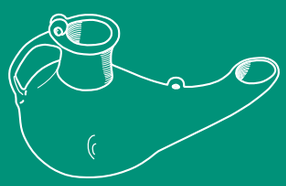
Depositional Practices at the Natural Sanctuary of Veshnaveh, Central Iran



Jewellery and Watery Caves

Natascha Bagherpour Kashani

DER ANSCHNITT BEIHEFT 46

Mining Archaeology in Iran 1

Research in Veshnaveh 1

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with a contribution on glass analysis by James Lankton and Bernard Gratuze

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Cover Image
View into Chale Ghar 1 (photo: K. Stange, AVttention).

Frontispiece
The donkey carries the equipment for the excavation at Chale Ghar (photo: M. Ecker).

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Bundesministerium für Bildung und Forschung

For my daughter Roya, who had accompanied this thesis since her first heartbeat.

Content

Editor´s Preface

The mining archaeological excavations in Veshnaveh were among the first systematic of their kind in Iran. This is surprising, since the site itself had been known and described since the 1970s (Holzer and Momenzadeh, 1971), but could not be investigated thoroughly until the early 2000s. The joint Iranian-German research in Veshnaveh was carried out as a part of the "Early Mining and Metallurgy in West-Central Iran" project, which had been continued until 2005 (Vatandoust, Parzinger and Helwing, 2011). In this context, the mining area of Veshnaveh was comprehensively researched and, for the first time, underground excavations and surveys were carried out in the vicinity of the mining area.

During our research of the mining evidence, it was the more surprising to discover ritual re-use of a Bronze Age copper mine. The excavations from 2001 onwards made it immediately clear that these deposits were not part of mining debris as one would have expected for mining activities. The findings suggested a different context and it was clear that this was a special rural sanctuary of pre- and early Zoroastrian cults (Stöllner and Mireskanderi, 2003; Stöllner, 2011).

The ritual practice has not only been archaeologically documented and evaluated but also discussed with Iranists and religious studies scholars (Kreyenbroek, 2011; Overlaet, 2011). It made clear that the remarkable rites and religious traditions already started in the early Iron Age (IA III). This also covers the beginnings of a Pre-Zoroastrian cult, which we can combine in the present case with libations and the laying down rituals of meals at a waterfront and later with the consecration of jewellery by primarily female adorants. The well-known Iranist Mary Boyce, with whom I discussed the place in correspondence, was deeply impressed and fascinated by this place, which for her and her colleague Philip Kreyenbroek was a missing link to the written ritual texts.

The fieldwork in Veshnaveh was accompanied by demanding and intensive work: I remember many people I am grateful to remember, of whom I would like to mention only a few here. In addition to me, Dr. Mahmood Mireskanderi (2001-2002) and Dr. Kourosh Roustaei (2004-2005) headed the campaigns. Both openness and cordiality in the joint work with them and the Iranian-German team are to be thanked. Many have worked here together, such as the excavators and surveyors B. Aghaie, N. Bagherpour Kashani, Jan Cierny †, Ismael Esmaili, Mahmood Ghasemi, Jan Müller, Rainer Pasternak, Mohsen Ramezani, Torsten Riese, Bernhard Schroth, Gero Steffens, Peter Thomas, Angelika and Gerd Weisgerber as well as Mohsen Zeidi. The restorers of the RCCCR have given us extensive support, especially Shahrzad Armin Shirazi, Majid Ghazian, Mahmood Ghasemi and Soraya Elikaeh. The Tabrizi family is also fondly remembered, in whose house in Veshnaveh we were guests, but above all the people in the village of Veshnaveh, who always met us with kindness and support. Above all, Kal-Abbas Djani should be remembered here, who as early as 1969 led Morteza Momenzadeh to the mines (as he did us), and the Bagheri family, whose three brothers Majid, Mohsen and Mostafa have supported us over the years in many ways.

With the present volume, we introduce the presentation of the results of the long-term research in Veshnaveh. The author, Dr. Natascha Bagherpour Kashani, must be thanked for, after all these years of patience, making another final revision for this volume. The present work was originally submitted as a dissertation to the Ruhr University and is now available in a revised form. The volume is also the first volume of publications of a project funded by the German Research Foundation (DFG) and the Wilhelm Mommertz Foundation as well as the Gerda Henkel Foundation. The foundations as well as the DFG, like the responsible referee at that time, Dr. Hans-Dieter Bienert, are very much to be thanked for their financial support. Further volumes are on the way: the results of the zooarchaeological and archaeobotanical investigations, the evaluation results of the ceramic deposits as well as the results of the field research and the further mining archaeological results together with a conclusive catalogue of features and findings.

The results of our work in Veshnaveh are published as part of the series "Mining Archaeology in Iran: The Excavations in Veshnaveh". I would like to thank Dr. Petra Eisenach, Mr. Bernd Lehnhoff as well as Mr. Hans-Jörg Lauffer, the publishing house Marie-Leidorf and its owner Dr. Bert Wiegel for the good cooperation. The series „Mining Archaeology in Iran" will also be continued by other volumes that present current research projects, such as the mining archaeological work at the salt mine of Douzlakh near Chehrabad and the archaeometallurgical sites of the Varamin plain near Teheran. All these publications will make clear the great importance of prehistoric and ancient raw material extraction in Iran to a broad scientific audience.

Thomas Stöllner (responsible head of Veshnaveh-project, German side), Morteza Hessari (Director of Iranian Centre of Archaeological Research, MICHHTO).

October 2021

Author´s Preface

This study describes and analyses the jewellery and the personal ornaments found in two ancient copper mines, Chale Ghar 1 and 2, at Veshnaveh. It was published online in 2014. The present edition reports the status of content and layout of that time with only a very few amendments. Now with the comprehensive catalogue and the other publications of the Veshnaveh excavation, this book is finally printed in hard copy. It was a great opportunity for me to work with this material, and in the course of my studies I had the chance to meet many scientists and to hold discussions with them. In the paragraphs below I wish to thank by name many of the institutions and persons who provided intellectual and/or practical support for my research.

Thanks to a scholarship from the Gerda Henkel Foundation, I had the privilege of being able to concentrate exclusively on my studies. I am very grateful for the years of support, and so I want to thank the foundation and its members for providing me with this outstanding opportunity.

I would like to express my indebtedness to Thomas Stöllner, who offered me this fascinating subject and supported my studies right from the start; he opened the doors for doing research in Iran, and for arranging the export of glass and amber samples from the country for scientific analysis. In the same contexts I want to thank the staff of the archaeological institute in Ghom and our colleague Kourosh Roustaei, the head of the Iranian excavation team at Veshnaveh, who between them made my efforts possible; also to be thanked are his compatriots M. Gazian and M. Ghasemi, who allowed me to examine the jewellery artefacts.

During my years of research I visited a number of museums, and I want to express my gratitude to the directors of the National Museum of Iran, the British Museum and the Louvre for all their support, and, in particular, for extending to me the possibility to work with unpublished material. This gratitude of course includes all the staff of those museums, starting with the National Museum of Iran, where I have many memories of the great efforts taken to comply with my requests: Mr. Kargar, Mrs. Jaffar Mohamadi, Mrs. Ayasi, Mrs. Akbari, Mrs. Askari, Mrs. Baseri, Mrs. Atefi, Mrs. Ruhfar and Mr. Sarlak. At the British Museum I valued the support of Mr. St. J. Simpson and the stimulating exchanges of ideas I had with him; additionally, he allowed me to present unpublished material from Kush, Merv and Siraf in my studies. I wish also to thank M^{me} A. Benoit from the Louvre for sharing her expertise with me.

For permission to mention unpublished finds from Tell Mohammed Arab I would like to thank M. Roaf from the Ludwig-Maximilians-University in Munich. For technical support concerning the complex data of the Veshnaveh excavation and its analysis, I would like to thank Annette Hornschuch and Gero Steffens for their patience and assistance.

I was fortunate, furthermore, to meet a number of other scientists with whom I enjoyed fruitful debates. I want to express my gratitude to all of them for the interest they took in my topic, and, above all, to my second supervisor Philip Kreyenbroek who discussed religious questions with me. I would like to thank also Ph. Kreyenbroek, Mr. Farridnejad and Mrs. S. Curtis for their help in reading the inscriptions of the coins. Concerning the material of the finds I exchanged thoughts with Gunvor Lindström and Uta van Freeden. For her ideas about glass techniques I want to thank Rosemarie Lierke.

Due to my family situation it was not possible for me to research and write this study at the Institute for Archaeological Sciences at Bochum, where I was enrolled as doctoral candidate. However, I found a welcoming atmosphere at the Archaeological Institute of the TU Darmstadt: I would like to thank Franziska Lang and all the staff members for the possibility to work and ‘live’ at their institute.

I want to thank my family for their massive and selfless support. My parents, Ellen and Kazem Bagherpour, and my parents-in-law, Lilli and Dieter Gerz, took care of my little daughter when I had to do research abroad. Even when it came to last-minute requests for assistance, they never hesitated to make themselves available to help our little family. Fortunately I was blessed with my wonderful child, Roya, that patiently accepted that her mother was away many times - out of town, abroad or reflecting over her work. I spent many evenings debating with my husband, Stephan Kaczmarek, and I would like to thank him for his magnificent support and for all his patience, especially during the final month of this thesis.

Examining the jewellery and personal ornaments from Veshnaveh was intellectually an eye-opening experience; and I want to thank also all the other people not named on these two pages, but who encouraged and helped me so much during the course of my studies.

Natascha Bagherpour Kashani

Darmstadt, May 2011 and October 2021

1 Introduction and Background

1.1 Veshnaveh: A Copper Mining Area

During his journey through western Iran at the end of the 19th century, A. F. Stahl (1894) described an area in the Aliabad Mountains as a district interstratified with copper ore (Stöllner, et al., 2004, p.240; 2011, p.537). This region is situated in the Iranian western-central plateau at a height of about 2,100 – 2,300 m above sea level; it is located several kilometres from the village of Veshnaveh, with the city of Ghom in the north, the Karkas mountains and the city of Kashan in the south, and the Dasht-e Kavir in the east (pl. 1). The deposits existed at the edges of the mountains and had been used as an open-cast mining area.

In his explorations, Stahl noticed both several small copper mines and countless holes and 'caves' that had been formed through the exploitation of copper. These were in turn visited by the geologists H. Holzer and M. Momenzadeh in 1969, who described the area and dated the mines to the prehistoric period on the basis of ceramic shards and mining tools (Holzer and Momenzadeh, 1971; Holzer, 1974; Stöllner, et al., 2004a, p.240; Stöllner, Mireskanderi and Roustaei, 2011, pp.537-538). Further investigations were carried out by French scientists in 1975 (Berthoud, et al., 1976; 1982); and in 1976 and 1978 by G. Weisgerber from the German Mining Museum at Bochum (Stöllner, et al., 2004a, p.240; Stöllner, Mireskanderi and Roustaei, p.538). The Iranian Revolution and the following eight-year-long Iran-Iraq War stopped further foreign archaeological activities in the district of Veshnaveh, as well as throughout the rest of the country.

