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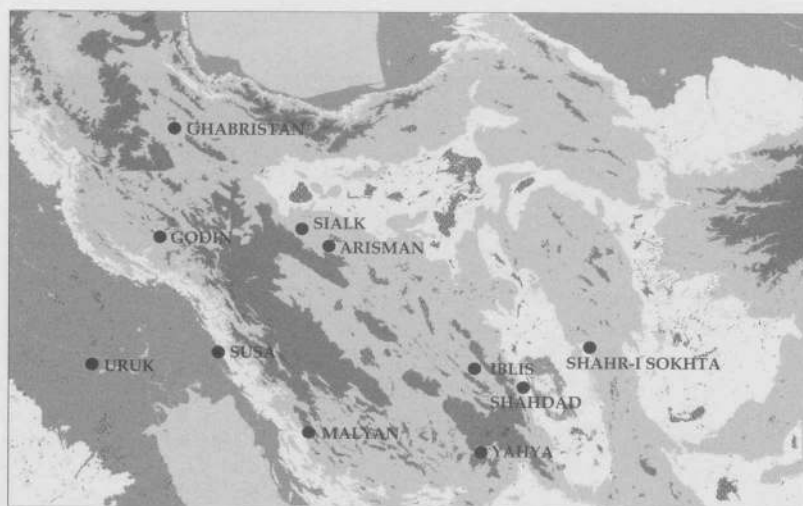
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B. Helwing

Long-Distance Relations of the Iranian Highland Sites during the Late Chalcolithic Period: New Evidence from the Joint Iranian-German Excavations at Arisman, Prov. Isfahan, Iran

Fig. 1. Map of Iran with relevant sites mentioned in the text.



Since the year 2000, the German Archaeological Institute (DAI) has resumed archaeological fieldwork in Iran as part of the interdisciplinary research project "Early mining and metallurgy on the Central Iranian Plateau". Work is carried out as a joint endeavour by the Iranian Cultural Heritage Organisation (ICHO) and the German Archaeological Institute, in collaboration with other specialized institutions, the Geological Survey of Iran, the German Mining Museum Bochum, and the Technical University Freiberg¹. This project aims at investigating the early development of metallurgy from different angles, including geological, technological, historical, ethnographical and archaeological perspectives. It begins with systematic prospection for metal sources and probable ancient mining traces, followed by geochemical and mineralogical analysis and a "fingerprinting" of ores and artefacts. Ancient mining traces are documented and finally, the documentation and excavation of prehistoric sites with clear evidence for metallurgical activities form a major part of the work. From the culture historical point of view,

the consequences of systematic metal production on the participating communities is investigated, as is the environmental impact created by the establishing of a major industry. The Arisman excavations are part of this larger general program (Chegini et al. 2000).

Geographically, the research project concentrates on the western part of the Iranian plateau (fig. 1), delimited by the Zagros Mountains to the southwest and the Alborz Mountains to the north.

¹ The research project "Early Mining and Metallurgy on the Western Iranian Plateau" has greatly profited from the firm support by vice minister Said Beheshti, head of the ICHO. It is jointly directed by A. Vatandoust (ICHO) and H. Parzinger (DAI), while the Arisman excavations proper are co-directed by Nasir Chegini (ICHO) and H. Parzinger (DAI). We wish to express our sincere gratitude to all the responsables for enabling this work and for their unceasing support. For an introduction of the project and a preliminary report of the first season, see Chegini et al. (2000).



Fig. 2. Arisman, area B, house of late Sialk III-period (middle of 4th millennium BC).

These mountain ranges consist mainly of tertiary volcanic and sedimentary rocks that host some of the most productive copper mineralisations that have been exploited since prehistory. Within this area, the best-known archaeological site is Tappeh Sialk in Kashan that has been investigated during the 1930's by a French mission directed by Roman Ghirshman (Ghirshman 1938), and that is again under excavation since 2001 under the directorship of Sadegh Malek Shahmirzadi (Malek Shahmirzadi 2002, 2003). Until today, the stratigraphy of Sialk, periods I–VI, forms the major chronological reference system for the Western plateau.

