Petrographic Analysis of Early Transcaucasian potteries from Tepe Gourab, Western Iran

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Abstract
In the middle of the fourth millennium, a distinguished culture was formed in the region Caucasus and it was extended at the beginning of the third millennium in a large area ended to Tehran plain, and the southern coast of the Caspian Sea from the east and to the coast of the Mediterranean Sea from the west. This culture, which has enjoyed a significant homogeneity, has been referred to as various names, including Transcaucasia culture, Kura-Araxes, Yanik, Karaz, and Khirbet Kerak. This cultural homogeneity and its geographical expansion led to the formation of broad debates among archaeologists in the short period of time. Such ideas as development, imitation, trade, and migration are amongst the main justifications for this issue. This culture is characterized with its unique pottery. In this study, the ideas and beliefs around this culture were taken into account and the Kura-Araxes pottery texture of Tepe Gourab in Malayer was studied by petrography. The study of pottery of this area showed that the pottery is consistent with the soil texture and geology of the area. It was also revealed that the pottery has been produced in the area and it has not been imported from Caucasus to the area as a result of trade and commerce. In conclusion, a reason other than trade should be emphasized for the expansion of this type of pottery.

Keywords: Kura-Araxes, exchange, Gourab, pottery, petrography

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Introduction

Archaeologists recognize Bronze Age in Iran and the Middle East with the rise of stratified societies and the emergence of governments and urbanization along with another complex set of changes. The traditional emergence of a pottery with features unique and quite different from the previous period in the North West of Iran is one of the most important issues in the archeology of Iran’s Bronze Age. This tradition of pottery, which is known by different names such as Transcaucasia culture, Kura-Araxes, Yanik, Karaz, Khirbet Kerak, and Shengavit, has been found in a large area of the northern plateau to the Levant region and also from the North Caucasus region of Dagestan and Chechnya to Harsin, Kermanshah (Alizadeh, 2010). This culture has apparently originated from the area between the two rivers, Kura and Araxes (Burney, 1962; 1964; Kohl, 2009) and then, this culture was spread to adjacent areas during its second period (Early Transcaucasia II) (Burney & Lang, 2007, Ajorlou, 2004). The first archaeologist who paid attention to this pottery was Saifullah Kambakhshfard whereas this pottery was not welcomed that much Iranian archaeologists (Alizadeh, 2010). Although this culture is known as Yanik culture in Iran, this site was not the first excavated site with Kura-Araxes evidences, Indeed, the initial activities around this pottery were conducted by Burton Brown while he was carrying out excavations in the Geoy Tepe (Tala’i, 2006: 79, Brown 1951). Although this pottery had been identified in Caucasus previously by the studies of Kuftin, the Russian archaeologist, the great number of Bernie studies in Yanik Tepe and the existence of a proper sequence of Early and middle Bronze in Yanik Tepe followed by the publication of the results led the culture to be known with this name in Iran (Fig 1).
Kura-Araxes culture in brief

Despite the availability of the variety and spread of the areas wherein this culture has been found, they share many cultural similarities together that have been introduced by Kiguradze and Sagona as follows:

Architecture with direct, semi-direct, and circular walls made up of adobe or reed and Carest coating; fixed and portable hearths, often in the form of man or animal; a variety of handmade scathing pottery with contrasting colors of black, gray, brown, and red and sometimes with ornamentations; tools made of bone; statuettes of horned animals; and simple metal objects (Kiguradze and Sagona 2003).

There are several different ideas about its origin. Kuftin limits the origin of this culture to the waters and streams between the two rivers of Kura and Araxes (Alizadeh, 2010). Dzhaparidze introduces South and Central Transcaucasia as the origin of this culture. Khanzadyan, Arshian, (Abedi 2011: 88) and Charles Burney referred to Eastern Anatolia and Elazig region and noted that the central valleys of Araxes river have been center of this transfer. Burton Brown introduces Azerbaijan region as the origin of this culture and Issen introduces the West Azerbaijan and the Eastern part of Georgia as its origin (ibid 2011).
One of the basic questions is about the way the Kura-Araxes culture has been spread. Is this phenomenon the result of the migration of people from Transcaucasia? Or is it the result of the trade of metallurgy technology and mining or the import of the pottery belonging to this culture by the people of other places? Have the local potters of Anatolia, the Levant, Iran and other places made these tools via local and aboriginal methods or have they imitated exotic styles or have these tools been imported by immigrants from the Caucasus to these regions? Or, have all of these developments been made in different areas and at different times (Batiuk and Rothman 2007)?