After the Iran-Iraq War European archaeologists did not perform field work in Iran, until the joint project 'Ancient Mining and Metallurgy' (together with the German Archaeological Institute and the Bergakademie Freiberg) was set up as an initial basis for scientific cooperation between Iranian and German colleagues (Vatandoust, Parzinger and Helwing, 2011; Stöllner, Mireskanderi and Roustaei, 2011, p.538). In 2000, alongside their partners from the Iranian Cultural and Archaeological Institute (ICAR), the German Mining Museum at Bochum started to examine prehistoric copper mines of the area close to the village of Veshnaveh, including the districts of Mazrayeh, Laghe Morad and Chale Ghar. The aim of the investigation was to gain knowledge about extractive metallurgy from the 3rd to the end of the 2nd millennia BC in the Iranian western-central plateau. In a total of five excavation and survey campaigns during the years 2000–05 (except for 2003) the region was accordingly examined by German and Iranian archaeologists.

Chale Ghar 1 and Chale Ghar 2: A Surprising Discovery

For this research study, the area of the Chale Ghar mines is of most interest. Chale Ghar 1 is one of the larger mines in this district, and in the first campaign in 2001 the archaeologists made a surprising discovery there. They came across finds clearly unconnected to the mining activity, and hundreds of years later in date. Obviously deposited in this later ancient period were: innumerable ceramic vessels and shards; wood and wooden vessels; remains of nuts, shell and baked goods; animal bones; one textile fragment; jewellery such as glass and stone beads and pendants, metal finger rings and earrings; one completely preserved glass vessel; and sheets of decorated metal. It is remarkable that all the finds and especially the organic ones were preserved so well, probably due to their storage in water infiltrated by copper ions (pl. 3); and it is startling that such various and numerous finds of ceramic shards and jewellery artefacts were discovered accumulated in this former copper mine (pl. 3). No similar discovery at such a place has ever been made in Iran or the Near East before.

Short Outline of Chale Ghar 1 and 2

In Chale Ghar 1, objects were uncovered in three places: the entrance area, the so-called main chamber, and the rear chamber (pl. 2). The entrance area consists of a hole and a passage through which anyone entering has to crawl to reach the interior of the mine. The main chamber, where most finds were unearthed, is located in a rear part of the mine, and was permanently filled with water, just as the rear chamber, which lies next to the main chamber, separated by a rock wall (pl. 2). The rear chamber was accessible through a small ventilation shaft, or by an ascending passage just in front of the main chamber. The areas between these three parts consisted almost entirely of uninterrupted, monotonous rock, and contained hardly any finds. For the duration of the excavation, water had to be pumped out of the mine.

In 2004 similar finds, but smaller in number, were unearthed in Chale Ghar 2, a mine located above Chale Ghar 1 (pl. 2). The objects were excavated in a humid corner in the south-eastern part of the mine: ceramic shards and glass and stone beads were uncovered, together with one fragment of a green glass vessel.

Dating of Chale Ghar 1
Based on radiocarbon dating and an Islamic coin find, a dating range running from approx. 800 BC to the 8th century AD can be offered for the use of mine 1 at Veshnaveh (for Chale Ghar 2 no scientific data is available). According to A. Abar (2011), the ceramics mainly date from the late Achaemenid to the Arsacid periods, with few Sasanian shards. The jewellery objects, however, belong to the Arsacid and Sasanian periods. Archaeobotanical and archaeozoological studies were carried out by R. Pasternak and M. Doll (Stöllner, 2011). Obviously, these two mines had been re-used after an interruption of more than a millennium, no longer for extracting copper, but as places of special significance.

1.2 Aims, Questions and Methods

In this work the jewellery finds from Veshnaveh will be examined. They have a special status and contain important information for the features of Chale Ghar 1 and 2. They are manifold in appearance and in material as well as in technical aspects. Manufacturing techniques, especially those used for the glass beads, may chronologically narrow down the place of discovery, because in many cases they are linked to certain regions or periods. However, we are generally still lacking detailed and overlapping studies concerning glass beads. Jewellery or personal ornaments can reveal individual taste as well as the 'contemporary fashion'. The shapes, colours and materials of personal ornaments may be loaded with special significance for their owner or owners. These issues stimulate questions that flow from a wider understanding of the discovery of Veshnaveh: in which periods were Chale Ghar 1 and 2 reused to deposit the objects? What is the intent of the depositions in the former mines, and why were they left there? What was the significance of water? Who used the mines for depositing the artefacts? How was deposition being practised?

To answer these questions an approach

- to the systematic presentation and analysis of small finds, especially beads,
- to the symbolic, religious and social meaning of the artefacts,
- and to the understanding of the stratigraphical, chronological and social contexts of the depositions in Veshnaveh

has to be made.

Stratigraphy
In Chale Ghar 1, the objects were obviously deposited either individually or in ensembles and not in a sequence that is indisputably obvious to the archaeologist; therefore their chronological order cannot be understood without additional analysis. The lack of a clear stratigraphy makes it necessary to conduct comparative studies before a technical analysis of the distribution and features of the finds can be made. Chronological classification of the artefacts helps to understand the sequence of the features and the coherence of the depositions.

Comparative Analysis
The jewellery finds from Veshnaveh will be discussed alongside personal ornaments from Iran, the Near East, the Black Sea area, as well as adjacent regions. In Iran beads appear frequently in archaeological contexts, especially graves (Egami, Fukai and Masuda, 1965; 1966; Kambakhsh Fard, 1998), but they hardly ever have been found in circumstances as those at Veshnaveh. When beads have been excavated, they have unfortunately seldom been analysed in detail, because rarely they have been found *in situ* and their handling is very complex due to their small sizes and fragility. Most often information about technique, colour and even material is lacking, as are proper illustrations.

Manufacturing Techniques
This study sets out to make an approach in analysing the production techniques. Methods of glass bead manufacturing, e.g. winding and folding and the mosaic and the gold-in-glass or overlay techniques will be introduced. Careful consideration should enable new insights. The metal artefacts from Veshnaveh are rather simple in appearance. They cannot be classified easily due to their mostly basic shapes, and also because of the limited state of research concerning personal ornaments, especially from the Arsacid and Sasanian periods.

Origin of the Finds
Besides chronological questions, the artefacts will be investigated to explore the exchange of goods and religious aspects of their use. The great variety of the finds from Chale Ghar 1 and 2 strongly suggests that at least sporadic exchange of goods in the region took place. Stones and shells for example have natural sources and in different ways technical and chemical aspects of the glass and amber found at Veshnaveh, may facilitate the understanding of ancient trade connections. However they also raise further questions, for instance: was the raw material or the finished artefact traded? Were the glass beads manufactured locally, or were they imported? If being imported, where did the glass or artefacts come from initially?

Religion, Cult and Depositional Practices
Religious and cultural facets of the site are reflected in the material, colour and shape of the artefacts. Chale Ghar 1 and 2 probably were religious caves for the ancient people who visited them, and the water that was

permanently present in these 'caves' obviously played a special role. Comparable sites incorporating such attributes may help establish more clearly the meaning of the depositions of Veshnaveh. Most remarkable are the parallels between those depositions and what appears in written sources, as well as in contemporary or near-contemporary popular belief. As well as generally, such parallels are discussed in connection with individual finds.

Analysis of the chorology and stratigraphy as well as the individual finds of Chale Ghar 1 and 2 will contribute revealing knowledge of the chronology and cultural meaning of small finds and the history of religion, especially pre-Islamic religion, in Iran.

1.3 Previous Works on Arsacid and Sasanian Jewellery

1.3.1 Desiderata

With the finds from Veshnaveh we are dealing mainly with Arsacid/Parthian and Sasanian artefacts, alongside a few Achaemenid and Seleucid ones. Only a small number of publications deal with Iranian jewellery of these periods, and even fewer with simple, popular artefacts of a rural community of the kind excavated in the mines Chale Ghar 1 and 2.

In Chale Ghar 1 and 2 most of the objects discovered were beads, and they vary greatly in material, shape, colour and probable technique of manufacture. Generally, beads appear frequently in archaeological contexts and contain valuable information about the community responsible for depositing them, such as chronological or cultural characteristics and patterns of interchange. Yet for the Arsacid and Sasanian periods few research studies have engaged with this category of find group; and personal ornaments of these eras such as the finger rings, earrings, pendants, metal sheets, inlays and other small finds unearthed in Chale Ghar lack a basic study, too.

1.3.2 The Classification of Beads and Pendants

A first classification scheme for beads was established by H. C. Beck (1928), and is still valid today. He concentrated on Indian beads and developed a classification and a nomenclature for them, using such terms as axis, apex, diameter and cross section. First of all, he suggested how to describe a bead, the most important dimension being its length, the distance between the two ends or apexes of a bead along the axis of the string hole (Beck, 1928, p.3). The end of a bead is termed merely 'end' when it is flat or concave; by contrast, an 'apex' is the convex or 'pointy end' of a bead (Beck, 1928, p.3, fig. 3). The diameter is always taken by measuring the bead at its thickest (Beck, 1928, p.3). Beck classified beads into disc beads, short beads, standard beads and long beads; he also attached considerable weight to three basic categories of shape, namely convex, straight and concave beads (Beck, 1928, pl. II, III). He further subdivided these groups into 276 types, and numbered them according to an alpha-numerical system. He used descriptions such as 'long truncated bicone' or 'short cylinder with one convex end' (Beck, 1928, pl. II, III types, D.1.f, B4d.b). Further criteria are the position of the string hole, colour, material and decoration of the bead. Within a work of 76 pages he described and classified beads and pendants in detail, and created what remains the basis for current bead studies (Glover, Brock and Henderson, eds. 2003).

Whereas Beck's ideas have been reused copiously, they do not adequately consider technical aspects, colour and decoration, so bead classification needs additional thought (Sasse and Theune, 2003, p.566). Inter alios, two authors who have particularly advanced nomenclature and classification systems for beads are W. G. N. Van der Sleen (1973), who extended Beck's system, and P. Francis (1981). More recent attempts at classifying beads have been carried out by J. W. Lankton (2003), and by B. Sasse and C. Theune (1995), who developed a computer program for the purpose.

1.3.2.1 General Studies of Beads

A general approach has been offered by L. S. Dubin (1987; 1997; 2010), who has produced a worldwide synopsis of beads, and one taking in a long chronological range too. Starting with the Neolithic era, she considers periods up to and including the Roman Empire, as well as Islamic and modern beads. Geographically she covers almost all continents: not just Europe, but Africa, Asia and the Americas, too. Her work offers considerable interest especially for the general collector, but unfortunately is not detailed enough for archaeological comparison studies. P. Francis (2002) in his monograph treats beads as goods in Asian maritime trade. He deals with Middle Eastern, Indian and Indo-Pacific beads, and investigates the manufacturing techniques used for glass and stone beads as well. His book gives a good general overview of the Asian bead trade and of selected processing methods. Conferences and workshops on beads have been held and their proceedings edited and published. Such articles discuss both technical and cultural dimensions to the beads and their use: alongside discrete aspects of manufacturing methods and the chronology of the adoption of those methods, the cultural and/or religious symbolism of possessing such artefacts is explored (Rasmussen, Lund Hanse and Näsman., 1995; von Freeden and Wieczorek, 1997; Liu, 2003; Istanbul, 2007).

A very revealing work is that of B. Musche (1992), who for the first time gave an outline of the Mesopotamian and Iranian jewellery from the Uruk to the Achaemenid periods, having earlier written a similar study of Arsacid (or Parthian) and Sasanian jewellery (Musche, 1988). She organises her comparative material into three categories:

1. Original finds from scientific excavations
2. Illustrations from reliefs, for which the grave reliefs from Palmyra are of greatest importance; by contrast, Arsacid reliefs she terms too rough.
3. Artefacts from the art trade, which require careful analysis to identify and compare.