During the late Chalcolithic period, in the late Sialk III and Sialk IV period, the site must have been in contact with the emerging civilizations of the Mesopotamian lowland (Ghirshman 1938), as is proved by some pottery types and small finds uncovered in the southern mound of Sialk. Since, the site is regarded to be representative of the proto-Elamite culture in highland Iran, displaying strong repercussions of a development towards greater complexity in the Mesopotamian Uruk culture.

This traditional, Mesopotamian-centric view of the cultural development of the Iranian highland during the late 4th and early 3rd millennium BC urgently requires re-examination. Traditional models on the so-called "Uruk-expansion" into the Mesopotamian periphery have been modified some time ago, triggered by new excavation results from sites in Turkey and Syria². Since no new data from Iran were available for a long time, the question of long distance relations of the Iranian plateau sites during the later 4th millennium BC has remained unchallenged for a while. However, resumed work in highland Iran, such as the new excavations at Arisman, enables us now to develop different outlooks at the cultural development of the 4th millennium BC.

The prehistoric site of Arisman, the focus of the following paper, is located about 60 kms south-east of Kashan and Tappeh Sialk, on the northernmost slopes of the 4000 m high Karkas mountains, at an elevation of about 1000 m above sea level. On the immediate fringe of the Dasht-e Kavir, the environment is arid with about 100 mm of precipitation in normal years. Prehistoric occupation traces extend over an area of more than 1 km². Cultural layers do not exceed 1.6 m, making a regular shifting of the settlement highly probable. Three huge heaps of slag of c. 25 m diameter form part of the site.

Excavations have been carried out in four areas: in two of the slag heaps in areas A and D, remains of late 4th millennium BC (Sialk IV) metallurgical activities were found. Area B in the southern part of the site revealed late Sialk III-, that is the mid-4th millennium BC, pottery workshop areas. A domestic quarter with integrated workshops contemporary to the slag heaps was uncovered in the northern part of the site in area C.

The earliest settlement layers were uncovered so far in area B (fig. 2). They consist of a domestic house of the late Sialk III period constructed from pisé, with a floor made from beaten earth. It is fully equipped with ovens and kitchen facilities and some handmade kitchen pottery was found next to the oven.

At a later stage of Sialk III, this area became a professional pottery workshop area. Pottery kilns (fig. 3) were dug into the settlement remains, and an ash layer corresponding to the kiln phase yielded hundreds and hundreds of similar vessels, probably belonging to one charge of the kiln. Two

² The current status of research is best represented by two conference volumes on the "Uruk expansion" (Rothman 2001; Postgate/Campbell 2002).

Fig. 3. Arisman, area B, pottery kiln of late Sialk III-period (middle of 4th millennium BC).



Fig. 4. Arisman, area B, painted pottery of late Sialk III-period (middle of 4th millennium BC).



different types of kilns have been found: one is represented by large ovens with a keyhole shaped outline and a central middle pillar. The second type consists of smaller roundish ovens with a pierced clay platform.

The pottery that has been produced there is made from a fine mineralic clay that turns buff when fired, with brown paint applied to this light ground, mostly in geometric patterns (fig. 4). Characteristic shapes comprise beakers and chalices, mostly with a stemmed base, and also large vessels. The assemblage is hence typical of the final stage of Sialk III, and can be dated around the middle of the 4th millennium BC (Chegini et al. 2000, figs. 10–12).

The ashy layer surrounding the pottery kilns yielded a lot of industrial wasters from the pottery production, but also from metal workshops. Those actual workshops have not been uncovered to date,

but must have been located in the vicinity of the potter's quarter. Thus, we have strong evidence for a specialized craft production around the middle of the 4th millennium BC, indicating the existence of labour specialization already at this early date.

Evidence for late 4th millennium BC copper working stems from the two slag heaps in areas A and D and from a domestic/workshop quarter uncovered at larger scale in area C. Area A yielded a copper smelting furnace right in the middle of the slag heap (Chegini et al. 2000, figs. 13–15; see here fig. 6). The round furnace stands on top and is partly dug into a mudbrick platform. In the lower part is a deep, U-shaped hollow channel. The lower part does not show slagged walls, probably because crucibles had been placed there to accommodate the smelted copper. The upper walls of the kiln are plastered with mud and are strongly slagged. The front side of the furnace is



Fig. 5. Arisman, area C, domestic quarter with workshops, Sialk IV-period (end of 4th millennium BC).