Several theoretical approaches have been mentioned in terms of the development and expansion of the Kura-Araxes culture as follows: immigration, trade, followed by the release of the tools via imitation of their styles or simulation of them by local builders. Immigration or "the movement of groups or individuals from their original living place to somewhere else" can be considered as the outcome of the negative factors of the source location (push) of migration and the positive factors of the destination (pull) of migration (Batiuk 2005). These negative pushing factors could include lack of suitable lands, population growth in the source location of migration, undesirable climatic conditions and/or proper economic opportunities in the migration destination.

A large number of Kura-Araxes sites in Transcaucasia and the North East of Anatolia, along with the signs of sudden abandonment of some of these areas confirm the theory of culture change activities and have probably been a major motivation for the move by ethnics. The approach entitled “Ripples in a stream” is expressive of the point that the social organizations of immigrant groups had been separately divided into smaller groups which had been derived from a larger population group and had still retained the cultural similarities of that larger group (Rothman, 2003).

There is another possibility that many of the tools of this culture used in Anatolia or Iran were built in Transcaucasia and then, were traded in other areas; however, releases and innovations also could cause these changes without being built in Transcaucasia (Abay, 2005).
Imitation and simulation, and the use of exotic styles by local people, and the simulation of the cultural materials of Kura-Araxes culture are very likely to play a major role in the emergence of this cultural complex (Kura-Araxes tools) in a very vast geographical district. Professional itinerant potters from Transcaucasia have possibly had an important role in the initial expansion of this culture until the Transcaucasians have permanently settled in different regions.

**Kura-Araxes culture in Iran**

In Iran, Kambakhsh Fard was the first Iranian archaeologist who noticed this particular type in 1967 while it had not received any attention previously (Alizadeh, 2010). This pottery was well studied and introduced by Burney excavation and, then, was known as Yanik. This culture was also identified in Haftavan, Geoy Tepeh, Hasanlu, Gijalar, and Kul Tepe Jolfa (Abedi, 2011). Ancient Bronze Age sites of the Northwest of Iran have been frequently studied (for example, see Sagona, 1984; Summers, 1982; Omrani, 2005; Abedi, 2011). This pottery was also identified in Western Iran, in Godin Tepe in layer IV by Young (1969). In more recent studies in Zagros, this culture has been reported in more than 93 sites, including Tape Gourab in Malayer, Tepe Pisa in the plains near Alvand (Motarjem, 2008: 286), three sites in Malayer (Howell, 1979) as well as in Markazi province. In north part of Iran, this culture was obtained from the archaeological excavations on Tepe Kelar of Kelardasht (Mousavi Koohp-par and Abbas Nejad, 2007; Mousavi Koohpar, 2008) and from the reviews done in Kojour (Khazaie Kouhpar, 2011) in West of Mazandaran.

Rothman believes that the distinguished pottery of Kura-Araxes represents the pastoral communities that have traded in the late Chalcolithic in East Turkey and the West of Iran. This population has been mixed with the Pre-Bronze Age of these areas and, then, they have constituted the communities of the Early Bronze Age of the region. In any case, cultural publication and immigration shape the elements of analysis and interpretation of the genesis and development of Kura-Araxes culture (Rothman, 2003).
Peterography in Archaeology and background of research

Generally research on clays are divided into two areas, one is their chemical study and the other one is the mineralogy of them. From chemical studies one could mention the instrumental neutron activation analysis (INAA), X-ray fluorescence (XRF), and also inductively coupled plasma mass spectrometry used for identification of different elements.

