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Tepe Hissar in the Fourth Millennium BCE

Neda Moradi
Department of Archaeology, Science and Research Branch, Islamic Azad University, Tehran, Iran
Hasan Fazeli Nashli
Department of Archaeology, University of Tehran,Tehran, Iran
Rouhollah Yousefi Zoshk
Department of Archaeology, Varamin Pishva Branch, Islamic Azad University, Varamin, Iran

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Abstract: The fourth millennium BCE in northeastern Iran was marked by intricate interactions at both regional and trans-regional levels. During this time, Tepe Hissar's inhabitants engaged in significant cultural exchanges involving pottery, figurines, and metal objects with various regions of central Iran. In the latter half of the millennium, these connections shifted towards northeastern Iran and the Gorgan Plain. Hissar became a hub for large-scale, centrally organized industries, particularly in metalworking and gemstone craftsmanship, such as lapis lazuli, which contributed to greater social stratification, evidenced by wealth accumulation in elite burials. New pottery chronologies offer a revised understanding of the cultural developments at the Hissar settlement and their social and cultural consequences, as seen in the material culture of settlements and burials. The primary goal of this research is to present the quantitative and qualitative changes in pottery and the influence of Tepe Hissar throughout the fourth millennium BCE. These changes indicate the formation of extensive internal and external cultural relationships, reflecting the cultural dynamism of Hissar during the fourth and third millennia BCE. It can likely be concluded that despite environmental heterogeneity in northeastern Iran, there were cultural homogeneities and similarities in this region. These can be observed in the resemblance of pottery styles and unified management techniques, which are attributed to cultural interactions between these communities within geographic and cultural frameworks.

Keywords: *Tepe Hissar, Fourth Millennium BCE, Cultural Interactions, Pottery.*

* Corresponding Author
Email Address: hassanfazeinashli@gmail.com *(Hassan Fazeli Nashli)*

Introduction

Tepe Hissar, located in the Shahrud plain southeast of Damghan, is one of the northeastern sites of the Iranian plateau. Archaeological evidence, including stratigraphic data and radiocarbon dating, places the settlement in the fourth millennium BCE. Hissar, like other prehistoric cultures in this region, underwent distinct archaeological developments. It also participated in cultural exchanges with other prehistoric sites, evidenced by both regional and trans-regional interactions. Between 4000 and 3500 BCE, the material culture at Tepe Hissar—particularly pottery, architecture, and technical methods—shared strong similarities with sites such as phases III1-3 and III4-5 of Tepe Sialk and Tepe Arisman. However, between 3500 and 3000 BCE, this cultural influence shifted northward and eastward, with Hissar's material culture indicating stronger connections to Gorgan and sites in southern Turkmenistan.

Despite the environmental heterogeneity of northeastern Iran, Hissar exhibited significant cultural homogeneity with other settlements. These similarities are seen in the pottery styles and shared management techniques, reflecting the cultural interactions that connected communities across the region within a cohesive geographic and cultural framework.

Tepe Hissar Site

The Tepe Hissar site, also known as "Tepe Qaleh," is located on the Iranian plateau, southeast of the Caspian Sea (36°9' N, 59°22' E), approximately 1.5 kilometers from the modern city of Damghan. To its north lie the majestic Alborz Mountains, the main source of water for the Cheshmeh Ali Spring (Cheshmeh Ali), which flows into the Damghan River (Map 1). To the south is the edge of the salt deserts of the Central Iranian Desert (Dasht-e Kavir) (Salzmann: 2016, 1((Fig. 1).

Fig. 1 Topographic map of Tepe Hissar and surrounding sites (after Roberts and Thornton, 2014: Fig. 23.1)

Tepe Hissar is one of the largest prehistoric sites on the northeastern Iranian plateau and ranks as the second most significant settlement in the centeral region. (Schmidt 1937; Dyson and Howard 1989). This extensive site encompasses multiple mounds (Helwing: 2006, 47) and is recognized as the largest known urban settlement in northeastern Iran, with a continuous cultural sequence spanning from the 5th to the 2nd millennium BCE (Hessari: 2011, 38). The modern landscape of Tepe Hissar extends beyond the main site to include at least three mud-brick fortresses from the Islamic Middle Period and a smaller prehistoric mound located a few hundred meters away. Overall, the Tepe Hissar complex covers approximately 200 hectares and includes several distinct archaeological sites (Fig 2) (Roustaei: 2010, 614).

The favorable geographic location of Tepe Hissar, situated between the Dasht-e Kavir desert and the Alborz mountain range, undoubtedly provided sufficient resources for subsistence agriculture, hunting, and fishing. In terms of subsistence strategy, the ancient populations of Tepe Hissar were able to exploit resources ranging from the desert (Dasht-e Kavir) to the Alborz Mountains and possibly even the Caspian coastal area, about 100 kilometers beyond the mountains. The diet of the Hissar inhabitants was diverse, as "natural resources were distributed around the [Damghan] basin" (Salzmann: 2016, 1).

The farmers of Tepe Hissar engaged in a wide range of subsistence activities, from growing grains—including various species of wheat and millet—to herding goats. Initially, Schmidt divided the cultural deposits of Tepe Hissar into three periods, which he named, from oldest to newest: Hissar I, Hissar II, and Hissar III. He further subdivided these periods based on minor changes in pottery into stages: Hissar I (from oldest to newest) was divided into Hissar IA, IB, and IC; Hissar II into Hissar IIA and IIB; and Hissar III into Hissar IIIA, IIIB, and IIIC (Schmidt, 1968). Thus, according to Schmidt's classification, Hissar IA represents the oldest cultural phase, while Hissar IIIC is the most recent (Schmidt, 1937).

Based on published absolute dating, the chronology of Tepe Hissar can be outlined in terms of absolute dates: Hissar I spans from the second half of the 5th millennium BCE to around 3700 BCE, Hissar II from around 3700 to 2900 BCE, and Hissar III from around 2900 to 1800 BCE. The classification of Tepe Hissar's cultural deposits was primarily based on pottery, much of which was recovered from numerous burials (Salzmannn: 2016, 1).