Fig. 6. Arisman, area A, copper smelting furnace, Sialk IV-period (end of 4th millennium BC).

broken, apparently to extract the smelted metal and the slag accumulated above. This slag was then simply shovelled away, resulting in the formation of the enormous slag heap still visible above the surface. The upper part of the furnace can most

likely be reconstructed as a vaulted structure. For every new smelting process, the furnace walls had to be rebuilt. In total, this furnace was rebuilt 33 times, so that 33 smelting processes have taken place in this kiln.

This second slag heap, area D, so far failed to produce a furnace, but a section cut through the central part of the slag heap revealed a long sequence of slag layers. Geomagnetic mapping had indicated the existence of round spot magnetic anomalies in the northern part of area D. An investigation of these anomalies – possibly kilns – led to the discovery of large pits with plastered walls and burning traces that had been dug into natural gypsum ground. The fill of the pits contained slag fragments, fragments of moulds and furnaces, few eroded pottery fragments of Sialk IV material, but no complete artefacts. At this moment, we host two hypothesis concerning the function of the pits. One possibility would be that the pits were used for the preparation of the copper ore for further processing in a smelting kiln by reducing them in an open roasting pit. A second hypothesis is that the pits may have been used for the production of charcoal in large quantities.

The further processing of the metal extracted in this industrial area next to the slag heaps took place in small workshops located within the settlement of the Sialk IV period in area C (fig. 5). Here, three domestic buildings located on two sides of a small lane were unearthed so far. The houses are constructed from rectangular mud bricks. Different installations are found in the courtyards, such as large vaulted ovens and platform-like hearths. Crushed slag was collected in containers, bags or the like, for further processing. Room fills contained all kinds of metallurgy-related finds such as slag, litharge and mould fragments and copper artefacts as well, indicating the large scale processing of the extracted metal in workshops within the settlement.

Arisman must have been a site with considerable craft activities since the middle of the 4th millennium BC. that during the later 4th millennium BC rapidly developed into a specialized industrial centre. Such a development can only be understood within a larger system of exchange or a trade network that provides safe marketing opportunities for the goods thus produced.

Such a trade network is generally assumed to have existed since the 4th millennium BC., basically in order to provide the growing polities in the Mesopotamian lowland with desired raw materials and prestigious items that fuelled the Mesopotamian economies (amongst others: Lamberg-Karlovsky 1978). Besides metal, which forms the bulk commodity at this early time, prestigious items such as lapis lazuli and chlorite vessels would have travelled to the lowlands along these lines (Herrmann 1964; Kohl 2001). But has long distance trade during the 4th millennium indeed been carried out within such a unidirectional framework? Or is it rather a matter of research focus on the lowland civilizations that has led scholars to assume such one-sided contacts?

A study of the find assemblages associated with the domestic quarter in Arisman area C hints instead at various – and partly unexpected – relations.

The pottery assemblage (fig. 7) of the Sialk IV-layers uncovered in Arisman area C can be distinguished into three major production groups. The largest group consists of a mineral tempered clay with sand and gravel temper that fires to reddish colour, indicating a considerable iron content within the raw material. A second large group consists of cooking pot wares that are characterized by clay with crushed quartz or calcite inclusions. They tend to be grey to black, but can be mottled with red as well. The third group is a fine grey ware with fine temper, either mineral or organic.

The clay used is in all cases material deriving from the local streams. The standard mineral temper is sand of fine or coarse fractions that derives from the same alluvial deposits. Surface treatment varies according to fabric group. Sandy standard fabrics are largely not treated at all after shaping or wet smoothed only so that the thin residue of clay water mixture left on the surface after smoothing results in a slightly lighter surface colour, an effect some people call “self slip”.