Techniques of mineralogy also include X-ray diffraction (XRD) or studying the case through using Light microscopy on thin sections (Sean Quinn 2013:1).

The study on thin sections under microscope (or petrography) is a method in which Polarizing Microscopes are used in order to study the clay texture and composition. Also, in this method each piece of clay is attached to a glass sheet and then the clay thickness is reduced to .03 millimeter. After reaching this thickness, light can pass through the clay which makes the identification of the minerals possible.

The history of ancient clay studies on thin sections dates back to mid-late nineteenth century. In this period, British Henry Clifton Sorby who is an influential expert of the field used this method in order to study the Roman and medieval bricks and also Eastern England tiles. However, the first published works of this period dates back to 1879 like the studies of Ferdinand Fouque and Auguste Michel-Levy on the historical geology of the Santorini island and also the prehistoric clays of Thera (Ibid: 10).

Research on Early Bronze Age potteries (Kura-Araxes) have been done in different areas such as Caucasus, Turkey, Levant, Palestine, and Iran. The only conducted study in Iran which is also considered as a pioneer work on Kura-Araxes potteries is the Petrography of Kura-Araxes potteries though later the site was left abandoned was done by Mason and Cooper on Godin-Tape, Sanglan-Tape, and Baba-Qasem-Tape (1999).

Other studies include the study by Batiuk on Bayburt of Turkey (2000) and the Levant area (2005), Schwartz and his collagenous study on Malatya and Elazig (2009), Paz and Iserlis (2009), and also Iserlis study on the Khirbet Kerak clays in Palestine (2009). Iserlis et al. published the
results of their comprehensive study in 2010 which was about Early Bronze Age of Khirbet Kerak and also two Early Bronze Age sites of Armenia (Aparan III and Carnot I). From other investigations one could mention a study by Kibaroglu et al. (2011) on the Sos Hoyuk potteries, Iserlis et al. study on Khirbet Kerak and Tel Beth-Shean (2012), Greenberg and Iserlis (2012), and also Iserlis and Goren study on Tsaghkasar site in Armenia (2015). Such studies did not continue in Iran after the work of Mason and Cooper. In general, this study revealed that Kura-Araxes clays were produced in the local area.

Early Bronze Age, Iron Age, to Islamic period were identified. The deposits of Yanik (Yaniq) culture belonging to this site occupy about 5.8 meters space, which shows the long persistence of the culture in this area and also its high investigational value for the identification of this culture in the West area of Iran. The important point that has led to the superiority of Yanik site over Godin area is attributable to the absence of any discontinuity during the transition from the Late Chalcolithic to Early Bronze Age in Gourab in addition to the thickness of the strata of this era. This significance has been rarely reported in the sites having this culture in Zagros. The availability of absolute dating has caused the increased importance of the conduct of studies on this area. The era VII in Tape Gourab is the Early Bronze Age (Yanik) that is characterized by the presence of

**Tape Gourab in Malayer**

Tape Gourab is located at Gourab village (Jourab) and at the 12-km distance from the city of Malayer, Hamedan and also lies in the vicinity of Malayer-Hamedan road. The latitude and longitude at which the site is situated are 34 13 29 and 48 52 00, respectively. This site is 28 meters higher than its surrounding lands and is 1823 meters height from the free water surface (Fig 2). This site was first identified in 1974 by Mehdi Rahbar and was appointed to the Sassanid era. Then, Ahmad Kabiri examined it and it was registered in the list of national monuments with the number 1042 (Khaksar, Hemati, Nowrouzi, 2015). Finally, the site was excavated by Khaksar (2006). On the basis of the stratigraphy carried out in this site, eight cultural periods from Middle and Late Chalcolithic,
shiny black pottery with great decorations. This period in Tape Gourab was dated three times with carbon-14 dating. These experiments were done in the laboratory of archeology, history and art at Oxford University and their results were published in March 2008. The result of dating is 3084, 2866 and 2874 BC, but most excavators believe that the date of this culture in Gourab returns to 3028-2904 BC (khaksar, Hemati and Norouzi, 2014). However, it is shown that the date of the establishment of Yanik / Kura-Araxes culture in Gourab is older than that in Godin because Godin dates to 2900-2200 BC based on two samples of carbon-14 in the period (Young, 1969).