History of Research

The first source of information regarding the archaeology of this region was provided by Schindler (1887), who reported a number of decorated pottery shards from a mound near Damghan called Tepe Hissar. Similar pottery fragments were studied in 1920 by Ernst Herzfeld (Dyson, 2009). The first systematic excavation at this site was conducted in 1932 by Eric Schmidt, under the supervision of the University of Pennsylvania Museum (Thornton: 2013, 2). Schmidt was able to identify various cultural aspects that had not previously been recognized in northeastern Iran (Roustaei: 2010, 614). He established a cultural sequence for this site from the fifth millennium to the mid-second millennium BCE, with most of the pottery and artifacts he used to create this sequence recovered from burials. In the 1970s, the site was revisited by an international team jointly led by Robert H. Dyson Jr. and Maurizio Tosi, known as the "Hissar Revision Project" (Howard & Dyson, 1989). Excavations took place on the main mound (Howard, 1989), the northern terrace (Dyson and Ramsen, 1989), the southern mound (Tosi and Bulgarelli, 1989), and the twins (Bizioni, unpublished), leading to the first stratigraphic sequence with radiocarbon dating at Tepe Hissar (approximately 4300-1800 BCE). Additionally, surface surveys and limited horizontal excavations on the main mound, northern terrace, and southern

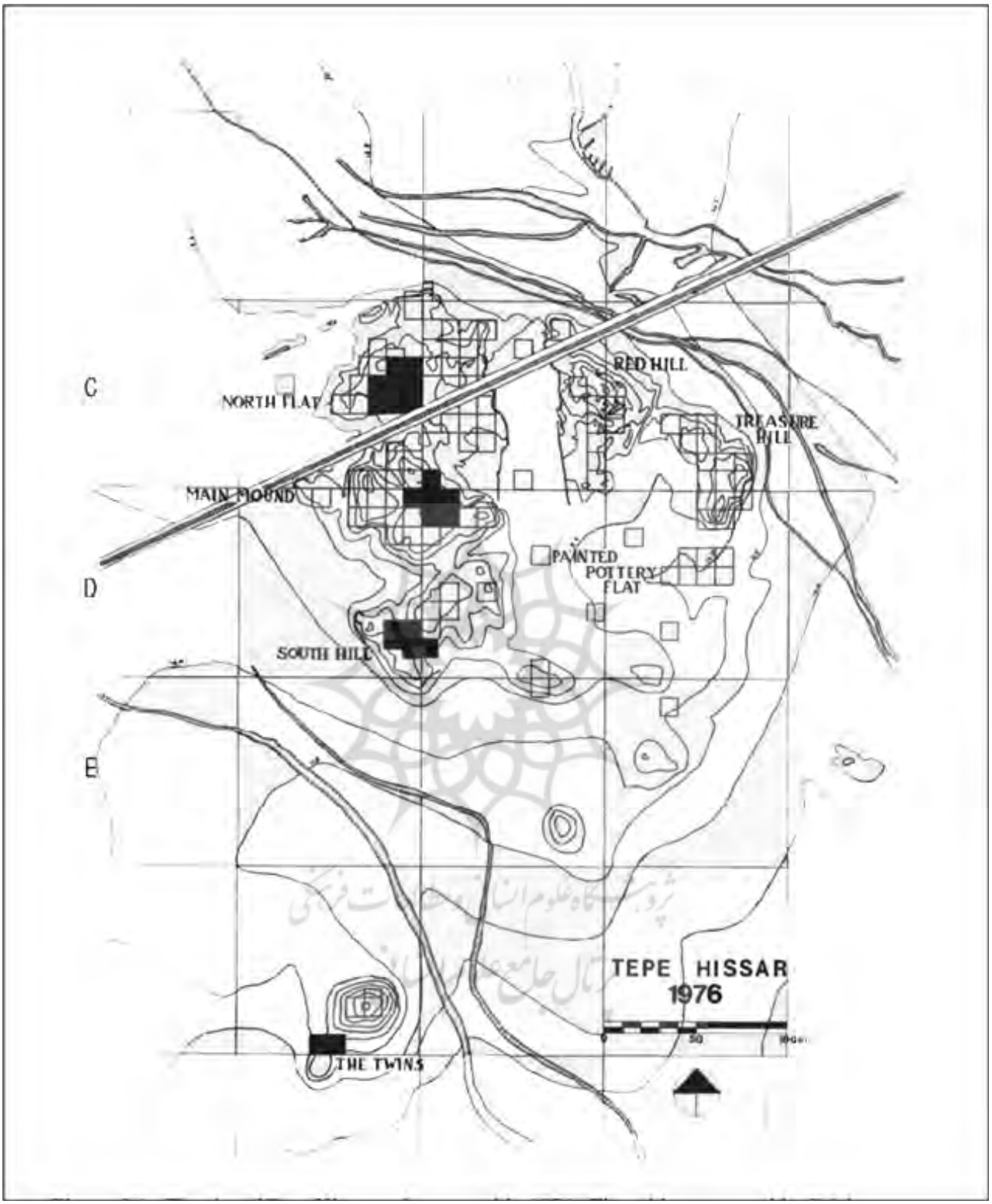


Fig. 2 The site of Tepe Hissar as it appeared in 1976. The grid was created by Erich Schmidt in the 1930s, and his trenches are indicated. Those filled in with black were explored by the 1976 Re-Excavation Project (adapted from Thornton 2006: Fig. 3.1)

mound provided a better understanding of the various industries present at the site (Bulgarelli, 1973, 1974, 1979; Tosi, 1984, 1989; Pigott et al. 1982; Pigott 1989) (Thornton et al: 2013, 4).

Since different areas of Tepe Hissar were studied separately, there was a need to integrate the final stratigraphic sequence of the site. This integration was particularly important due to the various terminologies used by different researchers. Dyson defined phases D-A for the northern terrace. Tosi identified phases 1-8 for the southern mound. Howard and Vincent Pigott classified the main mound into phases F-A, while Dyson (1987) provided a classification for the Hissar II period. Thornton and Dyson were able to create a unified stratigraphic sequence for the main and northern mounds through a review of the original field notes from 1976 (see Table 1; Thornton, 2009).

These excavations aimed to establish the first radiocarbon dating sequence at Tepe Hissar (approximately 4300-1800 BCE). In 1994 (1373 in the Iranian calendar), Hassan Rezvan conducted a study to determine the boundaries and protection zones of Tepe Hissar (Rezvan, 1994). In 1995, a rescue excavation led by Ehsan (Ismail) Yaghmaei was carried out by the Archaeological Research Institute of the Cultural Heritage Organization (ICAR) at Tepe Hissar (Salzmannn: 2016: 2). The most significant result of Yaghmaei's excavation was the discovery of a clay fragment bearing cuneiform signs, which had not been identified by Schmidt, Dyson, or Tosi (Roustaei: 2010: 615). However, the findings related to this material evidence were almost entirely unpublished (Salzmannn: 2016: 2). In 2009, Thornton and Dyson provided a unified stratigraphic sequence for this site. The revised chronology that they proposed for the fourth and third millennia BCE at Tepe Hissar eliminated the inconsistencies present in the 1976 dating and divided the site into phases F-A. Phase F was considered the earliest period at Tepe Hissar, dating from 3900 to 3700 BCE based on radiocarbon dating, while phases E-D and F-E were named transitional phases (Thornton et al., 2013). The excavations of the main mound by Pigott and Howard in 1976 provided the most complete vertical sequence at Tepe Hissar (Thornton: 2009, 74).