Among the jewellery which she analyses are: earrings, finger rings, headgears, bracelets, appliqués, bracelets, fibulae, jewellery for the ankle, and of course necklaces that contain beads inter alia. She even describes simple monochrome glass beads of the Achaemenid, Arsacid and Sasanian periods as individual objects (Musche, 1988, pp.117-175, 253-265, 299-303, 316-322).

Monochrome glass beads of these periods have indeed been listed in excavation reports or studies, but often lack a detailed description containing references to material, colour, measurements and shape (Musche, 1992; Petrie, 1894/1974; Baur, Rostovtzeff and Bellinger, 1933; Egami, Fukai and Masuda., 1965; 1966; Sono and Fukai, 1968; Negro Ponzi, 1970/71; Weinberg, G., 1971; Frye, 1973; Ghirshman, 1976; Van Ess and Pedde, 1992; Kambakhsh Fard, 1998; Novák, Oettel and Witzel, 2000; Haerinck, 2001; Yule, 2001). On the contrary, monochrome glass beads are repeatedly regarded as trade goods, as part of a necklace or adornment (e.g., Mackay, 1944; Haller, 1954; Kantor, 1957; Maxwell-Hyslop, 1971, pp.180-214; Pforzheim, 1974; Fukai, 1977; Higgins, 1980; Rehm, 1992; von Freeden and Wieczorek, 1994; Dubin, 1997, pp.29-261; Spaer, 2001; Francis, 2002, pp.87-93; Simpson, 2003; Kanungo, 2004).

Besides the two volumes of B. Musche (1988; 1992), a publication of M. Spaer (2001) especially deserves attention for its general value: she wrote a study on glass artefacts in the Israel Museum, and in doing so considered chronological as well as technical aspects of Near Eastern glass beads. The first outline analysis focussing solely on Sasanian beads was published in an article by J. Simpson (2003).

Three works by E. M. Alekseeva (1975; 1978; 1982) about beads from the Black Sea littoral are of great interest since they offer comparison studies for Iranian jewellery; but, unfortunately, the author does not specify the precise provenance of the material presented.

1.3.2.2 Gold-in-glass Beads, Eye Beads, Etched Cornelian Beads

In scientific publications about beads three groups have frequently been examined: so-called gold-in-glass beads; eye beads; and etched cornelian beads.

Gold-in-Glass beads

Gold-in-glass beads appear in Europe as well as in the Near East (Weinberg, G., 1971; Boon, 1977; Astrup and Andersen, 1987; Barag, 1990; Jönsson and Hunner, 1995; Spaer, 1993; 2001), and possible techniques of manufacture have convincingly been discussed by M. Dekówna (1999) for medieval European beads, and by M. Spaer (1993; 2001) for Near Eastern beads.

Eye beads

Eye beads have consistently had a special status, and their cultural meaning has been discussed in a number of essays (Sode, 1995; Cingi and Cingi, 2007; Dubin, 2007), while the archaeological aspects of the beads were first considered by G. Eisen (1916), with M. Spaer (2001, pp.77-97) recently making important additional observations. A special category of eye beads – compound eye beads – was studied by T. E. Haevernick (1972).

Etched Cornelian Beads

The study of the ancient and modern manufacture of stone beads has centred on Indian beads, and was first undertaken by H. C. Beck (1928) and D. Mackay (1937); their efforts were continued by L. Woolley (1934), N. R. Banerjee (1959), M. Tosi (1969), M. Piperno (1973), B. Allchin (1979), A. J. Gwinnet and L. Gorelick (1981), P. W. M. Wright (1982), G. L. Possehl (1981), N. Niharika (1993), S. B. Deo (2000), F. Tallon (1995) and J. M. Kenoyer (2007).

Widespread in the Near East are cornelian beads: due to their mostly simple shapes dating is very difficult, except in the case of the so-called etched cornelian beads, which are decorated with white or black lines etched into the stone. Beck (1933, pl. LXXI) already analysed etched beads and specified three main groups:

A: Beads of the early period - before 2000 BC

B: Beads of the middle period - 300 to 200 BC

C: Beads of the late period - 600 to 1000 AD

He further distinguished beads with white decoration on red stone (Type I) from those with black decoration on a white background (Type II). Sixteen years after Beck's classification, M. G. Dikshit (1949, p.10) added another type: beads with black decoration on a red background. E. Mackay (1933) observed the method of etching stone in contemporary Indian Sindh in the

year 1930 and described the procedure in detail in a short essay. It is most likely that the technique has not changed since antiquity. Further relevant studies on etched cornelian beads were carried out by by E. C. L. During Caspers (1971), J. Reade (1979), I. C. Glover and B. Bellina (2003), and A. De Waele and E. Haerinck (2006).

1.3.3 General Studies on Metal Jewellery

Among Arsacid and Sasanian ornamental metal artefacts, particularly magnificent relief-decorated plates, bowls, vases or other decorative items and coins have been much examined (Haskins, 1952; Bussagli,1956; Le Rider, 1965; Göbl, 1968; Curtis, 1976; Brussels, 1993; Alram, 1996; Schindel, 2004).. Small finds such as those found at Veshnaveh tend to feature in excavation reports (Allan, 1962; Egami, Fukai and Masuda, 1965; 1966; Frye, 1973; Ghirshman, 1976), yet they have barely been analysed systematically; one of the essential works on Arsacid and Sasanian jewellery was – as mentioned above – written by B. Musche (1988). General studies about Achaemenid jewellery were also completed by Musche (1992) and E. Rehm (1992), as well as by H. J. Kantor (1957). K. R. Maxwell-Hyslop (1971) investigated western Asiatic Jewellery from the early Dynastic period to the 7th century BC.

Together with the findings of other materials metal sheets, finger rings, earrings, metal beads and pendants were unearthed at Veshnaveh. As comparison studies for these only a limited number of publications are available for consultation, and often private collections will have to be considered as well, especially with regard to the Iranian finger rings which are usually found in graves, or are known from the art trade. There has been no monograph written on Iranian finger rings yet, and only a few publications discuss Persian rings (e. g., Musche, 1988, p.218-237, 276-278, 305-309, 329-330; Egami, Fukai and Masuda, 1965; 1966; Frye, 1973). From museums, several collections are known, and the provenance of most of their objects cannot be identified exactly or sometimes at all reliably; for instance, this applies to the catalogue of finger rings in the British Museum (Marshall, 1907). Other items from museums were excavated decades ago, and lack accurate documentation, important examples being the specimens in the National Museum of Iran, Tehran. Still museum publications and the finds they describe are important, and will be taken into account in this study.

1.4 Important Archaeological Sites for the Analysis of the Veshnaveh Material

A number of archaeological locations are very important for comparison studies of the jewellery finds from Veshnaveh, and are frequently quoted in this study, and so will briefly be introduced in the following sections.

1.4.1 North-Western Iran: Ghalekuti, Nowruzmahale and Hassani Mahale

In the north-western Iranian province of Gilan several sites were excavated in the 1960s by Japanese scientists, N. Egami, S. Fukai, S. Masuda and T. Sono (Egami, Fukai and Masuda, 1965; 1966; Sono and Fukai, 1968): Ghalekuti I and II, Nowruzmahale and Hassani Mahale.[1] They are located in the Dailaman district, within the Elburz ranges, at a height of about 2000 m above sea level (Sono and Fukai, 1968, p.1). At all three tombs grave goods such as pottery, beads, jewellery and weapons, as well as other objects were uncovered. The tombs of Ghalekuti were dated to the Achaemenid period with a *terminus ante quem* of the 4th century BC; seven tombs, however, belong to the Arsacid-Sasanian period (Egami, Fukai and Masuda, 1965, pp.25-28; Sono and Fukai, 1968, p.51). The necropolis of Nowruzmahle belongs to the second half of the Arsacid period, and seems not to contain any Sasanian finds (Egami et al. 1966, 18). The tombs of Hassani Mahale were dated to the 1st to 3rd centuries AD (Sono and Fukai, 1968, pp.8-14; Hori, 1981). In the 1970s S. Fukai, one of the excavators of the sites at Ghalekuti, Nowruzmahale and Hassani Mahale published a volume on Persian glass artefacts, which mostly came from the province of Gilan. It appears that some of these objects had once belonged to the periphery of the Dailaman tombs, although the author does not specify the origin of the artefacts presented.

1.4.2 North-Western Iran: Sites in the Provinces of Germi, Gilan and Hamadan

Northern Iranian sites can also be implicated to finds now present in the National Museum in Tehran. They originate from Iranian excavations carried out by A. Hakemi, E. O. Neghaban, S. O. Kambakhsh Fard, N. Egami, S. Gandjavi, J. Jasi and M. R. Saraf. Most important are the sites in the district of Germi in the Iranian province of eastern Azerbaijan. There pithos burials with pottery and jewellery finds were unearthed by S. O. Kambakhsh Fard (1998), dating to the Arsacid period. Artefacts of the National Museum of Iran have been found at Djuben and also at

[1] For dating see also Hori, 1981.

sites close to Rudbar (in the province of Gilan), at Tappeh Hatam and Abadije Sheikhlar (in Germi), as well as at Siah Darreh (in the province of Hamadan). Unfortunately they have not been included in publications, therefore the notes supplied by the National Museum of Iran are the only reliable source. Bronze finger rings in the museum apparently 'from Cheragh Ali Tappeh/Marlik' raise questions due to their origins, since Sasanian artefacts have appeared on the art market named after this famous discovery site, but obviously coming from somewhere else (Piller, 2008, p.27, note 61). It is unclear whether the finger rings in question came to the museum directly or by trade, and so their chronology remains debatable.

1.4.3 Southern, South-Eastern and Eastern Iran: Masdjid-e Suleiman, Bard-e Nechandeh, Qasr-i Abu Nasr, Nishapur and Ghubayra

In the south-western province of Khuzestan, R. Ghirshman (1976) excavated Masjid-e Suleiman and the neighbouring site of Bard-e Nachandeh. There he found a range of impressive remains from the Seleucid, Arsacid and Sasanian periods. Since Masdjid-e Suleiman had obviously been a sanctuary, the assembly of finds is at least as interesting for comparison studies as the individual objects themselves. In the province of Fars, alongside Persepolis (Schmidt, 1957a), and Pasargadae (Stronach 1965), one site, namely Qasr-i Abu Nasr (Takht-i Abu Nasr), plays a specific role in understanding the Veshnaveh finds. Qasr-i Abu Nasr was a fortress already in the Achaemenid period. However, remains having been excavated there, come disproportionately from the Sasanian period (Wilkinson, 1965, p.342, 344). An account of these remains was published by D. S. Whitcomb (1985) and R. N. Frye (1973). In eastern Iran the excavations at Nishapur in Khorrasan and at Ghubayra in Kerman have revealed comparable finds from periods as late as the late Sasanian and early Islamic eras (Allan, 1982; Francis, 1988; Bivar, 2000). Unfortunately, Nishapur was looted massively over a long period of time for the art market. Ghubayra is located 70 km south of Kerman City, and has been a medieval township (Bivar, 2001).