Fig 2: Arial view of Tape Gourab (After Khaksar, Hemati and Nowrouzi 2015).

Geology of the area

Since the aim of this study is related to the indigenous or imported nature of pottery, it is needed to discuss the geology and morphology of the area and provide some geomorphological information about the area before discussing the petrography of pottery.
Morphology of the area

From the morphological perspective, the average height of Malayer is big. However, there are few high mountains in this region, which is because of the type of stones of these mountains. A major part of these stones has been made of black phyllite and the penetrative mass of granite. The physical nature of these two types of mentioned stones is such that they show little resistance against weathering and wear out. Limestone altitudes lie in the south-east of Malayer and are categorized within the highest points. This unit passes through south-east to north-west. Khorramabad River is the only river in the region that flows from East to West and passes in the vicinity of Tape Gourab.

Geomorphology

The major portion of the stones of this area has been made of phyllite and slate rocks, which in most cases is relatively short to medium height. East and southeast altitudes of Malayer have been made of thick layer and mass limestone belonging to the Lower Cretaceous. Penetrative masses of granite and granodiorite of southern Malayer have relatively low height. Quaternary alluvial and mud plains in Kusaj Khalil have the lowest height in the area up to thousands of acres.

Geology

From the structural geological perspective of Iran (Ashtvaklyn 1968), Malayer is located in Sanandaj-Sirjan area. This zone is, in fact, some part of the area of central Iran.

Phyllite unit (Jph): these stones along with Middle and Lower Jurassic age are known as Malayer and Hamedan phyllite and slate. Malayer and surrounding areas take up most outcrop in the area. The basic color of the above-mentioned unit is dark gray to black. In microscopic studies, this stone has been found to be made of quartz, phyllosilicate and feldspar minerals. In the same way, siltstone, sandstone and micro crystals of quartz are widely observed in some parts of this stone unit.

Units of Jms and Ks: These two units of Jurassic age and sandstone are among the ones that are located in the region and are generally dark gray and dark green with slate and phyllite cross-layers.
Units of $K_{ml}^{nl}$, $K_{sd}^{sd}$, and $K_{I}^{I}$: these units are an alternation of cream colored Marly limestone to sand limestone; and of thick-layered limestone to a mass with thin dolomite and iron slit cross-layers that exist in this region.

Gabbroic rocks (gb): This unit is located in the southern part of the region and is black colored with coarse-grained texture. Plagioclase, amphibole, Biotite, and alkali feldspar are its constituent minerals.

Granite rocks (gd) and (g): it has the largest expansion in the region with a combination of granite, granodiorite, and monzodiorite to diorite. Alkali feldspar, quartz and amphibole are its main minerals. In addition to the rocky outcrops, garnet schist metamorphic rocks and alluvial deposits specific to the present age are found in the region (Fig 3).
Fig 3: Geological map of the area under study (Tape Gourab), derived from the geological map of Malayer 1: 100 000, National Organization of Geological and Mineral Exploration
Petrographic study of Early Bronze Age pottery of Tape Gourab

Petrography is derived from the word Petro, which means stone and the word graph, which means drawing. In geology, the study of stones and rocks and thin sections via microscope is called petrography. This study is an attempt to examine the structure and texture of stone, its constituents and the relationship of these components with each other. This approach has been used to study the petro-fabric texture and identify the constituents of pottery samples. Petrographic laboratory studies on Kura-Araxes pottery were conducted in the past. One study was done on the layer IV pottery of Godin Tepe which showed that pottery with former layers is different from the pottery with following layers in terms of texture (Mason and Cooper 1999). However, as it was mentioned earlier, it is not possible to give a strong idea on the transition period between the copper and new stone era and Early Bronze Age due to the time gap between them. Therefore, ten samples of pottery were found from the first layer of Kura-Araxes culture in the site by this excavator based on absolute dating since this period has been existing in Tape Gourab and no time gap has existed (Fig 4). It was attempted to choose the samples from different categories. Elegance or thickness degree, the type of relief (simple, burnished or engraved), even the body color, and the pottery dough are amongst the criteria for this classification.
Fig 4: Pottery sample from Tape Gourab

Macroscopic study

The color of pottery samples under study is dark in cross-section while sections in some of them have brighter margins compared to the central part and they are small-sized. In terms of structure, they are sand-structured and it is possible to observe different kinds of minerals in their fine crystal background. The thickness of pottery samples varies from of 5 mm to 10 mm.