The most recent field research at Tepe Hissar was conducted by Kourosh Roustaei and his Iranian team from September to December 2006, aiming to determine the boundaries and protection zones of Tepe Hissar, investigate the geomorphology of the site, and explore the potential for continuous settlement up to the Iron Age) (Roustaei, 2006) (Salzmannn: 2016: 2).

In addition, Ayşe Gürsan-Salzmannn from the University of Pennsylvania Museum studied Schmidt's classification of the pottery remains from the main mound and the northern terrace using her original field notes and the results of the 1976 project. A significant part of her research involved compiling a database of pottery from the excavations of these two areas to examine changes in styles and forms of pottery throughout the fourth and third millennia BCE (Thornton: 2009, 72).

Fourth Millennium BCE

The fourth millennium BCE coincided with the emergence of complex societies and the formation of governments in southern Mesopotamia and southwestern Iran, spanning roughly between 4100 and 3200 BCE (Nekoei et al: 1393, 168). This period marked significant economic, social, and political transformations in the Iranian plateau and its surrounding regions. During this time, we witness the rise of the world's first urban centers, hierarchical administrative structures, and writing systems. These developments signal major changes in the social and political fabric of societies, which are interpreted as evidence of early states emerging and regional trade expanding—a long-term process that began in the late fifth millennium BCE. Iran

played a pivotal role in Western Asia, particularly as a center for long-distance trade in raw materials (Petrie: 2013: 1).

In the fourth millennium BCE, northeastern Iran experienced a period of complex interactions at both regional and trans-regional levels. For reasons that are not well understood, this border region was divided between the East and West for most of the late prehistoric period. Sites in the east showed closer ties with their northern and southern neighbors, while those in the west demonstrated stronger connections with their western counterparts, as seen in the sequence at Tepe Hissar. Helwing (2006) notes that Tepe Hissar's cultural affiliations shifted throughout this period. From 4000 to 3500 BCE, many of the cultural materials at Tepe Hissar displayed strong similarities with sites in the west, such as Tepe Sialk and Arisman. Between 3500 and 3000 BCE, this sphere of influence shifted to the north and east, with Tepe Hissar's cultural materials showing stronger connections with Gorgan and sites in northern Turkmenistan. Additionally, as discussed in the introduction to this article, communication between Tepe Hissar and the Namazgah sites in northwestern Turkmenistan and northeastern Iran was virtually non-existent until the third millennium BCE. Helwing's observations on the shifting cultural orientation of Tepe Hissar—from west to north/northeast—are largely accurate (Thornton: 2013: 5-6).

In terms of chronology, the fourth millennium BCE in Central Iran is divided into the Middle Copper and Stone Age (4000–3700 BCE), the Late Copper and Stone Age (around 3700–3400 BCE), and the Early Bronze Age (3400–2900 BCE). In the first half of the fourth millennium BCE, most settlements in northern Central Iran and northeastern Iran exhibited similar cultural materials. However, in the second half of the millennium, cultural uniformity in these regions decreased. After 3400 BCE, cultural dependencies in the Qazvin Plain shifted toward the central Zagros and northwestern Iran. Surveys and excavations in the Tehran, Kashan, Qom, and Arisman plains indicate that the use of Sialk III6-7 pottery was ceased around 3400 BCE and was replaced by Early Elamite cultural materials around 3300 BCE (Fazeli et al: 2013, 107).

Tepe Hissar in the Fourth Millennium BCE

The eastern region of Iran during the fourth millennium BCE was marked by three significant cultural developments that shaped the period. One key feature of the pottery from this time was the decorative designs, which became more elaborate with the addition of natural motifs, particularly animal figures. Gradual cultural integration appeared through smaller regional groups, expressed in distinct northern and southern styles, and reflected in the use of red and buff vessels. This transformation is evident in the emergence of new pottery styles, the result of advancements in production techniques, especially firing. The use of kilns with controllable, higher temperatures led to the production of gray pottery, first identified in Baluchistan around 3800 BCE, during the Togau A phase (Decardi, 1965). Although animal motifs disappeared by the mid-fourth millennium BCE, geometric designs continued from Hissar I into the early Hissar III period. This continuity in the pottery tradition of Tepe Hissar is culturally significant (Salzmannn, 2016: 78). The material culture indicates a settled, agricultural community that engaged in subsistence activities and household production, which evolved into mass production in workshops by the late fourth millennium BCE.

The new ceramic sequence fills an important gap in our understanding of cultural and chronological developments at Tepe Hissar and the northeastern region of Iran from the fourth to the late third millennium BCE. It provides strong evidence that the settlement became a center for urban crafts during this period, with cycles of abandonment when parts of the site were used as a cemetery. Overall, this new pottery chronology sheds light on the cultural evolution of Tepe

Hissar and its social and cultural implications, particularly in terms of material culture from both settlement and burial contexts.

In the second half of the fourth millennium BCE, Hissar became a major center for processing semi-precious stones such as lapis lazuli, alabaster, and carnelian, and for producing copper, lead, and possibly silver alloys (Tozzi, 1984; Tusi, 1989) (Thornton & Rehren: 2009, 24).

The first period at Tepe Hissar, which began in the second half of the 5th millennium BCE and lasted until around 3700 BCE, is referred to by Schmidt as the "decorated Pottery Period." The pottery from Hissar I, in contrast to the plain gray wares of later periods, featured matte-painted designs, though some vessels displayed simple motifs (Schmidt, 2012: 77). The architecture of this period consisted of mudbrick and wattle-and-daub houses built without any specific order. The walls were often coated with mud plaster, and the interiors included fireplaces and small storage areas (Schmidt, 2004).

During this period, the inhabitants produced various objects from baked clay, such as figurines, spindle whorls, and button-like seals. They also crafted stone tools (blades, drills, arrowheads, axes), as well as mortars, pestles, weights, and beads. Although copper was known, it was used primarily for simple items like needles, decorative beads, and occasionally knives and axes (Ibid, 303). Stamp seals, but no cylinder seals, were found in the first and second Hissar periods (Qaleh Hoseini, Nami, Rezaei: 2024, 29). Large copper seals appeared during the Hissar IIB period (Schmidt: 1937, 119), and human and animal designs were rare before the third Hissar period, with geometric motifs appearing consistently throughout all phases (Bennett: 1989, 128). The second period at Tepe Hissar began in the mid-fourth millennium BCE and is notable for new and distinctive pottery motifs, such as "spotted leopards," "schematic gazelles," and "alternating triangles," along with an increased presence of gray ware. This period also saw the first evidence of organized craftsmanship, with the introduction of tablets, seals, and other administrative tools (Thornton: 2009, 100). Only one relatively well-preserved building complex from Hissar II (B) has been uncovered on the southern mound. Unlike Hissar I, wattle-and-daub walls were less common in this period, with most structures being made of rectangular mudbrick (Schmidt: 2012, 159).