The types follow a limited corpus of shapes, comprising bowls and beakers, jars and jugs, and *pithoi*. Reddish standard ware is used for the production of simple bowls or beakers, jars and jugs. Matt brown paint can be applied to this reddish, either untreated or self slipped surface. One of the *leitfossils* of the Sialk IV period reddish standard ware at Arisman is the spouted beaker. With larger vessels, surface treatment often is more careful and some specimen bear a true whitish slip. Horizontal brown bands are painted onto the

vessel, another highly characteristic category. Another significant group are nose-lugged jars that occur undecorated, with plastic lines or red-brown slip, and can sometimes be painted as well. Very often, the paint is very faint and preserved only as a negative pattern barely visible on the surface. Most rarely, and so far attested only from fragments, brown paint is combined with white paint on a red slipped surface, creating a polychromatic effect.

Among the coarse ware, bevelled rim bowls occur regularly, as do the large open trays. Cooking pot ware is different in so far as vessels are usually built by hand. The surface is carefully smoothed over and can be shiny. As a standard, cooking pots have handles applied below the rim. As for the grey ware, it is difficult to distinguish by visual autopsy only whether the vessel had been thrown on a wheel or built by hand. The surface is usually very carefully smoothed or even polished so that no traces of the fabrication technology remain visible.

If the dependency of the cultural development in highland Iran from the Mesopotamian Uruk- and Jemdet Nasr culture is to be proved, a comparison of the Arisman area C material should reveal significant similarities between the two areas. A comparison with sites to the southwest, and hence on the way to Mesopotamia, revealed the following picture:

Naturally, the limited Tappeh Sialk IV/1 material easily matches the Arisman corpus (Ghirshman 1938, pl. 88–90), and the *leitfossils* of the period, such as spouted beakers and conical beakers are attested. The limited sample from Godin V, held to be a major trading station of the Uruk culture in the Kanganvar valley (Algaze 1993, 53–55), indeed indicates strong Uruk affiliations, with nose lug jars and other unmistakable shapes (Weiss/Young 1975, fig. 3, 1–2; Badler 2002). However, the Arisman standard types are rare and seem not to exceed the occasional spouted beaker, while all other comparisons relate to Uruk-influenced shapes. The Susa-acropolis layer 17 material provides some general parallels, even with the spouted beakers (Le Brun 1978a, b), but as was the case in Godin, mostly within the range of Late Uruk pottery standards. Most remarkable is, however, the lack of direct comparisons with other sites to the southwest, especially in the Diyala area.

At the same time it is most interesting to compare Arisman with sites located southeast of Arisman, in Fars and in Kerman. Tall-i Malyan provides parallels for most standard shapes from Arisman (Nicholas 1990, pl. 23, c). Nose lugged jars and spouted vessels are but a minor portion of the comparisons (Nicholas 1990, pl. 17, f; 18, d; 19, s). Instead, bead rim bowls – a standard from Arisman – are equally frequent in Malyan (Nicholas 1990, pl. 21, b, f), and band painted jars are especially characteristic, as are the large coarse flat