Microscopic study

For the microscopic study of the pottery samples, two-photon polarization microscopy (James Swift) was used. The magnification types of 4X and 10X were employed in this study. For the ease of achieving the petrographic results, the results are presented in Table 1.
Table 1: Results of petrographic studies of Bronze Age pottery in Tape Gourab, Malayer

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<th>Number of Sample</th>
<th>Qz (Clean)</th>
<th>Qz (Cloudy)</th>
<th>Pl &amp; Py</th>
<th>Fe-oxid</th>
<th>Mi</th>
<th>Ce(Mi)</th>
<th>Ce(Sp)</th>
<th>M-Rock</th>
<th>P.Rock</th>
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<th>Sand &amp; Silt Ston</th>
<th>grog</th>
<th>Texture</th>
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In geology, the term texture is used for the classification of rocks under microscope, based on which the targeted samples are classified with regard to the constituents of samples. Accordingly, if the coarse-grained components fall within the fine crystal category, they are referred to as porphyritic texture. In this texture, the size of the components is about 2mm that are floated and scattered in the form of fine...
crystals. If the size of components is more than 2mm-3mm, the texture is referred to as mega-porphyritic texture. The samples with approximately 0.5 mm-sized constituents have a silt texture.

This applied geological method has been used in the study of pottery of Tape Gourab and such terms as porphyritic, mega-porphyritic, and silt have been used instead of using general words like coarse, sand, and elegant textures in addition to the identification of the constituents of pottery (Table 1, last column).

The pottery samples of Gourab show the two general structures of isotrop\(^1\) and anisotropie\(^2\).

The samples numbered 1, 5, 6, 7, 9, and 10 have anisotropic backgrounds while the samples numbered 2, 3, 4, and 8 have isotrop backgrounds. In terms of texture or petro-fabric, the study samples are divided into three categories, namely porphyritic, mega-porphyritic, and silt textures or fine crystal as it be seen in table 1. The minerals quartz, plagioclase, amphibole, iron oxide, mica, and calcite are present in all the samples. It should be noted that the frequency of each of these components is different in each sample. The most abundant component of this pottery is the mineral quartz whose amount in the background is variable from 10 to 15 percent. This mineral is generally a fine crystal, its size is not greater than 0.5mm, it has angular to sub-rounded margins, and the phenocryst type of this mineral has a higher frequency than the polycrystalline quartz (see Figs. 7 and 8).

The rock fragments of pottery, fragments of metamorphic rock (slate and phyllite) (Figs. 5 and 12), sandstone (Fig. 6), siltstones, igneous rock and silt and clay baked pieces (grog) (Figs. 10 and 14) exist in most of the samples. The sample numbered 3 is the only sample in which the remains of plutonic igneous rock (amphibole granite) and altered and flawless feldspar phenocrysts can be observed (Figs. 8 and 9).

This sample contains coarse-grained mega-porphyritic texture. The size of its components reaches up to 4mm. In the sample numbered 7, there are much more

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\(^1\) isotrop is a state that does not undergo any changes in color with the full rotation of the microscopic table and remains quite dark.

\(^2\) anisotropie is a state in which the background of pottery brightens four times or darken four times with a full and 360-degree rotation of the microscopic table.
frequent pieces (grog) compared to the other samples. These pieces are often dark-colored or are seen the same colored as the background. The dark-colored type of it is stained with iron oxide and probably contains an external source in relation to the background (Fig. 10) and the clay and silt pieces of the background have an internal source (Fig. 14).