1.4.4 The Persian Gulf and Oman: Siraf, Khark, Ed-Dur and Samad

Finds that resemble artefacts from Veshnaveh also came from places as far away as the Persian Gulf coast of Iran. There the port of Siraf was excavated by D. Whitehouse (1968; 1969; 1970; 1971a; 1972; 1974). It was an important transshipment point probably already in the Sasanian, but especially in the early Islamic periods (Whitehouse, 1971b; Kory and Steiniger, 2001, p.257; Priestman, 2005). Though few objects from there are considered, they are significant. Connections between the central plateau – where Veshnaveh is located – and the Persian Gulf are also indicated by one find from the island of Khark, now in the collection of the National Museum of Iran, Tehran. Also on the Gulf coast the archaeological site of Ed-Dur is located. On the west coast of the Oman peninsula graves of the 1st century BC and 1st century AD were excavated (Whitehouse, 1998; Haerinck, 2001). Here some noteworthy comparable finds were discovered, and details were then published, with the writings of E. Haerinck and A. De Waele being particularly important (Haerinck, 2001; Haerinck and De Waele, 2006; De Waele, 2007). Frequently artefacts from Samad al Shan in Oman are cited. Their dating needs carefully consideration, and has recently been corrected by the author of the Samad excavation report on an a posteriori basis (Yule, 2008).

1.4.5 Mesopotamia: Uruk, Tell Mohammed Arab, Al-Tar

In Mesopotamia three sites are in the main relevant: Uruk of the later periods (Van Ess and Pedde, 1992; Boehmer, Pede and Salje, 1995; Pedde, Heinz and Müller-Neuhoff., 2000); the caves of Al-Tar (Fujii, 1976); and Tell Mohammed Arab (Roaf, 1984). The latter was excavated in the Eski Mosul Dam Salvage Project northwest of Mosul and revealed inter alia finds of the 4th to 5th centuries AD, the late Sasanian period. The Al-Tar caves are located about 30 km south-west of Kerbala. They were used for burials over a long timeframe, probably starting as early as near the end of the 2nd millennium BC (Fujii, 1976, 301), and some grave goods can be dated to the 2nd and 3rd centuries AD or the 3rd to 7th centuries AD (Fujii, 1976, 247).

1.4.6 Syria, Israel, Palestine and the Levant: Dura Europos, Tell Sheikh Hamad, Horbat Castra, Samaria

In Syria and the Levant generally several sites are important, a prime example being Dura Europos, which was a Greek foundation under the Seleucid Empire, and later belonged to the Roman Empire (Rostovtzeff, 1938; Toll, 1946). In the middle of the 3rd century AD it was conquered by Sasanian troups and almost immediately abandoned. Formerly Assyrian Tell Sheikh Hamad/ Dur-katlimmu in eastern Syria became less important in the Persian era, but in the Arsacid period the lower town was settled, and artefacts from the Parthian/ Roman necropolis play a role in dating the Veshnaveh finds (Novák,Oettel and Witzel, 2000). A tomb of the 3rd

to early 4th centuries AD at Horbat Castra in Israel and another from Samaria of the 3rd–5th centuries in Palestine contained interesting material, especially for the study of glass beads (Crowfoot, Crowfoot and Kenyon, 1957; Barag, 1978; Meyers, Strange and Meyers, 1981; Gorzalczany, 2005).

1.4.7 The Black Sea and the Kuban Region

Numerous places from Iran and the Near East are described, but also archaeological sites from the northern Black Sea littoral and Crimea are of importance (Alekseeva, 1975; 1978; 1982). From the Black Sea region particular account has been taken of finds from Tanais/Russia, Vladimirovka/Ukraine and Kalantaevo/Ukraine, and from the Kuban region/Russia important sites include Adygeen, Krasnodar, Voroncovskaja, Ust'Labinskaja, Tbilisskaja, Kazanskaja and Michailovskaja (Simonenko et al., 2008).

1.4.8 Roman Provinces

Besides the comparable finds from Iran, the Near East and the Black Sea region, useful parallels from the Roman context are described in the catalogue. That such parallels are important is plausible due to proven connections between Rome, the Near Eastern Roman provinces and ancient Iran (see Debevoise, 1938; Ziegler, 1964; Winter/Dignas, 2001; Howard-Johnston, 2006). Research studies about Roman small finds have not been surveyed in detail in this work; nonetheless, the few Roman examples presented may give some indications of the date of the objects from Veshnaveh.

1.5 Applied Techniques of glass and stone jewellery from Veshanveh

1.5.1 Introduction

Eight categories of small finds were unearthed in Chale Ghar 1 and 2: coins; beads; pendants; inlays and one gem; finger rings; earrings; metal sheets; and miscellaneous objects. A large number of glass beads and many stone beads were found in the mines. The manufacturing method used to make glass beads and many of the stone beads is of great interest for interpreting the beads, as well as for offering plausible date ranges in some cases. Therefore, an introduction to the manufacturing processes used to make beads follows. In the course of that introduction the methods likely to have been used to make the beads found at Veshnaveh are identified and explained.

Before the objects are presented in detail, relevant jewellery techniques that were applied on the artefacts from Veshnaveh are described. The glass beads found at Veshnaveh are very diverse and show highly skilled craftsmanship. First, an introduction about basic bead-making methods will be offered, and in the following section more elaborate techniques, such as gold-in-glass and mosaic, are discussed, because ancient procedures are not yet understood in detail. For stone beads the preparation, the finish, the drilling, but especially the etching of cornelian beads will be explained.

Most of the metal objects that were found in Chale Ghar 1 and 2 are rather simple in appearance, and did not involve craftsmanship of great complexity. Notwithstanding the spherical hollow gold beads were most probably hammered in or made with moulds, while the manufacturing method used to make the granulated beads with hollow spherules remains most conjectural. Bronze and lead beads show sharp edges that indicate the use of tools on the cold metal. The metal sheets are obviously wrought with the repoussé technique, in which the metal is hammered from the reverse side (Higgins, 1980, p.12).[2] Gold can be hammered very thin, and, as it happens, the gold sheets discussed here are very fine.

1.5.2 Glass - the Basic Methods

Glass as a material: Glass was discovered in the late 3rd millennium BC and it was not until 500 years later that the first glass vessels emerged; it took a further 1500 years to invent glassblowing (Stern and Schlick-Nolte, 1994, p.21). Recent studies have shown that glass has been treated in Egypt since 1550 BC, and according to E. M. Stern and B. Schlick-Nolte (1994, p.25) this craft was obviously influenced by the Near East at first.

Glass is a non-crystalline (amorphous) solidified high-temperature melt and is composed usually of quartz sand (SiO_2) that forms the glass, a flux, for example soda (Na_2CO_3), and a stabiliser, for example lime ($CaCO_3$). With the addition of metal oxides, such as copper oxide, glass becomes coloured.[3] The process of producing glass was very elaborate and needed special skill. It is very likely that glass was produced at centres of glass production and then traded as ingots or chunks, as were found from 14th-century-BC Tell el-Amarna or on the shipwrecks of Uluburun (Lierke 2009, p. 15 fig. 96). Most probably pre-manufactured glass rods were used for bead manufacturing then. This means that it was possible for anyone to manufacture glass beads, if the raw materials and the specific skills were available, but without the necessity of building a glass

[2] 'Repoussé is a general term for ornamental work produced on sheet metal with a hammer and punches. Strictly, it should apply only to work embossed from the back, while work done from the front is known as chasing;…' (Higgins, 1980, p.12).

[3] For more detailed informations read e.g.: Shortland, 2012, pp.21-27.

furnace and a large workshop (Stern and Schlick-Nolte, 1994, p.27). Raw glass would have had to be obtained from distant workshops and then to be coloured separately, or already coloured glass was traded (Stern and Schlick-Nolte, 1994, p.21). So the treatment of glass by a small (shielded) fire might also have been possible in a settlement (Stern and Schlick-Nolte, 1994, p.27). In addition, the working of glass into objects directly at a glass melting furnace seems not to have been established before Roman times (Stern and Schlick-Nolte, 1994, p.25; Lierke, 2009, p.14 fig.95).

Different methods could be used to produce a glass bead and in the following paragraphs the techniques that have been identified at Veshnaveh will be explained.

Winding glass: To produce beads, an enclosed fire enforced by draft was needed to reach high temperatures for melting pre-manufactured glass rods (Lierke, 2009, p. 7 fig. 93). The spherical shape, for all intents and purposes, can be recognised as the basic shape of a glass bead: turning hot glass – of a melted glass chunk or rod – on a rod (of a material other than glass) would usually form a spherical bead without the use of any more tools. Probably for that reason, the most commonly represented shapes, among the monochrome beads from Veshnaveh, are the spherical beads. The molten glass was wound around a metal rod by turning the rod slowly. Funnel shaped string holes indicate the use of a conical rod to produce the bead. Beads and eyelets could also be perforated by drilling (Stern and Schlick-Nolte, 1994, p.47), but such methods are rather dangerous and not very convenient, because a bead could easly break during the process. Another method would be winding – in a furnace – gathering the soft glass with a peaked mandrel and winding the gathered glass thread around the rod. This, however, was probably not performed before Roman times.

Folding glass: The technique of folding glass also shows one of the methods of making beads, instead of winding hot glass several times around a rod it was given just a single turn or a pre-manufactured stripe was folded around a stick sometimes leaving a seam (Beck, 1928, p.61; Van der Sleen, 1967, p.26; Spaer, 2001, p.309). To perform the folding technique, the glass must have been rather stiff. The bead was marvered to its shape or shaped by tools then (e.g. conical as no. 4299c, pl. 5). In many cases this method is not recognisable especially to the naked eye. Glass beads can be heated until the seam and the beads fuse without a trace. From modern bead making in India the folding method is known: the bead maker would fold the glass stripe around a piece of wire and shape it by rotating, similar to the way wound beads are produced (Kanungo, 2004, p.123). This technique requires several tools and appliances (e.g. a marver) and careful observation of the temperature of the glass. Incorrect cooling and reheating results in the glass cracking (Lierke, 2009, p.9 fig.94). This method was perhaps useful above all in producing multi-coloured or mosaic glass beads. P. Francis declares that this folding method was Hellenistic (Francis, 2002, p.93).

Drawing glass: Bar-drawing has been a basic part of the glass manufacturing process from earliest times. Finds of bars for colour decoration of core-shaped vessels are known already from the the 16th and early 15th centuries BC (Stern and Schlick-Nolte, 1994, p.54).

Drawn glass was mostly used for the making of the translucent beads found in Veshnaveh, but also a few opaque ends of rods were found.[4] Glass was maybe inserted with a bubble of air by using a tool, then it was drawn into a rod (Spaer, 2001, pp.46-47) and processed further, for example pressed into a mould or directly cut into single cylindrical beads (Spaer, 1993, p.10). During the process length-wise lines can emerge and are visible on the bead especially when corroded (pl. 5, no. 1949f; pl. 6, no. 1222b2). These characteristics and the elongated air bubbles are regarded as evidence of the drawing technique. According to M. Spaer (1993, p.10) 'drawing' was introduced sometime prior to the introduction of gold-in-glass beads, that means in the Hellenistic period.

Shaping beads: By winding, as a matter of course spherical or ovaloid beads could be produced. To achieve other shapes, such as rectangular, hexagonal or faceted beads, various tools had to be used, notably the marver (Gam, 1990, p.204; Sode, 2007, pp.3-4). Another possibility would have been to use moulds. Cylindrical or biconical beads most probably were produced by marvering (rolling). The ribs on melon beads were probably made with a knife (Gam, 1990, p.204; Sode, 2007, p.3). Facetted or hexagonal beads could be fabricated with tools, moulds or even by grinding when the glass was cold. One conical bead from Chale Ghar 1 has sharp edges that may be traces of grinding (pl. 5, no. 4299c).