The Hissar II period, known for its gray pottery, was relatively short. According to Schmidt, construction practices in this period showed little change from earlier phases, though mudbrick was used more frequently. While some decorated pottery from Hissar I persisted, the gray pottery, particularly pedestal vessels, became a defining feature and did not continue into later periods (Ibid: 303-304). This period also saw a significant increase in copper objects, including mace heads, rings, bracelets, and earrings, along with small gold and silver items, some of the earliest discovered on the Central Iranian Plateau (Schmidt, 2003). Helwing suggests that there was no evidence of contact between Tepe Hissar and the Proto-Elamites of Sialk IV1 during this time, indicating that Hissar likely served as a production center and trade partner along a major route across the Iranian Plateau to the oases of Central Asia—outside the Proto-Elamite sphere of influence (Helwing: 2006, 46).

The third phase, beginning in the early third millennium BCE, was characterized primarily by gray pottery. In the early part of this phase, a jug-like vessel was common, while a canteen-shaped vessel became dominant by the end (Schmidt: 2003, 187). During this period, Hissar established connections with surrounding regions.

Hissar III is distinguished by the abundance and diversity of artifacts, mostly recovered from burials. Construction during this period, though more damaged than earlier phases, was most-

ly found on the elevated parts of the mound. A defining feature of this phase is the wealth of tombs filled with grave goods. The most well-preserved structure from this period is the famous "Burnt Building" from Hissar IIIB, discovered in the "Northern Area" and named for the burn marks and ash found on its floor (Ibid: 182-187). Three cylinder seals from Hissar IIIB were found among the Tepe Hissar seal collection, which Schmidt attributed to imports from Mesopotamia or Elam (Qaleh Hoseini, Nami, Rezaei, 2024: 29). The seals became more varied and symbolic in this period (Afsharfar, 2010: 14). Schmidt suggested that the lack of remains from Hissar III in the decorated Pottery phase indicates that the final phase of Tepe Hissar was smaller but more densely populated than previous ones.

Changes in pottery production at Tepe Hissar were not caused by large-scale population migrations, as previously thought when gray pottery was associated with Indo-European migrants during the Hissar II and III periods (Schmidt 1937; Ghirshman 1954; Deshayes 1968, 1969, 1977). Instead, it is now believed that the pottery at Tepe Hissar was locally produced, based on the uniformity in production techniques and the continuity of forms and some decorative motifs from late Hissar I to Hissar III (Salzmannn: 2016, 73).

Squares	Ceramic Phase	Date Range (BC)	Revised Period
Pinnacle (lots 4–1) (MM	B-A/A Late Bronze Age	ca. 2200–1800	Late Hissar I
Pinnacle (lots 8–5), DG20 ovens (MM); Burned Bldg. CF46–47 and 56 (NF	B Middle Bronze Age	ca. 2500–220	Mid-Hissar III
Below Burned Building (phase B) (NF)	C (earlier than phase B in NF); only walls 40–41 in MM	GAP (NF) 2900–2500 (MM	
Pinnacle (lots 12–10) Building 3 (upper) (MM); CF58 /2/ and /3/ (burned rooms) (NF)	D-C (Transitional)	ca. 3100–2900	Early Hissar III Late Hissar I
Pinnacle (lots 15–13) and Building 1 upper (MM); CF48/14/, CF57 (NF	D Bronze Age	ca. 3350–3100	Mid-Hissar II
Pinnacle (lots 17,16) (MM); CF57 TT lots 1,2), (NF	E-D (Transitional) Transition to Bronze Ag	ca. 3400	Early/Mid-Hissar II
CF57 TT lot 3, (NF) CF57/16, (NF)	E	ca. 3650–3400	Early Hissar II
DF09 deep sounding, lots 9, 14 (MM)	F-E (Transitional) Terminal I	ca. 3700	Late Hissar I–Early Hissar II
DF09 deep sounding lots 16, 15 (MM)	F	ca. 3900–3700	Early Hissar I

Table 1: The new Ceramic Sequence and Stratigraphic Context from the Main Mound (MM) and the North

Pottery of Hissar I

The pottery of Hissar I can be divided into the following categories:

Hissar IA: Handmade vessels with linear designs or, less frequently, simple curved patterns. No animal motifs are present during this phase. The designs are executed in dark gray on a brownish-red background.

Hissar IB: Wheel-made vessels with a few handmade pieces from Hissar IA. In this phase, motifs of gazelles, particularly rows of birds and human figures, begin to appear on the pottery. The

most distinctive motif is the vegetal scroll or palm tree. Apart from the vessels of Hissar IA type, the designs are painted in dark brown on a generally light brown background.

Hissar IC: Wheel-made vessels with dark brown designs on a light brownish-gray background. The dominant motif during this period is the wild goat, with feline motifs, possibly leopards, emerging towards the later part of this phase.

Pottery of Hissar II

The second period at Tepe Hissar begins in the mid-fourth millennium BC. This period is marked by the emergence of new and distinctive motifs, such as "spotted leopards," "schematic gazelles," "alternating triangles," and others. Gray pottery becomes more prominent, and the first signs of organized craftsmanship appear in the form of tablets, seals, and other administrative management symbols (Thornton: 2009, 100).

This period also shows the first evidence of continuous contact between Hissar and the sites of the Gorgan Plain. This era is marked by the appearance of engraved and embossed gray pottery, along with what may be "black-on-red Caspian pottery" from the main mound (obs. pers. 2007). Additionally, the "alternating triangle" motifs are observed at sites in Gorgan (Abbasi: 2007, 257).

Almost all of the decorated pottery and the distinctive gray pottery from Hissar II were found in burial contexts. Therefore, it is certain that these potteries belong to the final phase of the decorated pottery period, which overlaps chronologically with the early phase of the gray pottery period (Schmidt: 2012, 159).

In Hissar IIA, wheel-made pottery features the same color scheme as Hissar IC, with gray designs on a brownish-red background. The motifs closely resemble those of Hissar IA. There are also red or brown vessels with a clay coating that often flakes off. The gazelle motif appears in a highly stylized form with exaggerated necks, while the leopard motif begins to decline, but remains similar to those seen in late Hissar IC and is still common in this phase. The gray pottery found alongside the late decorated ware is similar to that of Hissar IIB (Schmidt, 2012: 77-78). The surface color of the gray pottery in Hissar II is darker than that of Hissar III (Ibid: 167).

In Hissar I graves, painted and decorated pottery was predominantly found, whereas in Hissar II, gray luster pottery was often found alongside decorated ware.

Pottery of Hissar III

The emergence of plain gray pottery, followed by the disappearance of decorated pottery (except for a few remnants), marks the beginning of Hissar III. The distinction between Hissar II and Hissar III is recognized by changes in the key pottery shapes. Bottles, jugs, vases, elegant bowls, and flasks (towards the end of the period) are the main forms in Hissar III. Hissar IIIA represents the transitional period from Hissar II to Hissar III (Schmidt: 2012, 251). While animal designs mostly disappear by the mid-fourth millennium BCE, geometric patterns persist from Hissar I through the early phase of Hissar III, which is also significant from a cultural perspective (Salzmannn: 2016, 78).