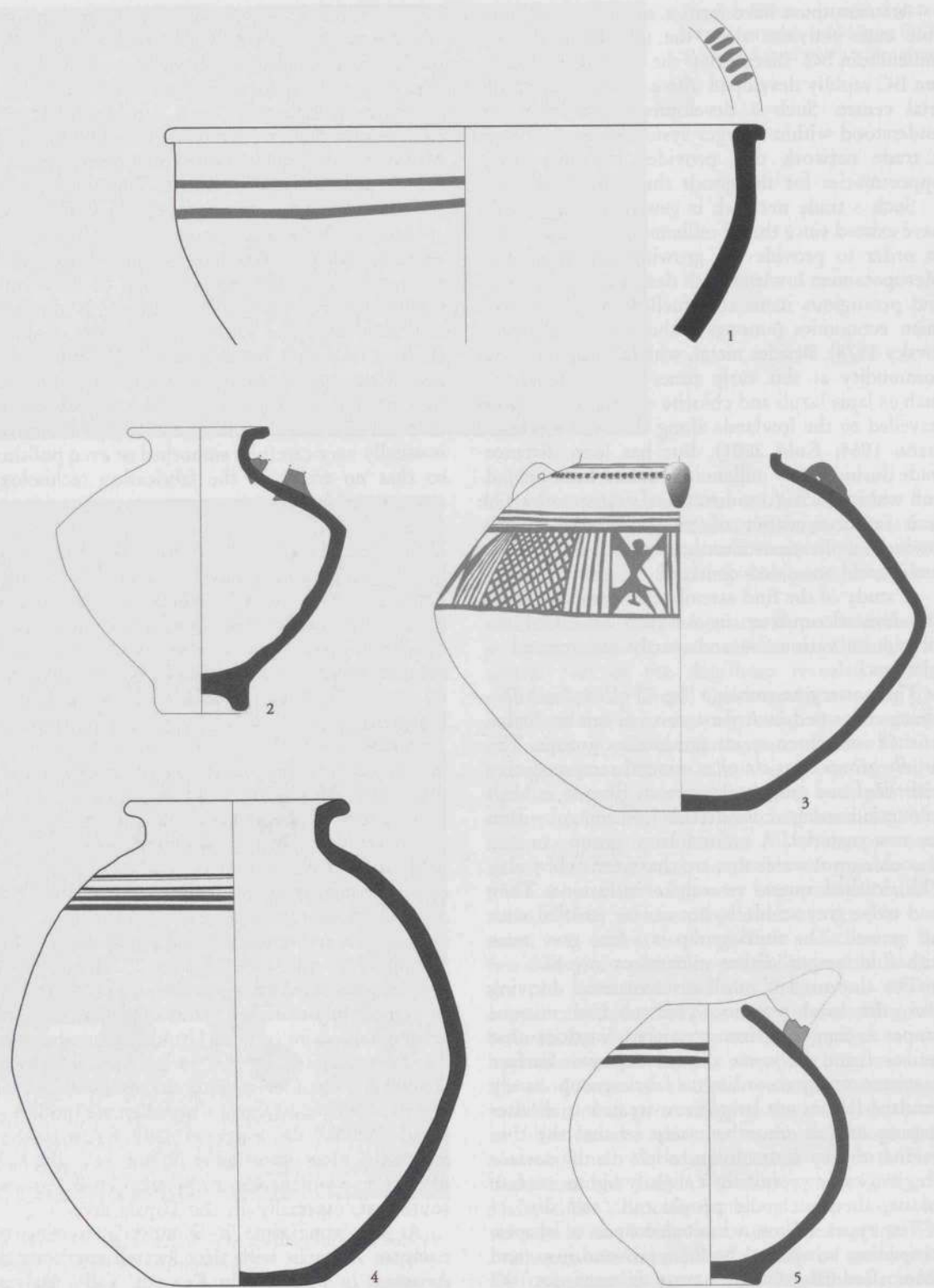


Fig. 7. Arisman, area C, pottery of the Sialk IV-period (end of 4th millennium BC).

trays (Nicholas 1990, pl. 13, a-j). Thanks to the recent publication of the Tappeh Yahya 3rd millennium material, a larger sample of pottery from the slightly later IVC level is available. Here, we find – within the so-called “Jemdet Nasr related” group – direct comparisons for the painted nose lugged jars from Arisman (Potts et al. 2001, fig. 1. 40.B), but also other comparisons such as large trays and bowls with bead rims (Potts et al. 2001, fig. 1.14, 1.24). Even spouted beakers are attested (Potts et al. 2001, fig. 1.54). Tal-i Iblis – the third contemporary site to the southeast – experiences a gap in occupation towards the end of the 4th millennium BC, followed by phase Iblis VI – the Najafabad complex. Although not stemming from reliable archaeological contexts, examples of band painted ware and open spouts indicate that an assemblage closely comparable to the Arisman material must have been in use at the site at one time (Caldwell 1967, fig. 40, 1–4). And regarding further types, all three sites in the southeast share the repertoire of bead rim bowls, large open trays and bevelled rim bowls.

Finally, the painted pottery indicates some more long distance comparisons, The checkerboard pattern – singular in Arisman – is equally found in Tappeh Yahya (Potts et al. 2001, fig. 3. 7, B) and esp. in Shahr-i Sukhte (Sarianidi 1983, fig. 5, a; Tosi 1983) where it is said to indicate relations with Turkmenian sites. The solidly filled lozenges equally occur in Malyan (Nicholas 1990, pl. 24, l. o). And the red pottery with black paint over white wash – also singular in Arisman – can best be compared to the painted jar from Yahya (Potts et al. 2001, fig. 1. 40.B).