Overlay glass: Some beads that were found in Veshnaveh are made of two layers of glass, the so-called overlay beads.[5] Either a glass rod or a molten chunk of usually colourless or yellowish glass was overlaid with another usually translucent molten glass layer – most probably by winding – and then the chunk was drawn and cut into single beads; or single beads were covered with another glass layer (Stern, 2001, p.30). Another method could be to cover the molten chunk with a round slice and to attach it to the core by rolling it back and forth on a marver (Stern, 2001, p.30).

Gold in glass: A flimsy gold foil, secured around a glass core, is surrounded by clear, colourless glass. The cov-

[4] See cylindrical yellow beads nos. 1629e–f (pl. 5).
[5] For technical terms see Stern, 2001, p.30.

ering gives the bead a depth effect and intensifies the brilliance of the gold like a loupe: such is the appearance of the so-called gold-in-glass beads.

Geographically, gold-in-glass beads are distributed broadly, from Asia to Europe, including even Great Britain (Francis, 2002, pp.31-30; Boon, 1977). A terminus post quem is indicated by the finds from the famous glass manufactory on the island of Rhodes in the eastern Aegean. There G. Weinberg found late 3rd-century-BC remains of gold-in-glass beads, which were in the process of being manufactured: segments of double-layered glass rods with a third layer of gold foil in between the two (Weinberg, 1971, pp.150-151).

While this late 3rd-century site established that the manufacture of gold-in-glass beads was under way, G. C. Boon (1977, p.194) argues that the first gold-in-glass beads were produced in Egypt, appearing perhaps early on in the Ptolemaic period (from the end of the 4th to the 1st centuries BC). To the contrary, D. Barag suggests (1990, p.24) that the first gold-in-glass work was performed in the late 3rd century BC (at the same time as the Rhodes factory), but he suggests that the roots of the technique lay in Phoenician art of the 8th century BC. M. Spaer (1993, p.18) also considers Egypt 'the birthplace' of the gold-in-glass technique, and one that went on to be an early centre of production. Indian scientists, however, assume that the origins of the technique lie in their country (Francis, 2002, p.91; Dikshit, 1969, pp.56-58).

Key to understanding gold-in-glass production and early gold-in-glass artefacts are the vessels of the so-called Canosa group, which contain inter alia two well preserved bowls with decorated gold inlays and eight further items of glassware. One hundred years ago these gold-in-glass bowls came to the British Museum from a grave in southern Italy. They are believed to have been manufactured in a Ptolemaic workshop of the first half of the 3rd century BC (Harden, 1968, pp.21-47). In M. Spaer's judgment (1993, p.10) – supported by the research of D. B. Harden (1968, pp.45-46) and A. Oliver (1969, p.16) – no gold-in-glass beads have been found that have been dated earlier than the Canosa group. Considering this, and looking at the results of the Rhodes excavation, a terminus post quem for the production of gold-in-glass beads can be fixed to the late 3rd century BC (Weinberg, 1971, pp.150-151).

Spaer (2001, p.130) identifies a hazard for the archaeologist: 'Gold-glass beads remained over the centuries a rather homogeneous class of beads, and their origin and date can only rarely be fixed with precision. Nonetheless, minor differences of style and technique point occasionally to some recognizable chronological differences.' According to her, individually finished gold-in-glass beads are characterised by careful preparation and neatly smoothed ends: 'The perforations are rather large and the two glass layers are of roughly equal thickness.' (Spaer, 2001, p.131). These characteristics apply to an earlier dating of these gold-in-glass beads (Hellenistic to early Roman), while 'beads finished by the use of segmenting molds' appeared a little later (Roman or post-Roman; Spaer, 2001, p.134).

This situation continued until the Middle Ages when gold-in-glass beads were produced in Europe (Spaer, 1993, p.20; Boon, 1977, pp.201-202), while evidence for gold-in-glass beads in the Near East is scarce for the same centuries. The reason therefore may be a change in burial rites (Spaer, 1993, p.20).

Manufacture of gold-in-glass beads: The production of gold-in-glass beads requires special skill and experience: a glass core was covered with gold or another metal and overlaid with translucent glass. To work the glass, core and cover need to have the same thermal expansion coefficient to avoid fracturing (Lierke, 2009, p.9 fig.94). There is no evidence that the inner and outer layers of the gold-in-glass beads from Veshnaveh were of the same composition, but chemical analysis of metal-in-glass beads from the early mediaeval hoard of Zawada Lanckorońska in southern Poland allows us to assume that the same glass was preferred for most of the metal-in-glass and overlay beads (Zoll-Adamikova, Dekówna and Nodek, 1999).

However, investigations revealed that the outer glass layer was of much better quality than the opaque core, though both were composed of the same material in the same proportions (Dekówna, 1999, p.52 tabs.1-2). M. Dekówna (1999, p.52) suggests that the outer glass layer was more thoroughly molten and cleared glass, while the core was less thoroughly molten. The latter had no decorative function anyway and was hidden by the metal foil. According to R. Lierke using heat from the outside automatically results in better molten glass (Lierke in an e-mail of the 6th of February 2011). Concerning the mediaeval beads from Poland their cores were made of drawn rods or of two previously drawn-out glass plates or bands with the side edges melted together (Dekówna, 1999, p.55). On the Veshnaveh beads no further observation of the cores could be made, because they are still covered by foil and surface glass.

The metal layer poses at least as many questions as the core, the main reason for this being its extreme fragility. The gold foil or film is exceptionally thin – according to E. M Alekseeva up to a thickness of 0,0001 mm (Alekseeva, 1978, p.27). However, suggestions have been made that molten metal was applied onto the glass core (Astrup and Andersen, 1987, p.225; Dekówna, 1999, pp.55-56) – a method which seems rather unrealistic, but instead of the molten metal a gilding solution could have been applied (Lierke pers. comm.).

Disagreement dominates the discussion of the covering glass (Spaer, 1993, p.14). M. Dekówna (1999, p.56) puts it simply: 'It has not been resolved as yet how the glass outer layer was made'. For the mediaeval beads suggestions made remain as varied as: already impressed segments were coated with molten glass (Astrup and Andersen, 1987, pp.224-225); or a thin 'leaf of glass' was applied on the metallic layer (Bezborodov,

1959, p.229). C. G. Boon (1977, p.193), who examined British gold-in-glass beads, writes: 'The beads were made from sections of tube, generally colourless, covered in the foil and then dipped into molten glass for protection and added brilliancy.' The tube was held by a rod or wire and pushed in at intervals to get segments or single beads, or was shaped with help of a mould. Gold-in-glass beads with quite small string holes have frequently been discovered, which, in Boon's opinion, is to be explained by the use of a wire for holding the bead during the process of production. He adds that the gold-in-glass segments were then broken into singular beads, or, as an alternative, into two- or three-bead segments.

This rather theoretical attempt by Boon to describe the manufacturing process does not take account of one fact: without the aid of a specialist tool it is not possible to cover a gold-foil-coated rod with glass just by dipping it into hot glass and expecting the coating not to be harmed (Lierke, 2009, pp. 6-7 figs.92-93.). Low viscous glass, into which something could realistically be dipped, would have to be at least as hot as 1100 °C (Lierke, 2009, p.4 fig.92); this temperature would harm the gold foil, which has a lower melting point. Another point is that until about the first century AD a glass furnace that could provide molten glass directly from the crucible was obviously unknown. Instead, most probably pre-manufactured and reheated glass chunks were used to work on (Stern and Schlick-Nolte, 1994, p.28). Boon's dipping-into-molten-glass theory does not stand scrutiny in the light of these considerations. The small string holes most probably emerged through the segmenting of the beads: in the centre of each bead the string hole tends to be wider (Spaer, 2001, pp.131-133).

Spaer published a single volume analysing glass in the Israel Museum, and it has become an essential work for glass bead studies in the Near East. She focused on gold-in-glass beads both in this work and in an earlier article (Spaer, 1993; 2001, pp.130-139). Similar to Boon, she describes the process of manufacturing gold-in-glass beads, but concerning how the gold foil was covered she disagrees: along with Z. A. L'vova she believes that another pre-manufactured glass tube was slipped over the core and the gold foil (L'vova, 1983, 101; Spaer, 2001, p.131). This combination was then carefully heated and shaped. For segmentation probably tools or moulds were needed (Spaer, 1993, pp.10-16).

This method may have been used in certain times or localities. However, to produce two glass tubes that would fit exactly one into another and then to heat this combination is very difficult. Often air pockets are trapped between core and cover. To avoid air between the two tubes in the manufacturing process would require a special technique involving a reduced air pressure. These problems led to an alternative suggestion by R. Lierke based on her own former experience of using glass powder and multi-ply overlay glass: The gold-faced rod was covered with glass powder.

The monk Theophilus describes a comparable method used for making mosaic cups in the Middle Ages: gold-foil-covered cups were coated with powder of translucent glass (mixed with water) and then heated in a furnace (Theophilus Presbyter, 1847, pp.132-133). The glass powder fuses at a temperature far below the melting point of gold, thus avoiding the danger of overheating the sensitive gold foil. Another observation, however, strengthens the case for a rethink of this 'powder' theory: on some of the gold-in-glass beads from Veshnaveh elongated striae, air bubbles respectively, are clearly visible in the cover glass (e.g. nos. 1222b, 6267): do they indicate that alongside the powder method the drawing method was used to make the covering glass? Air bubbles in the covering layer were captured by the melting glass powder, as can be seen on bead no. 1883c32. They would have become long thin streaks in a drawn tube.[6]

The shaping of the gold-in-glass tubes into segmented specimens was obviously performed after the cover layer had been applied (Dekówna, 1999, p.59; Spaer, 1993, p.12), and it seems plausible that the gold-in-glass tube was rolled on a mould. Another suggestion is that tools such as pincers were used to shape the segments (Dekówna, 1999, p.59).

The conclusion must be that the technique used in ancient times to produce gold-in-glass beads has not yet been fully established; furthermore, the technique may have varied across different regions and periods.

Based on the chemical examination, it seems likely that the segmented metal-in-glass beads from Zawada Lanckorońska were made of glass from the same origin, possibly the Near East (Syria, Egypt) or provincial Byzantine centres (Dekówna, 1999, p.54). Unfortunately, such an analysis could not be performed on the gold-in-glass beads from Veshnaveh, and it would be very interesting to establish whether or not an investigation of their chemical composition would lead to similar results. As it is unlikely that such technically elaborate beads were produced locally, the question of their origin remains. Did the gold-in-glass beads from Veshnaveh come all from the same region or were they produced at different manufacturing centres?

Stripe- and Trail-decorated beads: The term 'trail-decorated', favoured by M. Spaer (2001, p.99), is used here for the beads of Veshnaveh in a very general way, implying any kind of ornamentation that can be termed striped or linear, regardless of how it was achieved.

Stripe- or trail-decorated beads could be produced on the rod or on drawn beads, though the latter are 'considerably less numerous than rod-formed trail-decorated types' (Spaer, 2001, p.99). Technically, already in the

[6] If a bead or its cover looks streaky, it is worth looking carefully to see whether or not it is the striated core which is shining through the cover (e.g. pl. 6, no. 4090e; no. 4062h). Sometimes a striated core generates impressions on the inside of the covering layer as seems to be the case in no. 1222b2 (pl. 6).