Pottery Chronology at Tepe Hissar

Phase F (Early Hissar I, 3900–3700 BCE):

Five distinctive types of pottery in this phase include coarse vessels, grayluster, decorated buff, plain buff, and red vessels, most of which are handmade. The most common type is dec-

orated buff vessels (66%), followed by plain buff and red vessels (13.3%). Coarse vessels are less common (6.7%) (Salman, 2016: 82). According to Piggott, findings from this period include several pieces of gray pottery found among undecorated coarse vessels, along with geometric and linear black designs on buff and black-on-red pottery (Thornton: 2009, 4).

Most of the vessels in this phase were handmade. During this period, the slow-wheel technique was utilized to create thin-walled vessels, particularly in the case of decorated buff pottery (Salzmann, 2016, 82). A small percentage of sherds were made on the slow wheel. Buff painted goblets and stemmed vessels have linear and geometric designs, generally ladder and tree motifs. In the following transitional phase F-E, the ibex and feline, as the iconic motifs of this phase are incorporated to the continuing geometric motifs (see Fig. 3: 1-7). The reconstructed forms are, (1) large storage jar, (2) pedestal bowl/goblet, and (3) bowl/cup (Salzmann: 2016, 82). Gray stoneware is missing, as in the earlier phase F. Gray burnish ware is minimally present (2%, not represented In Figs. 3: 3-4) (Ibid: 86).

Transitional Phase F-E (Late Hissar I - Early Hissar II, 3700 BCE

In the transitional phase F-E, the pottery is similar to that of phase F but with slightly more complex forms and geometric/linear designs, including checkerboard patterns (see Figure 6) (Thornton: 2009, 75-76). Many of these motifs resemble those found on pottery from Sialk phases 5-6 (Ghirshman, 1938, Pl. XI). For the first time in this phase at Hissar (at least in the limited sequence observed by Piggott), zoomorphic motifs, particularly felines like spotted leopards, begin to appear. This marks the characteristics of Hissar IC, as described by Schmidt (Thornton, 2009) (Thornton et al.: 2013, 4).

In phase F-E, the motifs of wild goats and felines are combined as symbolic designs alongside geometric patterns. The forms that are reused include: (1) large storage jugs, (2) bowls and pedestal cups, and (3) cups/mugs (Salzmann: 2016, 82).

The pottery collection from the transitional F-E phase introduces two new vessel forms: wide-based bowls and cone-shaped cups with pointed bases. These shapes are found in coarse, plain buff, decorated buff, and gray luster pottery. Thus, during this phase, black-on-red decorated pottery becomes a fundamental component of the collection, following plain and decorated buff pottery (Thornton: 2009, 76).

Among the technological innovations in this phase are the frequent use of the potter's wheel to achieve thinner walls, higher firing temperatures, and a temper primarily consisting of sand/gravel. The four new forms of pottery include: (1) cone-shaped cups with a pointed base in buff and decorated buff pottery, (2) wide bowls in buff, decorated buff, and red pottery, (3) large storage jugs with a straight or rail rim in coarse pottery, and (4) large wavy bowls in decorated buff pottery (Salzmannn: 2016, 82).

Phase E (Early Hissar II, 3650-3400 BCE)

This phase corresponds with Dyson's Hissar II period (1987). During this phase, vessel forms and motifs from the earlier transitional phase F-E reappear, such as pedestal bowls, wide-based bowls, and large storage jars with rail rims. Pedestal bowls feature more complex geometric designs. These include hanging triangles and hatched circles arranged in horizontal bands. Key motifs of Schmidt's Hissar IIA phase include abstract representations of animals such as cats, wild goats, and birds on decorated buff pottery.

The animal motifs on buff pottery evolve into abstract depictions of gazelles, felines, and possibly giraffes in motion, framed by horizontal bands (Fig 3: 8). Another feature of these vessels

invenchery	form	ware	slip	temper
200,218	Pedestal Bowl/Goblet	BP	●	sand and grit

Decoration:
wheelmade; everted wall; tree pattern alternate with vertical waves from rim to base

Fig 3-1

invenchery	form	ware	slip	temper
302	Pedestal Bowl/Goblet	BP, R	●	sand

Decoration:
wheelmade; everted wall; ladders in zigzag alternate with leopard in registers, interior circle with dots, (droppings)

Fig 3-2

invenchery	form	ware	slip	temper
698b,c	Pedestal Bowl/Goblet	BP, R	●	sand

Decoration:
wheelmade; carinated belly; brown triangles stacked, right side and upside down, filled with dots, stylized leopards

Fig 3-3

invenchery	form	ware	slip	temper
626, 668	Pedestal Bowl/Goblet	BP	●	sand

Decoration:
wheelmade; everted wall; carinated belly; panels of dotted triangles alternate with dotted vertical panels

Fig 3-4

invenchery	form	ware	slip	temper
1182, 1193a–c	Pedestal Bowl/Goblet	BP	●	sand

Decoration:
wheelmade; everted wall; feline and hatched lozenges in register

Fig 3-5

invenchery	form	ware	slip	temper
746,623,660	Pedestal Bowl/Goblet	BP	●	sand and grit

Decoration:
wheelmade; brown stylized gazelles, alternate with tree design

Fig 3-6

invenchery	form	ware	slip	temper
1190b,1127	Pedestal Bowl/Goblet	BP	●	sand

Decoration:
wheelmade; everted wall; carinated; birds in flight in vertical rows; brown bands below

Fig 3-7

invenchery	form	ware	slip	temper
NF47	Cup/Bowl	BP	●	sand

Decoration
wheelmade; carinated belly; long necked gazelles under rim

Fig 3-8

invenchery	form	ware	slip	temper
NF69	Cup/Bowl	R	●	sand and grit

Decoration
wheel- and handmade; carinated belly; wide horizontal band along belly

Fig 3-9

invenchery	form	ware	slip	temper
NF74	Cup/Bowl	R	☐	?

Decoration
wheelmade; carinated belly; band around interior rim wide vertical bands from rim

Fig 3-10

invenchery	form	ware	slip	temper
NF75	Cup/Bowl	R	●	?

Decoration
wheel- and handmade; band around exterior and interior rim, vertical diagonal band

Fig 3-11

invenchery	form	ware	slip	temper
NF76	Cup/Bowl	R	●	?

Decoration
wheel- and handmade; carinated belly; black band around interior rim diagonal bands exterior

Fig 3-12

invenchery	form	ware	slip	temper
NFvv	Cup/Bowl	R	?	?