The pottery analysis of the Arisman materials is hence a good indicator for cultural relations between Arisman and the Sialk area not to the southwest, as had been expected, but rather towards the southeast, and to Fars, the heartland of the proto-elamite culture. A coherent sphere of related pottery styles has become visible, while all participating sites equally reveal some – but probably indirect – influence of the Uruk culture. A look at the glyptic material may further help to understand that pattern. Two cylinder seals were found in one single small room next to a large hearth platform in area C. One shows a single quadruped in front of a hurdle. The figure is rendered in a highly schematic way from incised straight lines. Most characteristic is the enormous size of the eye. This seal finds a close parallel in one example from Tepe Sialk (Ghirshman 1938, pl. 94 S48), where the animal is equally constructed from straight lines that in this case link drilled cornerpoints, and the eye fills the complete space of the head. Animals with head-size eyes hence seem to be a special icon used in the Kashan area.

A second cylinder seal was found immediately below room 17, where the first seal stems from.

This seal is cut from glazed steatite and one side is broken. It belongs to a large stylistic group of seals known as “Jemdet Nasr piedmont style” or “glazed steatite style” (Pittman 1994). They are found especially in sites of the Zagros-Taurus foothills, hence the name, and are characteristic for the turn of the 4th/3rd millennium BC.

The two seals discovered to date in Arisman clearly attest the application of seals in the site, probably for the closing and signing of containers. This proves that the Arisman community was clearly familiar with the significance and the codes of sealing. The seals used are either local (the animal seal) or belong to a wide spread group of little originality (the glazed steatite seal). Interestingly, no seal impressions have yet come to light. In other contemporary sites, e.g. Sialk IV or Godin V and others, the number of seal impressions usually by far exceeds the number of original seals. One possible reason for this may be that the sealed containers were not used within the settlement, but were sent away. The use of seals in Arisman can therefore be interpreted as an indicator for the integration of the site into a larger system of trading and exchange.

It is much too early to draw firm conclusions on the base of this preliminary analysis. It has become evident, however, that the Arisman pottery production shares many elements with Fars and finds close parallels in the Kerman area as well – it may become possible in the future to describe this even as a “province of shared pottery styles”. At the same time, comparative materials from the sites in the direction towards Khuzestan/Mesopotamia are surprisingly rare except for the seals.

This pattern stands in stark contrast to archaeologist’s mental map of cultural relations of the Iranian highland sites in the late 4th millennium BC. In this map, Mesopotamia as the centre in an asymmetrical exchange system would clearly dominate the direction of exchange (Lamberg-Karlovsky 1978).

Instead, a complex network of interconnected settlements becomes now evident in Iran. Seals show the development of local styles alongside the usage of the Piedmont style. Pottery even more indicates local productions and shared pottery styles of sites in highland Iran with a clear focus on Fars/Malyan and the Kerman area/Yahya. A network model connecting all these different sites would therefore provide a much more appropriate description of late 4th millennium exchange systems in highland Iran.

Arisman thus provides exciting new insights not only into the development of pyrotechnology and metallurgy over the 4th millennium BC. We gain the impression of specialized workshops and a cottage industry devoted to the processing of smelted raw metal as early as the mid-4th millennium BC. By the end of the 4th millennium BC,

the smelting facilities were constructed outside the settled area, indicating a trend towards further differentiation of complex labor. Further processing of the material then took place within the houses. The extension of the area covered by slags, the abundance of magnetic anomalies that indicate the existence of numerous fire pits, and the enormous size of the three slag heaps underline the role of Arisman as a major metallurgical centre of the 4th millennium BC. Arisman can hence be considered a specialized industrial settlement, probably providing metals for a major trading centre such as it did exist at that time e. g. at Tepe Sialk. The integration of the site into a larger settlement and exchange network begins to become apparent from the ongoing analysis of the find material. It is our all hope that future research will allow to further investigate the role of the Iranian highland as a crossroads of exchange and a mediator between east and west.

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