2nd millennium BC artisans were able to produce striped beads in different variations (Spaer, 2001, p.99). According to M. Spaer (2001, p.105), 'the common technique of making beads with longitudinal trails involved the application of trails to the gob of glass prior to the primary drawing process, allowing for mass production. The drawn trailed beads became well known only in the late Hellenistic and early Roman periods, but may have had earlier beginnings.'

Mosaic glass: The term mosaic is used when different coloured glass is arranged into ornamentation and melted together, and often different techniques are described with this term (Spaer, 2001, p.118). Fragments of vessels from Hasanlu, Marlik, and Tell Al-Rimah that have been dated as early as the 2nd millennium BC are defined as mosaic by some scholars (Von Saldern, 1966; Spaer, 2001, p.118), while others do not count this method as a mosaic technique, but as a preceding method (Stern and Schlick-Nolte, 1994, p.46). These vessels are presumably cored vessels and were made of pieces of glass rods pressed into a soft core material, which was removed after melting the glass (Stern and Schlick-Nolte, p.46). Glass powder has played a role in producing cored vessels (Lierke, 2009, p.19 fig.97), as well as in the production of ornamented glass beads (Sprague, 1966; Francis, 1979, p.88).

According to M. Spaer (2001, p.118), Mosaic glass came into common use only in the Hellenistic period. At that time, a mosaic pattern was created by bundling cold glass sticks or canes to form an ornament (Stern and Schlick-Nolte, 1994, p.54; Spaer, 2001, pp.48-49; Francis, 2002, p.94). The finishing of such composite glass sticks (bundled in cold condition) is assumed to have been an invention of Phoenician craftsmen. The earliest examples come from the 8th century BC, and were excavated in Arslan Tash in northern Syria (Stern and Schlick-Nolte, 1994, p.59). Egyptian glass fabricators seem to have been the first to produce mosaic sticks, often ones with diminutive patterns. The earliest examples are found on a wooden sarcophagus in Turin (Scamuzzi, pl.CVII; Stern and Schlick-Nolte, 1994, p.60). Such ornaments could again be drawn to narrow canes when heated (Spaer, 2001, p.51). In turn colourful ornamented stripes made of such sticks were folded around a rod to form a bead or applied onto the hot glass of an already rod-formed basic bead. The sticks themselves, that were bundled to rods, must have been elaborately shaped by tooling or moulding to produce figurative patterns (Spaer, 2001, p.51): this point is especially pertinent for the flower-ornamented bead, no. 1472 (pl. 10), and for the bird mosaic bead, no. 6885 (pl. 10), from Chale Ghar 1.

Eye beads: In a report about objects from Samaria/Palestine three main methods of producing eye beads are mentioned. In the course of the discussion it is outlined that '...a cane is made up of the pattern required for the eye and pieces of this cane are broken off and pressed into the base.' (Crowfoot, Crowfoot and Kenyon, 1957, p.391). This technique had earlier been outlined by G. Eisen (1916, p.6, p.10, p.24), but unfortunately he was not able to present substantial quantities of comparable finds. Fragments found in Chale Ghar 1 clearly show this method: short cylindrical beads were pressed or embedded into a blue basic glass, probably powder glass (pl. 11, no. 6135a4).[7] Instead of pressing white rods into a hot bead, it is rather plausible to use a hot glass stripe that was decorated and then folded around a rod. This is proven by the appearance of some complete preserved blue/white eye beads: they show an alignment of the white glass rods in the direction of the winding or folding, as well as the seam of the folding.

Besides impressing small rods into hot glass stripes, the embedding of white rods or beads into blue glass powder is likely to have been a possible means of producing corresponding decorated glass stripes.[8]

Glass blowing: The earliest evidence for the blowing of glass was found in Jerusalem, where the waste of glass manufacture was found in a layer of the early 1st century BC (Avigad, 1972, pp.193-200, Israeli, 1991, pp.46-55). When glass blowing began to reach its full extent in the 1st century BC, the new technique spread throughout the Roman Empire fast (Stern/Schlick-Nolte 1994, 81). One small glass vessel excavated in Chale Ghar 1 was obviously blown (pl. 46, no. 4553a).

Glass gem: Intagli are inlays made of stone or glass with negative worked-in patterns. It is not always clear whether the figural designs on Hellenistic and earlier glass gems were mould-shaped, or engraved when the glass was cold. In each case the ring stones were mould-shaped. Traces of tools on the back of some antique gems indicate the technique of their manufacture: obviously molten glass was used. The artist would have laid a small chunk of glass into an open mould and heated the glass together with the mould. When the glass became soft and semifluid he would press it into the mould with a flat tool (Stern, 2001, p.358; Krug, 1980, pp.151-260, pl.64-137; Krug, 1995, pp.159-218, pl.39-58). It is most likely that this is the method used on the inlays and the gem from Veshnaveh.

[7] A smooth transition led from the 'powder' process to the mosaic technique, where glass powder or crumbs were spread between the mosaic slices (Stern and Schlick-Nolte, 1994, p.63).

[8] In this case the powder and the rods were molten when they were pressed to form a bead or stripe in a mould. The stripes could then be folded around a rod. In each case, whether using a metal rod or a mould, a release agent would have been necessary. Otherwise the glass and rod or mould would have stuck together. It is assumed that bone ash was such an agent (Stern and Schlick-Nolte, 1994, p.24).

1.5.3 Stone - the Basic Methods

Introduction: Shahr-i Sokhta in Iran probably was a centre for producing stone beads in early times. The unfinished and fragmented stone beads found there advance understanding of the manufacturing process for stone beads in general (Niharika, 1993, p.7). A number of authors have studied the process of stone bead making (e.g. Beck, 1928; Woolley, 1934; Mackay, 1937; Banerjee, 1959; Tosi, 1969; Piperno, 1973; Allchin, 1979; Gwinnet and Gorelick, 1981; Wright, 1982; Possehl, 1981; Tallon, 1995; Deo, 2000; Kenoyer, 2007). Niharika describes the techniques based on studies of the bead factory in Chanhu-daro/Pakistan, where beads and tools were found (Niharika, 1993, 6), and by watching contemporary stone bead makers in Cambay/Gujarat/India (Niharika, 1993, p.11). Similar observations were made by P. Francis in modern Arikamedu/India (Francis, 1991, pp.36-40), while D. Mackay (1937) analysed bead making in ancient Sindh. Also in India, in Cambay, F. Tallon (1995, p.39-44) observed stone bead manufacturing; and J. M. Kenoyer (2007) studied stone beads in ancient South Asia with regard to technology, style and values. P. W. M. Wright (1982) recorded the drilling of stone beads in Kabul/Afghanistan. The process of shaping amber beads probably followed a similar technique to that used for the stone beads, although amber is very fragile and drilling the string hole is especially risky.

Based on the observations of the above named authors, a rough outline of stone bead production can be given:

Heating: Sometimes stones were heated to remove the inter-crystalline water for easier and more controlled shaping, or to improve the colour; this is especially relevant for cornelian beads, so that either a more prominent colour could be achieved, or so that the stone could be softened for better working. When the interior of a broken cornelian bead has a different colour from the exterior it is possible that it was treated with heat or probably with chemical substances.

Sawing and cutting: First the stone is chipped, smashed, sawn or pecked into small rough-outs. These were worked into a more even shape and then cut into a final appearance; for this the stone probably was fixed in a frame and then tools, likely made of metal, were employed to saw, cut and grind the stone.

Drilling: 'Before the final polishing the drilling was done' (Niharika, 1993, p.9). According to J. Boardman (1970, p.380), in antiquity bow-drills were most probably used for the perforation of beads. These drills consisted of a wooden stick with a string stretched between the two tips. The string is wound one turn around the shaft of the drill and then held vertically; then it is moved back and forth. Metal, stone or even diamond tips were used, and the drilling was done possibly with abrasive (emery) powder and/or water. Several types of drills are known to have been used in prehistoric and early historic periods (Kenoyer, 2007, tab.3).

The marks that are preserved inside the string hole attest the drill types and may indicate different workshops or regional styles of stone bead manufacture. Unfortunately there is a lack of basic studies covering these issues. Some beads from Veshnaveh show a deepening at the ends of the string hole. Probably these were made with a broad drill first, for guiding a thinner drill or for the abrasive to prevent it from escaping. According to P. W. M. Wright (1982, p.99) these deepenings are characteristic of bow-drilled beads. Some stones are much harder than other stones – notably rock crystal – and need harder drills.

It is known that sometimes beads were drilled before the final shaping of the bead, because of the danger of breakage. Most of the stone beads from Veshnaveh were obviously drilled from both ends to prevent the stone from breaking.

Polishing: The last step was to polish the stone bead, probably by rubbing it with another stone piece or a hone. A modern method of polishing stone beads is to use a leather bag, filled for example with sand or cornelian powder. This bag is rotated until all the beads have even and polished string holes. In this way the previously sharp holes become smooth and a thread would not be cut.

Etching stone beads: At Veshnaveh a number of cornelian beads were excavated that showed a white line decoration, one that was applied by using an alkali for etching the stone. Such beads are distributed in the Near Eastern world, and beads with black ornamentation are known as well. Such decoration was generated by using mineral salts including copper or manganese (Dikshit, 1949, p.2).

So, in antiquity craftsmen were obviously capable of decorating stones not only mechanically, but also chemically. This decoration has survived in large quantities and over many centuries. It is believed that the technique was developed in the Indus valley, where sufficient deposits of cornelian stone existed. Early finds were excavated in the bead workshop of Lothal (Rao, 1985), and M. G. Dikshit (1949, pp.3-10) mentions numerous places in modern Pakistan and both northern and southern India where etched cornelian beads have been found, while H. C. Beck (1933) introduced finds from Mesopotamia, Syria, Turkey, Kashmir, Bengal, Madras, Persia, Baluchistan, China, Tibet, Turkestan, Russia and Africa.

In 1930 E. Mackay (1933, pp.144-145) studied the manufacturing method of etched cornelian beads in modern Sindh/India. For this purpose she needed to persuade a craftsman to revive a technique that he had learned from his father, but had not performed since his youth. E. Mackay described the process in detail: first of all, the craftsman stirs the ends of a certain bush, *cap-*

paris aphylla, to a mash, with the help of a wooden stick. Then he mixes soda and water with a little bit of the plant mash and strains it through a linen sheet; with a pencil made of a reed containing the mash, he draws a pattern on the cornelian bead, which is secured in a mounting made of clay and cotton. Skill and a calm hand are required to apply the decoration onto the small bead. Still as it is being mounted the artefact is laid on a metal platelet, which is then placed into embers until the decoration dries. After this the bead is completely covered with the glowing ash. P. R. S. Moorey (1995, p.141) considers a heat of about 300–400°C to be needed for the alkali to infiltrate the stone. After a short delay of only about five minutes, the stone is put under an upturned cup to slow its cooling. The cooled stone can be cleaned with a cloth, and in the process it becomes clear that neither the stone nor the decoration have been harmed or contaminated by the ashes. By examining a thin section of an etched bead H. C. Beck (1933, pp.384-385) found that the decoration was not only visible at the surface, but that the soda lotion had penetrated into deeper layers of the cornelian stone. By her own experiments E. Mackay learned that the plant mash does not have any effect in the chemical process. Obviously it prevents the diffluence of the colour during the heating. Therefore, besides technical ability, most of all experience was important to etch beads: some stones become white, pink or opaque when heated too long or too much (Mackay, 1933, p.145). The etching was obviously done before the drilling, because decorated stone beads have been found that had not been drilled yet (Beck, 1933, p.386; Mackay, 1938b, pp.84-85). In pre-Islamic and pre-Christian eras the etching of the beads most probably proceeded similar to the method described by Mackay.