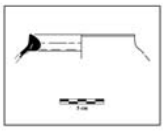
Decoration
wheel- and handmade; inverted wall; black band around rim interior and exterior, diagonal bands from rim on exterior

Fig 3-13

invenchery	form	ware	slip	temper
4668	Jar	c	●	chaff and grit

Decoration
handmade; outcurving rim, extra clay on interior rim

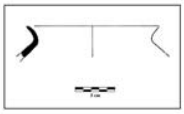
Fig 3-14



invenchery	form	ware	slip	temper
4445	Jar	C	●	chaff and grit

Decoration
wheelmade; outcurving rim, short neck

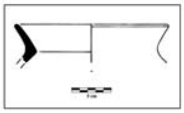
Fig 3-15



invenchery	form	ware	slip	temper
4470	Jar	C	●	grit

Decoration
outcurving rim, long neck

Fig 3-16



invenchery	form	ware	slip	temper
2196a	Conical Cup/Bowl	BP	●	chaff and grit

Decoration
wheelmade; reddish vertical bands below rim; pointed base

Fig 3-17

invenchery	form	ware	slip	temper
2447	Conical Cup/Bowl	BP	●	chaff and grit

Decoration
wheelmade;orange-brown vertical bands below rim, horizontal band near base, pointed base

Fig 3-18

is the presence of reddish-brown bands on the outer rim and belly of everted bowls (Fig 3: 9-13). The gray luster pottery has a fine fabric and a shiny metallic light-gray appearance. The addition of rail rims and necks is a characteristic that starts in the earlier phases and continues into the early 3rd millennium BCE (Salzmannn: 2016, 111-112).

Two significant innovations in pottery production are observed during this phase: the presence of slag in the clay and a metallic gloss on the surface of gray pottery, which resembles metalware. These changes may indicate increased metallurgical activity and metal object production at Hissar (Ibid , 98). The linear and geometric motifs from the previous phase continue, including prominent "hanging triangle" designs (Schmidt, 1933: pl. LXXXII, H1559).

Noteworthy motifs from this phase include classic Hissar IIA-IC designs like spotted leopards (Schmidt, 1937: pl. VIII, H4478) and wild goats with curving horns (cf. Schmidt, 1937: pl. X, H802). In the late layers, classic Hissar IIA motifs like "schematic gazelles" (cf. Schmidt, 1937: pl. XX) and IIB motifs, such as crossed circles above alternating triangles, appear (Thornton, 2009, 76). During phase E, red pottery sharply declines (Salzmannn: 2016, 111).

Phase E can be divided into an early and a late sub-phase. In the early sub-phase, significant evidence of soapstone and calcite craftsmanship was found among the decorated pottery with a buff-colored coating, which often featured zoomorphic motifs similar to the felines depicted in the previous phase. Large striped triangles were often painted "hanging" from the edge of many red vessels during this period. In the late sub-phase, the masterfully crafted zoomorphic motifs were replaced by more abstract designs resembling "long-necked gazelles" (Schmidt Period IIA) and combinations of hatched circles with alternating rows of triangles (from Schmidt Period IIB). This motif, which extends into the 'E-D transitional period,' resembles the pottery designs of phase III7 of Sialk (Ghirshman, example cited on Pl. LXXII #38: 1938) (Thornton et al.: 2013, 4).

Transitional Phase E-D (Early and Middle Hissar II) 3400 BCE

During this period, which marks the transition to the Bronze Age, various types of vessels appear with notable shifts in the types of vessels produced. Decorated pottery is only found in buff vessels. However, after the mid-fourth millennium BCE, these vessels are gradually replaced by gray luster and coarse vessels, which became common in the subsequent phase (D). The only newly introduced forms are braziers and miniature jars.

Other continuing forms include storage jars with a ribbed rim, plates/trays, and wide bowls. Some jars are made on a slow wheel and are likely smoothed by hand, but the plates/trays and wide bowls are still made with handmade molds (Salzmann: 2016, 99).

In this phase, we see the first signs of "handles" and "embossed patterns" as decorative motifs on gray luster vessels (Schmidt 1937, pl. XXVI H4783) and "stripes" (Ibid, p. H5118 XXVI). These motifs are increasingly utilized in the later phases D-C to B (Ibid, 110). Most of the GB vessels have a "metallic" luster (Ibid, 110-111). The red and decorated buff vessels decline in this phase compared to phase E, while gray luster vessels experience a significant increase. Some jars in C ware are made with a short neck that rest on carinated shoulders and have plain everted rims (Figs. 3: 14, 3: 15-16).

Two major changes occurred during this period. First, supports appeared for the first time in mud-brick architecture (see Dyson 1987, p. 659). Second, gray vessels became more common compared to decorated vessels (especially decorated buff vessels). Some motifs, such as hatched circles (often without alternating triangles), clearly continue on the surfaces of phase

D, while others, like hanging striped triangles and zoomorphic images, disappear in the transitional phase E-D (Thornton et al.: 2013, 5).

There are several interesting aspects of the transitional phase E-D at the main mound. First, in the pottery discussion from 10/CG90/Section 28, Howard notes in his field notes: The pottery from Section 28 is significantly different from the pottery in Areas 1 and 8 [referring to "Phase D3" or early phase D]. The pottery is finer, clinkier, and includes a high percentage of decorated fragments. In fact, this piece contains a mix of black-on-buff pottery from phase E (for example, intersecting circles and alternating triangles), new motifs from the transitional phase E-D such as "alternating tongues" (see Schmidt 1937, pl. XXVI), and styles of gray vessels from IIB Hissar, including engraved gray vessels (see Schmidt 1937, pl. XXXVIII H4260), raised ridges on stemmed vessels (see Schmidt 1937, pl. XXV H5070), and flaring rims on stemmed-out vessels (Schmidt 1933: pl. XCVII H1664). Overall, Howard's initial assessment of the pottery from this phase indicates a relatively significant cultural change around 3400 BCE, perhaps when gray vessels became more dominant.

Phase D (Middle Hissar II) 3350-3100 BCE

In this phase, marking the entry into the Bronze Age, gray luster vessels dominate. Notably, all pottery types from phase E-D are still found in phase D. The only two new forms are gray luster bottles and wide-mouthed jars made from gray and gray luster stoneware (as shown).

Bottles continue until the mid-third millennium BCE (Phase B), with minor changes in profile (spherical, wavy, and oval) and in vessel coating (see also lower phase B). It is wheelmade with, well-levigated paste, and is high fired. The conical cup/bowl has a rounded base and is painted in light brown/orange with wide or wavy bands extending from rim to midpoint enclosed within hori- zontal bands, as observed in the earlier E-D phase (Figs. 3: 17-25). The potters continue to use the early repertory of motifs such as “opposing tongue,” hatched circles and hanging triangles between bands, and a net pattern (Figs. 3:26-27).

Early technological innovations in firing control, glazing, surface coatings, and wheel usage for producing thin-walled vessels continue in this phase. These features are particularly evident in decorated buff vessels and gray luster vessels. In phase D, gray luster vessels with a "metallic" luster and gray stoneware are examples of high-fired ceramics (Salzmannn: 2016, 111).

