and





Fig. 7: Pearl necklet of lazurite, chalcedony und carneol, early 3rd. Mill. BC.; Photo: DBM, M. Schicht.

other by-products of lead-silver ore smelting at South Hill and the Twins, highlight the role of Hesār in manufacturing such items. So far, remains of litharge have been found on Sialk (Roustaei 2002, 121, Pl. 3:7; Nokandeh & Nezafati 2003, Pl. 1), and Arisman (Stöllner, pers. comm.). \$ Abb. 8

Our current knowledge on the possible ore resources used by Hesā r metalworkers is limited. This is caused to a large extent in a lack of systematic survey aimed to find the ancient mining sites in



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North-Eastern Iran. Nevertheless, according to a number of geological surveys, two sites of Taknar, about 22 km north-west of Bardeskan, and Gooshe, in Torood district about 100 km south of Shahrood, show evidence of ancient mining, which are among the nearest copper deposits to the Tappeh Hesār (Bazin & Hübner 1969). In this regard we may mention two further far distance mining districts of Veshnāveh, in southern mountains of Qom, and Anarak, about 320 km south of Hesār, on the southern edge of Dasht-e Kavir Desert.

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Threshing-area in a village in Northwestern Iran; Photo: G. Weisgerber 1978.