2 Catalogue: Description and Interpretation of the Finds

Terms and Technique: The objects are presented and analysed in sections that are each divided into two parts: in the first one, the specimens are briefly described and listed in tables, with information about their material and colour, shape and preservation, measurements and technical specifics where observable. The finds from the two mines, Chale Ghar 1 and Chale Ghar 2, are classified in separate tables. In the second part of each section the objects are compared to finds from Iran, the Near East and other regions; based on these comparisons and on technical details, chronological ranges are provided wherever possible, and interpretation suggested. The comparable finds are listed in tables with their date, provenance and a short description as well as a reference.

Outline catalogue: The outline of the cataloque is shown in the table overleaf.

Number: The find number refers to the registration number of the excavation. In case of the National Museum of Iran, sometimes several finds share one find number.

Colours: the colours of the glass beads are specified according to the Michel Colour Guide (37th edition): for example, grey-yellow is 5-2-6 and vivid greenish blue is 31-38-5.

Shapes: The shapes given are based upon the classification system for beads established by H. C. Beck (Beck 1928). However, in some cases the descriptions deviate from Beck's nomenclature. For example, due to their irregular and rough manufacturing, some beads have been summarised as ovaloid instead of ellipsoid (according to Beck 1928, pl. II III, D. 1 a). Conventional terms from established nomenclatures have been used, when Beck's tables do not provide a satisfactory answer.

Technical details: This heading is most relevant for glass beads, as such a range of terminology is used, i. e. wound, folded or drawn glass, and funnel shaped string holes.

Measurements: Beads are measured according to Beck's system (Beck, 1928, p.3). Length is the distance from one string hole opening to the other. Diameter is the broadest dimension of an artefact, for beads at 90^{o} to the string hole. Finger rings have both outer and inner diameters, indicated respectively as 'D.' and 'inner D.'.

Provenance: Mainly modern country names are used, and for archaeological sites either ancient or modern/ artificial designations are given – as is recommended in the established literature. Finds from museum collections are also considered, though their provenances cannot be stated precisely in some cases.

Date: Where possible an absolute date is given, but often only periods such as Hellenistic, Roman (= Roman Empire), Arsacid, Sasanian are indicated, as is normal in the relevant literature. The Arsacid period corresponds to some extent with the Roman period and both terms are used.

Illustrations: A selection of illustrations of the artefacts from Veshnaveh is presented in this volume, to represent the types. Some of the illustrations are reproduced in colour; others are only in black-and–white, like the illustrations in the catalogue of the Veshnaveh finds. There all plates will be ordered and listed according to the features of the objects concerned.

Quotes: Literature is cited according to the Anglia Ruskin University/Harvard system. However, the plates are cited in Roman or Arabic letters as appears in the literature itself, to avoid misconceptions, because some authors use Roman and Arabic letters side by side for numbering their illustrations within the same publication.

Outline of the catalogue.

Category	Hypernym	Material	Specifications
Coins	Metal	Silver/Bronze	Arsacid coin Sasanian coins Umayyad coin
Beads	Glass	Glass	Simple monochrome glass beads Overlay beads Gold-in-glass beads Stripe-/trail-decorated beads Variously ornamented beads Mosaic beads Eye beads
	Metal	Gold	Hollow spherical beads Melon-shaped beads Keg- and ring-shaped beads Granular beads
	Metal	Silver	Granulated beads Cylindrical and ring-shaped beads
	Metal	Lead	Cuboid beads Double-conical beads
	Metal	Bronze/copper	Spherical beads Ring-shaped beads
	Stone	Cornelian	Spherical beads Double-conical beads Ovaloid/conical beads Hexagonal beads Disc-shaped beads Ring-shaped beads Keg-shaped beads Rhombic, rectangular, triangular, irregular beads Fluted beads Etched beads
	Stone	Garnet and brown, red and pink stones	Spherical beads Ovaloid beads Rectangular beads Hexagonal beads Irregular beads Brown, red and pink stone beads
	Stone	Lapis lazuli, turquoise and azurite beads	Ovaloid beads Ring-shaped bead Disc-shaped bead Cornerless cube shaped beads Rectangular bead Turquoise and azurite beads
	Stone	Limestone, marble, chalcedony, rock crystal.	Eye stone bead Limestone and marble beads Chalcedony beads Rock crystal beads
	Stone	Jet	Spherical bead Ovaloid beads Cylindrical beads Disc-shaped beads Rectangular beads

Outline of the catalogue.

Category	Hypernym	Material	Specifications
	Organic	Amber	Spherical beads Ovaloid beads Ring-shaped beads Cylindrical beads Cornerless cube shaped beads Triangular (cross section) beads Drop-shaped (cross section) beads Irregular shaped beads Fragments
	Organic	Shell/coral	Worked shell or coral beads (cylindrical)
	Organic	Mother of pearl	Mother of pearl beads
	Organic	Cowrie and other shells	Cowrie shell Conus shell
	Other and organic	Other	Clay Bone
Pendants	Glass	Glass	Blue and yellow conical pendants Brown bag-shaped pendant Blue lunula shaped pendant Multi-coloured oval pendants
	Metal	Gold	Pomegranate shaped pendants Pendant with turquoise inlay Miscellaneous pendants
	Metal	Bronze	Decorated pendants Bell pendants
	Stone	Cornelian, agate, chalcedony, jet	Trapezoid pendants
	Amber	Amber	Bag-shaped pendant
Inlays	Glass	Glass	Inlays: round, ovaloid, rectangular, droplet shaped
	Stone	Garnet, chalcedony	Inlays: ovaloid and half spherical
Gem	Glass	Glass	Ovaloid gem
Finger Rings	Glass	Glass	One glass finger ring
	Metal	Bronze/Silver	Variety 1.1.1: Bronze and silver finger rings with standing birds, upward-curving tail feathers and crest Variety 1.1.2: Finger rings with bird decoration in drawn out manner with horizontally protruding tail Variety 1.1.3: Finger rings with standing birds with horizontal short tail feathers and additional decoration Variety 1.1.4: Finger rings with simple standing birds, schematically illustrated Variety 1.1.5: Finger rings with very roughly incised moving birds on triangular or rhombic bezel Variety 1.1.6: Finger rings with flying birds (bird decorated ring type 6) Variety 1.2: Finger ring with griffin Variety 1.3: Finger ring with stag Variety 2: Finger rings with inscriptions Variety 3: Finger rings with plant motifs Variety 4.1: Finger rings with cross motifs Variety 4.2: Finger rings with circle or eye motifs Variety 5.1: The ‘Tie finger ring’ Variety 5.2: The metal sheet finger ring Variety 5.3: The spiral finger ring

Outline of the catalogue.

Category	Hypernym	Material	Specifications
	Metal	Bronze/Silver	Variety 6.1: Finger rings with oval green glass inlays Variety 6.2: Finger rings with round blue inlays Variety 6.3: Finger ring with bezel (lost inlay) Variety 7: Finger rings with open ends Variety 8.1: Finger rings with oval and rectangular (stepped or not stepped) bezel Variety 8.2: Finger rings with rhombic or triangular bezel Variety 8.3: Finger rings with ribbon hoop, broadening to a bezel
	Metal	Iron	Variety 9: Corroded finger rings Variety 10: Finger ring with green inlay
Earrings	Metal	Bronze	Simple hoop earrings of bronze wire Earrings with swelling Small crescent earrings Earring with cone ornament
	Metal	Iron	Lunula earrings with round body U-shaped earring
	Natural	Shell	Circular earring
Sheets	Metal	Gold/silver/bronze	The figural sheet Sheets with plant decoration Animal shaped sheets Sheets in the shape of body parts Gold, silver and bronze sheet fragments
Miscellaneous objects	Glass	Glass	One phallus Unknown glass object Globular glass vessel Green rim fragment of a bowl
	Metal	Gold/silver/lead/ bronze	The arrow head Shank buttons Nail heads Appliqués Chain links Mountings with or without stone The strap end The iron chain Objects not definable
	Stone	White stones	White stones without string hole
	Stone	Red and black stones	Red and black stones without string hole
	Natural	Wood and bone	One unknown object (toy?) Decorated bone disc

2.1 Coins

Coins often enable an archaeological site to be dated either on an absolute or on a relative basis. Fortunately at Veshnaveh eight coins were discovered, of which five were datable (tab. 2.1): two drachmae and one tetradrachma date to the early Sasanian period (pl. 4, nos. 1217c, 1639, 1835i), a further coin to the Arsacid period (pl. 4, no. 1348), and another to the early Islamic era (pl. 4, no. 4456).[9] The other coins were too corroded or otherwise damaged and could not be restored to the point of reliable identification.

2.1.1 Arsacid Coin

No. 1348, Mithridates IV (129 – 40 AD):
The Arsacid drachma shows King Mithridates IV on the obverse; on the reverse an inscription runs diagonally, written in the Arsacid language and Greek alphabet (Sellwood, 1971, pp.262-264; Alram, 1986, pp.124-125, type 395; Stöllner, Slotta and Vatandoust, 2004, p. 670, no. 269). In a space without an inscription a man is depicted sitting and holding a bow (pl. 4). Above this archer there are two letters, which look like a circle followed by an 'A'. It is conjectured that these are the first letters of

ΒΑ[ΣΙΛΕΩΣ]

ΒΑ[ΣΙΛΕΩΝ]

To the left of these letters a word is written downwards, which is an apparent misspelling of the word 'epikaloumenou', namely,

ΙΠΙΚΑ[ΛΟΥΜΕΝΟΥ]

While it is possible that it stands for ΙΠΙΦΑ[ΝΟΥΣ], the first reading seems much the more likely.

2.1.2 Sasanian Coins

Besides their inscriptions, Sasanian coins can be determined according to the typical crown, face attributes and hair dress of the king's portrayal. Comparable illustrations of kings can be found on other coins or on metalware (Haskins, 1952; Göbl, 1968; Erdmann, 1951).

No. 1639, Bahram II (276 – 293 AD):
After restoration this coin reveals a rough image, possibly of Bahram II (Göbl, 1968, pl.4, tab.3; Erdmann, 1951; p.122, fig.1); on the reverse appears an altar with two divinities (pl. 4).

No. 1835i, Hormizd II (303 – 309 AD):
This well preserved drachma (pl. 4) shows the face of Hormizd II (Erdmann, 1951, 122, fig.1, 123, fig.18; Göbl, 1968, tab.14, pl.5, 80-87; Alram, 1986, pp.194-195); on the reverse a fire altar is flanked by two yazatas (Zoroastrian divinities). The inscription on the obverse says,

mzdysn' bgy 'wHrmzdy MRK'n MRK' 'yr'n W
'n'yr'n MNW ctry MN yzd'n
His Mazdayasnian Majesty Ohrmazd, King
of Kings, whose essence is from the Gods."