Continuing forms in phase D include: pedestal bowls, spherical bowls, storage jars, wide-based bowls, plates/trays, braziers, cups, and mug/bowls. However, the most common shapes found from this phase are conical cups in decorated buff vessels.

The conical cup: decorative motifs include more refined examples of animal figures from the earlier phases E and E-D (such as mountain goats and felines), along with complex geometric and floral motifs that cover most of the outer surface of the vessel (Figs. 3: 17-25).

Beneficial veins in C vessels are common. Notably among them are storage vessels with ribbed rims and wide bowls (such as pedestal bowls, wide-based bowls, spherical bowls, and large/small jars). More practical vessels are commonly found in coarse wares.

Transitional D-C (Late Hissar II - Early Hissar III) 3100-2900 BCE

In the transition from Hissar II (Phase D) to Hissar III (Phase D-C), gray luster vessels decrease from 35.8% to 30%, coarse vessels rise from 19.4% to 26.6%, and red vessels decrease from 1.5% to 0.8%. Plain and decorated buff vessels also show a slight decline, from 28.9% to 22.6%. Two new forms in this phase are goblets with tulip-shaped designs and wide-mouthed jars

invenchery	form	ware	slip	temper
5210,5224	Conical Cup/Bowl	BP	flaking	sand

Decoration
wheelmade; panel of wavy bands below rim, painted band along rim interior; pointed base

Fig 3-19

invenchery	form	ware	slip	temper
4262	Conical Cup/Bowl	BP	●	grit and chaff

Decoration
handmade; panel of wavy bands below rim, painted band along rim interior

Fig 3-23

invenchery	form	ware	slip	temper
5229	Conical Cup/Bowl	BP	flaking off	sand

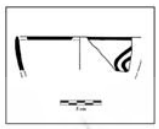
Decoration
wheel- and handmade; wavy bands below rim; pointed base

Fig 3-24

invenchery	form	ware	slip	temper
5292	Conical Cup/Bowl	BP	●	grit

Decoration
wheelmade; part of ibex horn in orange

Fig 3-25



invenchery	form	ware	slip	temper
5262	Conical Cup/Bowl	BP	●	grit

Decoration
wheelmade; horizontal bands below rim; pointed base

Fig 3-20

invenchery	form	ware	slip	temper
5252	Conical Cup/Bowl	BP	☐	-

Decoration
inverted wall

Fig 3-21

invenchery	form	ware	slip	temper
5283	Conical Cup/Bowl	BP	●	sand and grit

Decoration
wheelmade; below rim are: circles with cross hatching, horizontal bands, chain motif; pointed base

Fig 3-22

invenchery	form	ware	slip	temper
5273	Conical Cup/Bowl	BP	●	sand and grit

Decoration
wheelmade; dark brown net in circles and hanging triangles between bands

Fig 3-26

invenchery	form	ware	slip	temper
H76-33	Conical Cup/Bowl	BP	flaking off	chaff and grit

Decoration
wheelmade;below rim registers of motifs: horizontal waves circles with cross hatching enclosed in bands another band of cross hatching

Fig 3-27

invenchery	form	ware	slip	temper
3061	Jar	C	●	grit

Decoration
handmade; two ledge handles attached to jar

Fig 3-28

invenchery	form	ware	slip	temper
2869	Jar/Canteen Lug Handle	C	☐	-

Decoration
circular lug handle attached to jar

Fig 3-29

	Late Hissar I (F)	Late Hissar I Early Hissar II (F-E)	Early Hissar II (E)	Early- Mid Hissar II (E-D)	Mid Hissar II (D)	Late Hissar II (D-C)	Mid Hissar III (B)	Late Hissar III (B-A/A)
B	13.3	6.1	4.5	2.5	9	16.1		25
BP	66.7	53	42.7	29.9	19.9	6.5	8.3	
R	13.3	28.6	31.5	10.2	1.5	0.8		12.5
C	6.7	10.2	7.9	17.8	19.4	26.6	33.3	25
GS			1.1	8.3	13.9	14.5	25	
GB		2	11.2	31.2	35.8	30.6	33.3	25
G			1.1		0.5	4.8		
Total	n=15	n=49	n=50	n=157	n=201	n=124	n=12	n=8

Table 2: Overall Percentage Frequency of Wares by Phase (1976)

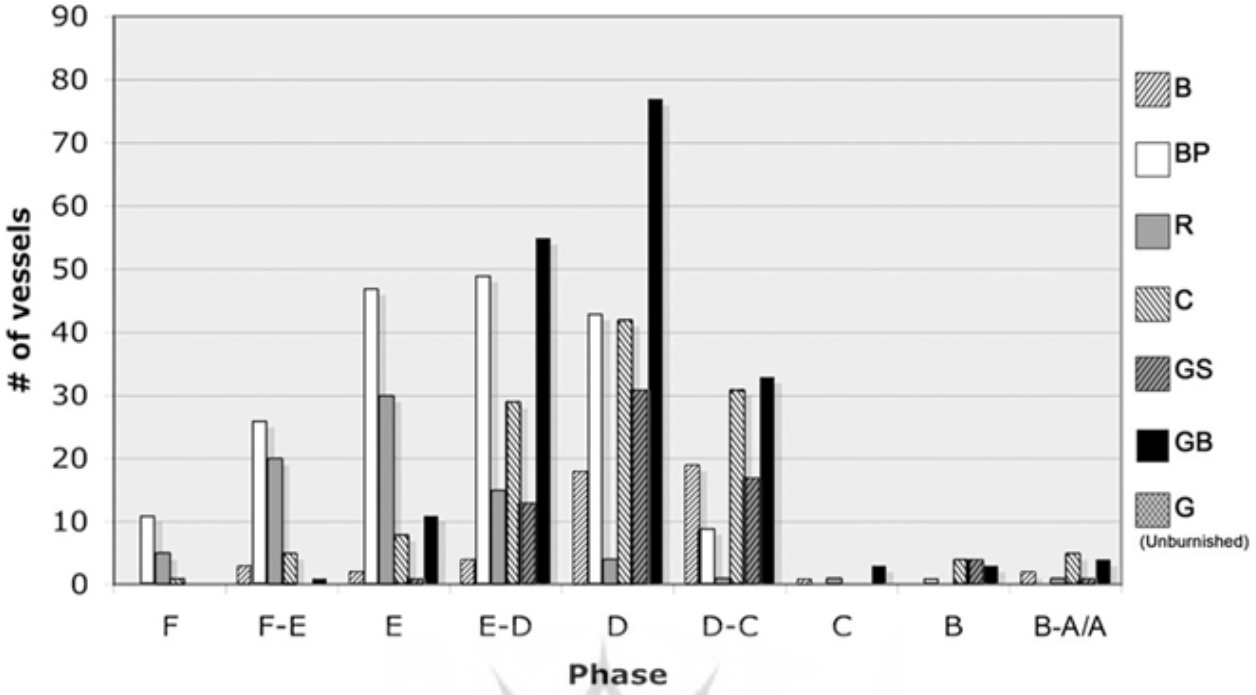


Fig 30: Graph showing the quantity of vessels associated with wares through all phases.