In all the samples, there is calcite (Fig. 7). This is the initial calcite and coarsely crystalline calcite (Sparite) is seen in the samples numbered 1 and 6 (Fig. 15). In this study, pottery obtained from initial mineral calcite is used as a thermal index. This mineral goes away in the temperature range between 800-850 °C and the baking temperature of the pottery has definitely been lower than 800 °C since there is calcite in all the samples. The remarkable point in the sample numbered 8 is that the degree of filler pieces (Tampere) is very low in this sample and the secondary process of alteration and formation of the secondary yellow mineral (zeolite) have widely occurred (Fig. 13). It is the only sample wherein the garnet mineral was observed (Fig. 14).

In the samples numbered 2, 4, and 6, the margins are brighter in color than their central parts and it is said that there is a two-colored background. The sameness of the combination of the two parts can be attributed to the oxidation conditions, high temperature, and higher oxygen levels of the margin of pottery compared to its internal section when being baked (Fig. 11).
Fig. 5- Photomicrograph, GOURAB-2, light: XPL, field of vision length 2.7mm, porphyritic texture, slit piece of rock in the center of the picture, anisotropic background of pottery, quartz mineral with bright color and in the form of fine crystal are seen in the whole parts of the background in a scattered mode. In this light, the available void space in the pottery has been specified with dark color.

Fig. 6- Photomicrograph, GOURAB-3, light: XPL, field of vision length 2.7mm, sandstone piece in the center of the picture, anisotropic background of pottery, quartz mineral with bright color and in the form of fine crystal along with Amphibole mineral
Fig. 7- Photomicrograph, GOURAB-3, light: XPL, field of vision length 2.7mm, coarsely crystalline calcite is seen in the center of the picture and crystal is seen above the picture of the mineral.

Fig. 8- Photomicrograph, Gourab-3, light: XPL, field of vision length 2.7mm, piece of Granite rock, feldspar mineral along with amphibole and quartz mineral in the center of the picture.
Fig. 9- Photomicrograph, GOURAB-3, light: XPL, field of vision length 2.7mm, this is the same as the figure 8 but is seen in polarized light. Amphibole mineral is clearly distinguishable in green. In this light, the void space and quartz mineral are bright-colored.

Fig 10: Photometric graph, Gourab-9, Light XPL, Field of vision 2.7 mm, added clay pieces (grog) to paste are visible in black, the fine paste are crystal, homogenous and isotrop.
Fig 11: Photomicrograph, Gourab-2, Light PPL. Field of vision Length 2.7 mm, completely heterogeneous texture, oxidized section is light and reduction section is dark. This situation is because of change in amount of oxygen and pottery firing temperature.

Fig 12: Photomicrograph, Gourab-2, Light XPL. Field of vision length 2.7 mm, plagioclase twinning mineral and light gray in center of picture. At lower part two pieces of slate or phyllite stone is visible.
Fig 13: Photomicrograph, Gourab-8, Light XPL, field of vision length 2.7 mm, Yellow and secondary minerals of alteration. This mineral made in pottery because of secondary processes such as humidity and temperature of region and other factors over time under earth.

Fig 14: Photomicrograph, Gourab-8, Light PPL, field of vision length 2.7 mm, garnet mineral and grog piece.
Fig 15: Photomicrograph, Gourab-6, Light XPL, field of vision length 1.3 mm, large crystal calcite mineral (sparite) in light yellow with pieces of quartz mineral.

**Conclusion**

According to the geology of the region and due to the existence of slate and phyllite rocks, granite, garnet schists, sandstone, slit stone, and limestone in the region and also because of the presence of the remains of these rocks in the pottery samples under study, it can be claimed with certainty that these samples have an internal and domestic origin. In addition, the firing temperature of the pottery has not exceeded 800 °C because of the existence of calcite in all samples. The pottery sample numbered 3 is different from other samples in terms of the emergence time and origin of the composition (presence of penetrative igneous parts) and has an indigenous origin. Similarly, fewer rock pieces are seen in the pottery samples numbered 8 and 9 compared to the other samples of the study, but the amount of added clay and silt parts (grog) is very higher.

The results of this study showed that the Early Bronze Age Potteries of Tape Gourab of Malayer were produced locally and were not imported; moreover, the texture and composition of the clays were
consistent with the geological structure of Gourab and Malayer area. Apart from using geological minerals, grog was also used as Temper. This situation is consistent with various areas such as Godin IV of Early Bronze Age, Sanglan-Tape, Baba-Qasem-Tape, Caucasus, Turkey, and Levant sites. Taking the Kura-Araxes tested samples into consideration which were also taken from sites with no break in history and layer encryption, one could conclude that most likely the Zagros Early Bronze Age potteries were not the results of import from Caucasus area. Although there is still debate on ideas such as immigration, the presence of itinerant potters, or local potters imitating the Caucasian traditions, by juxtaposing studies in other regions one can refer to other issues which can indeed strengthen immigration approaches or at least lead to the idea of appearance of new human groups in the area. One point that can be referred to is that in all these areas, despite the wide geographical area, the forms of the clays are similar. The second point is that because of the previous era, one could mention the dramatic changes in the technology of pottery baking and also the use of grog. Another point is that these people intentionally did not use the pottery technology specially the pottery wheel. The study of Levant area by Iserlis et al. showed the simultaneous coexistence of two distinct ethnic groups in Beth-Yerah site in two separate areas while each group used quite distinct techniques and soil resources. It may be admitted that the local potters imitated the forms through watching; however, when sudden changes are observed in the technology, one may consider the appearance of new human groups more likely.

We are not certain yet that the changes in the region in general and in Iran and Zagros area in particular are the results of mass immigration and inflow of new human groups or the results of the arrival of a new group of artisans and potters in the region for providing the needs of the locals with these clays.

The researchers' efforts on studying the copper and new-stone clays and also more recent layers of Kura-Araxes culture will continue and undoubtedly would help in understanding this culture much better.
Reference:


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مطالعه پتروگرافی سفاله‌های موراره قفقاز قدیم ته گوراب، غرب ایران

علي‌پرویز نوبی‌ی ۱، مصطفی خزایی ۲، عباس مرجم ۳

تاریخ پذیرش: ۹۸/۹/۲۸
تاریخ دریافت: ۹۴/۷/۲۸

در اواسط هزاره چهارم هـ. فرهنگی شاخه در منطقه قفقاز شکل گرفت و در آغاز هزاره سوم در منطقه
وسیعی که در شرق به دشت تهران و سواحل جنوبی دریای خزر و در غرب تا سواحل دریای مدیترانه
گسترش یافت. از این فرهنگ که همگونی قابل توجهی داشته است، با نام‌های گوناگون همجون فرهنگ
ماوراره قفقاز، کورا-ارس، پاتیک، کاراز، خریبت کرک و پاتیک بادم می‌شود. این همگونی فرهنگی و
گسترده‌گی جغرافیایی آن در بازه زمانی کوتاه سبب شکل‌گیری مباحث گسترده‌ای در بین بناستان شناسان
شد. نظراتی همجون گسترش تقلید، تجارت، و مهاجرت از عمدی ترین توجیهات برای این مسئله است.

سفاله‌های این فرهنگ شاخه عمده این فرهنگ است. در این پویش‌های نظریت‌های پرورش آن فرهنگ و
مطالعه بافت سفاله‌های کورا-ارس محوطه گوراب در ملاصی پا روش پتروگرافی پرداخته شد. مطالعه
سفاله‌های این محوطه نشان داد که سفاله‌های کورا-ارس ته گوراب با فاصله‌ای بین زمین، شناسی منطقه
همخوانی دارد و نشان از تولید محلی آن در منطقه دارد و بر اثر تجارت از منطقه قفقاز وارد نشده است.

در تبیین پایه‌گذاری گسترش این نوع سفاله در زاکروس به دنبال عالمی غیر از تجارت تأکید کرد.

کلید واژه: کورا-ارس، میادله، گوراب، سفال، پتروگرافی.

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