(Salzmann: 2016, 126).

A rare feature in phases D and D-C is the circular lug handle attached to the body of coarse table wares or jars (Fig 3: 28-29). Similar to the previous phase D, in addition to miniature vessels, most old forms continue in this period, including cups, goblets, jars, pedestal bowls, and tall-stemmed bowls, which are generally seen in plain and decorated buff vessels, as well as coarse and gray lusterwares. All types of previous forms are found in the transitional D-C phase (Ibid, 113).

Only four out of seven vessel types occur frequently in this phase: gray lusterware, gray stoneware, plain buff, and coarse vessels. Gray luster and coarse vessels peak in this phase, while decorated, gray, decorated buff, and red vessels appear in smaller percentages.

Table 2 gives an overall frequency of wares, and Figure 3.30 shows the quantity of vessels associated with wares through all phases.

Regional and Trans-Regional Connections

The fourth millennium BCE in northeastern Iran witnessed a period of complex interactions at both regional and trans-regional levels. For reasons that remain unclear, this border region was divided between the East and West for much of the later prehistoric period, with sites in the East being closer to their northern and southern neighbors, while sites in the West showing stronger connections with their western neighbors.

Research on the development of early complex societies during the fourth millennium BCE has been one of the main focuses of Near Eastern archaeology in recent decades (Helwing: 2006, 39). During the fourth and third millennia BCE, several sites began to develop into regional centers and small towns. This development led to significant changes, marking this period as a dynamic phase in the cultural history of human societies (Rousatei: 2004, 222). In the first half of the fourth millennium BCE, most settlements in northern Central Iran and northeastern

Iran show similar cultural materials, while in the second half of the fourth millennium BCE, the degree of cultural uniformity in these regions changed. During this period (3500-3000 BCE, the Sialk III6-7 period), Hissar's connections with Central Iran communities were cut off, and this sphere of influence shifted northward (to the Gorgan Plain) and northeastward. The study of Hissar's material culture shows a strong connection with these areas (Thornton et al.: 2013, helwing, 2006,).

Cultural interactions based on characteristics such as pottery, figurines, and metal objects between the inhabitants of Hissar in the fourth millennium occurred with various regions of Central Iranian plateau. Subsequently, in the second half of the fourth millennium, these interactions shifted toward northeastern Iran and the Gorgan Plain, leading to the formation of extensive intra-cultural and trans-cultural relationships that reflect the cultural dynamism of Hissar throughout the fourth and third millennia BCE. Additionally, since in the second half of the fourth millennium, metalworking and the processing of gemstones (especially with lapis lazuli) were conducted on a large scale and organized centrally in Hissar, this led to a greater social distinction in the site (evident in the wealth accumulation seen in the burials of "elites"). Perhaps during this period, the sites in the lowlands of the Gorgan Plain, due to resource scarcity, became the main consumers of the products produced in Hissar. This significantly reduced the need for Hissar artisans to trade their products to the west (Thornton et al.: 2013, 6).

The new ceramic sequence fills gaps in our understanding of cultural and chronological developments at the Hissar site and in northeastern Iran more broadly, from the fourth millennium to the late third millennium BCE. There is strong evidence that the settlement became a center for urban handicraft industries during this period, as well as for periods of abandonment when parts of the site were used as a cemetery. Overall, the new pottery chronology offers a reinterpretation of the cultural developments at the Hissar settlement and their social and cultural implications within the framework of material culture from both settlement and burial contexts.

The material culture attests to the ancient settlement as part of an active agricultural society whose population was engaged in everyday subsistence activities and the home production of tools and handicrafts, which later transitioned to mass production in workshops by the late fourth millennium BCE. The emergence of seals, tablets, significant changes in architectural style, and a noticeable increase in economic activities all indicate a complex society in Hissar. The specialized development of industry and the use of a controlling administrative system for production and trade have been highlighted throughout the fourth millennium BCE.

Tepe Hissar was part of the so-called "interaction sphere" of Central Asia, spanning from the early fourth millennium to the beginning of the second millennium BCE. This cultural sphere covered a vast area from southern Mesopotamia to the Indus Valley, including Iranian plateau, the Persian Gulf region, Afghanistan, and western Central Asia, where powerful political-economic systems were established around 3500 BCE. At Tepe Hissar, regional and intra-regional interactions with Central Asia and Mesopotamia are demonstrated based on material cultures, administrative systems, and prestige objects, particularly from burial evidence on the main mound and treasure hill, as well as from settlement levels on the main mound, the northern expanse, and the southern hill (Ibid, 7). During the early fourth millennium BCE, sites in Iranian plateau, engaged in a process of specialization in the production of specific materials (Helwing: 2013, 509). Tepe Hissar also emerged as a major center for copper, lead, and semi-precious stones throughout the fourth and third millennia BCE, situated on the northern edge of the desert and along the Great Khorasan Road (Helwing: 2006, 36).

Conclusion

During the fourth millennium BCE, there was a period of complex interactions at both regional and supra-regional levels in northeastern Iran. Like other prehistoric cultures in the area, the Tappeh Hissar site underwent its own unique archaeological developments and participated in cultural exchanges with other prehistoric sites in the region, leaving behind evidence of both intra-regional and supra-regional cultural interactions. Based on material and technological evidence, particularly quantitative and qualitative changes in pottery, it can be asserted that the Hissarsite experienced a series of social changes and cultural interactions during the fourth millennium BCE.

These transformations were influenced by various endogenous and exogenous factors across spatial and temporal dimensions, including Hesar's political and economic role. Due to its strategic location, Hissarbecame an important site for East-West trade routes between southern Mesopotamia, the Iranian Plateau, and Central Asia during the fourth and third millennia BCE. Studies and evidence indicate that these cultural interactions, based on cultural markers such as pottery, figurines, and metal objects, also reflected different political and cultural orientations between Hesar's inhabitants and various regions of the central Iranian Plateau during the fourth millennium BCE. In the latter half of the fourth millennium, these interactions shifted towards northeastern Iran and the Gorgan Plain, resulting in broader intra- and inter-cultural relationships, showcasing the cultural dynamism of Hissarduring the fourth and third millennia BCE.

Additionally, during this period, large-scale, centrally organized production of metal and gemstone (especially lapis lazuli) industries occurred in Hesar, contributing to greater social stratification, as seen in the wealth accumulation in elite burials. As Thornton suggests, during this time, the lowland sites of the Gorgan Plain, likely due to resource scarcity, became major consumers of Hesar's production, significantly decreasing the reliance of Hesar's artisans on trade to West.

Conflict of Interest: The authors declare that they agreed to participate in the present paper and there is no competing interests.

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