No 1217c, Shapur II (309 – 379 AD):
This Sasanian silver drachma is very fragmented (pl. 4), but still visible on the obverse is the Sasanian king Shapur II wearing a typical mural crown, with a Pahlewi inscription being an additional identifying feature (Erdmann, 1951, p.99, p.121 fig.1, p.123 fig.18; Haskins, 1952, pl.4, fig.3; Göbl, 1968; tab.6, pl.6; Alram, 1986, type 778); on the reverse a fire altar is flanked by two figures. The inscription can be deciphered as

"mzdyšn bgy ŠḪpw[Ḫry.....].
His Mazdayasnian Majesty Shapur..."

2.1.3 Umayyad Coin

No. 4456:
This early Islamic coin belongs to the Umayyad era (661 – 750 AD). Unfortunately, the marginal inscription on the front is badly destroyed, and so the date cannot be read. But inscriptions on both sides are legible, the obverse having the usual kalima,

There is no god but Allah, He is alone, there
is no partner to him.

The reverse shows that it is an Umayyad coin, and the inscription comes from Sura 112:

'Allah ahad 'Allah, as samad lem yalid wa,
lem yulad wa lem yakun lahu kafu ahad.

2.1.4 Conclusion

One Arsacid coin was found (no. 1348), and it dates to the reign of Mithridates IV; the Sasanian coins belong to the dynasties of Bahram II, Hormizd II and Shapur II (nos. 1217c, 1639, 1835i), i. e. to the beginning of the 4th century AD. They all were found in the main chamber of Chale Ghar 1. Some fragments of coins, though, were discovered in the entrance area (no. 6561) and in the rear chamber (nos. 63181a1, 6297b).

The Umayyad derham was found in the main chamber of Chale Ghar I, too, but not in the same feature as the Sasanian coins.

[9] Again I would like to thank Ph. Kreyenbroek, Mr. Farridnejad and Mrs. S. Curtis for their help in reading the inscriptions of the coins.

Tab. 2.1: Chale Ghar 1, coins.

Find Number	Feature	Material	Unit	Dating	Measurements
1217c	10013/1	Silver	Drachma	Shapur II (309 - 379 AD)	D. 2.8 cm
1348	10013	Silver	Drachma	Mithridates IV (ca. 140 AD)	D. 1.9 cm
1639	10014	Unknown	Tetra drachma?	Bahram II (276-293 AD)	D. 3.0 cm
1835i	10013	Silver?	Drachma	Hormizd II (303-309 AD).	D. 2.8 cm
4456	10012/6	Silver	Dirhem	Umayyad (661 - 750 AD)	D. 2.44 cm
6561	10050	Unknown	Unknown	Unknown	D. 2.08 cm
6318a1	10022	Bronze?	Unknown	Unknown	L. 0.99 cm, W. 0.7 cm. D. approx. 1 cm
6297b	10022	Bronze?	Unknown	Unknown	L. 0.98 cm, W. 0.77 cm

2.2 Beads

2.2.1 Simple Monochrome Glass Beads

A considerable number of beads was excavated in Chale Ghar 1, and a smaller number in Chale Ghar 2. The database claims 1332 specimens, including 576 alone made of glass, 449 made of cornelian stone; the remainder are of metal, amber, different kinds of stones and organic materials, mostly shell. In this first paragraph of the beads section monochrome glass beads are presented. They are simple items of either opaque or translucent glass, but can contain important evidence of a chronological, technical or cultural character. Because simply shaped monochrome glass beads from the Near East have not been studied in depth yet, detailed presentation of the monochrome glass beads from Veshnaveh may provide a corpus of comparisons for future studies of Iranian beads, where there is currently such a gap. In some cases beads might consist of frit, but because of the quite hard consistency of most of the beads it seems reasonable to categorise them as glass beads. The monochrome glass beads are listed in the tables according to their shape first: spherical, ring-shaped, ovaloid, disc-shaped, cylindrical or barrel-shaped, conical, double-conical, rectangular, tube-shaped, cornerless-cube-shaped, hexagonal, melon-shaped, tapered, segmented, biconical; and one spacing bead. There follows a splitting of the colours: yellow, green, blue and brown-orange-red; furthermore, there are colourless/white and dark/black beads.

The classification of these beads is done according to their colours because that is the most significant attribute of these unadorned beads, and because of the cultural meaning of colour, which is discussed in chapter 5. The great majority of the beads are recorded in separate tables, as generally most finds were unearthed in Chale Ghar 1, and fewer spherical glass beads were found in Chale Ghar 2.

2.2.1.1 Spherical Monochrome Glass Beads (Tabs. 2.2.1.1 a–h)

The spherical shape can for all intents and purposes be recognised as the basic shape of a glass bead. Turning hot glass on a rod, would usually form a spherical bead without the use of any more tools. Probably for that reason, the most commonly represented shapes among the monochrome beads from Veshnaveh are the spherical beads. Here 89 ones are listed in the tables and are divided into the following colours: yellow (10 beads), green (26 beads), blue (23 beads) and brown-orange-red (14 beads), the latter in one table; furthermore there are colourless/white (11 beads) and dark/black coloured beads (9 beads). Because of their rough surface two beads might be of frit or faience (nos. 1742, 1744).

A number of observations could be made on the monochrome spherical beads, several beads show technical details which are visible to the naked eye, as there are funnel shaped string holes or an indication of the folding technique. The latter could mostly be distin-

guished by the seam of the fold. At least one white bead seemed to be made of a drawn glass tube, as shown by the length-wise lines, which were generated by the manufacturing process (no. 6144a1).

In spite of named observations many of the groups could not be dated or classified because of their common chronologically and geographically widely spread manufacturing technique and shape. Still, the cornerless cube shaped and the green hexagonal beads have convincing comparisons and could be categorised. The spherical melon shaped beads are too widespread to be dated, but this type represents a significant find group.

2.2.1.2 Ring Shaped Glass Beads (Tabs. 2.2.1.2 a–e)

59 monochrome beads were classified as ring shaped. This shape is characterised by a short length and by sometimes having a relatively large string hole, so the bead would appear as a little ring and not as a disc.

Five tables (2.2.1.2 a–e) contain twelve yellow beads, eight green beads and 25 blue beads (cf. tab. 3.2.1, no. 4419f); the latter are the most numerous among the ring beads. Again, orange, red and other colours are subsumed in one table, with just eight items, as well as six colourless/white ring shaped beads.

Technical specifications to the folded and drawn glass are stated in the tables when observable by naked eye, but due to their size, funnel shaped string holes cannot be observed. At least one of the fragmented pieces seems rather to be a remnant of a cover layer than a whole bead. Bead no. 1678 (tab. 2.2.1.2 e) is of a very thin glass and has a large string hole.

Fragments nos. 1768b and 1775d (tab. 2.2.1.2 d) have exactly the same colour and were found in the same feature 10013/1. Therefore it seems obvious that they belonged to the same bead.

2.2.1.3 Ovaloid Glass Beads (Tabs. 2.2.1.3 a–f)

Here the ovaloid beads correspond to C. Beck's long ellipsoid beads (Beck, 1928, pl. II, III). These beads have an apex as end of the string hole (Beck, 1928, p.3); in contrast to barrel shaped and cylindrical beads, which have flat ends. In tab. 2.2.1.3 a one yellow bead with repairs is presented. Eleven green beads in total from mine 1 are listed in tab. 2.2.1.3 b; tab. 2.2.1.3 c presents the only green coloured bead of Chale Ghar 2. Furthermore there are seven ovaloid blue beads, of which five were found in Chale Ghar 1 and two in Chale Ghar 2 (tabs. 2.2.1.3 c, e). In tab. 2.2.1.3 f the only ovaloid brown glass bead is shown. Among the ovaloid beads there are those made of drawn glass and some that have funnel shaped string holes, which indicates that they were made on a conical rod.

One note should be made to bead no. 1823b, it seems to have been repaired in antiquity. The bead perhaps was broken and then spliced together with an opaque material that is visible as a core in the interior of the bead and as lines on the surface. Another possibility would be that the bead was produced as it appears today with a special kind of decoration?

2.2.1.4 Disc Shaped Glass Beads (Tabs. 2.2.1.4 a–d)

Disc beads are rather short in length and thus appear flat. In the mines, just a few disc shaped beads were unearthed. Two green opaque beads, each in Chale Ghar 1 and 2 (tabs. 2.2.1.4 a-b) and just one blue bead and one red disc shaped bead in mine 1 (tab. 2.2.1.4 c-d).

2.2.1.5 Cylindrical and Barrel Shaped Glass Beads (Tabs. 2.2.1.5 a–f)

The transition between ovaloid, keg or barrel shaped and cylindrical shapes is sometimes vague; some cylindrical beads may either be categorised as ovaloid or barrel shaped. Cylindrical beads rather show flat ends of their string holes, or flat 'sides', while ovaloid or spherical beads on the contrary, have an apex at both ends (Beck, 1928, p.3 fig.3). Barrel shaped beads however, are characterised by concave profiles and ends of string holes. The latter are summarised with the cylindrical beads in this chapter.

Among the cylindrical and barrel shaped beads, the most numerous are the green beads (tab. 2.2.1.5 b, c), which are 30 pieces, of these just one is from Chale Ghar 2. Eight yellow (tab. 2.2.1.5 a) and 16 blue (tab. 2.2.1.5 d), represent further cylindrical beads, as well as eight beads each of the brown, red and orange (tab. 2.2.1.5 e) and colourless/white beads (tab. 2.2.1.5 f).

Besides the beads with technical features, such as funnel shaped string holes and indications of drawn glass, there are two yellow and one blue bead, which show interesting peculiarities (pl. 5, nos. 1629e, 1629f, 1883c23). They are obviously cut from a glass tube. They may have been the ends of that tube, respectively, because they have a flat, slightly oblique end at one side and an apex at the other. These beads clearly demonstrate the method of cutting beads from a pre-manufactured glass tube, which would be a simple and quick process to produce cylindrical glass beads, since glass bead makers were able to produce hollow glass rods (Spaer, 2001, pp.46-47, no.307).

2.2.1.6 Conical Glass Beads (Tabs. 2.2.1.6 a–d)

H.C. Beck (1928, p.7) describes cones as follows: 'Beads in which the profile consists of one straight line which is not parallel to the axis, and which meets the perforation.' A variation of that would be the truncated cone, in which the lines do not meet the perforation (Beck, 1928, p.7, pl.II-III,D.1.d). Here, H. C. Beck's descriptions are used when they are accurately applicable to the Veshnaveh beads. In various cases the term 'conical' is used. All of the conical beads from Veshnaveh have round or oval sections, except for no. 1508c, which has a square section and edges (Beck, 1928, p.3. fig.4). The latter seems to have been ground after cooling, according to its sharp edges.

26 conical beads were mainly found in Chale Ghar 1 and just three colours were represented, green – nine pieces from Chale Ghar 1 (tab. 2.2.1.6 a); blue – 13 beads from Chale Ghar 1 and one from Chale Ghar 2 (tabs. 2.2.1.6 b-c); and three brown ones again from mine 1 (tab. 2.2.1.6 d).

Many of the cone shaped beads also have funnel shaped string holes, which might point to the preference of using a strong conical rod to produce such beads, in particular those beads from Veshnaveh.

One translucent blue glass bead shows the folding technique very nicely; at the seam the overlapping glass is very clearly visible (pl. 5, no. 4299c). Possibly the glass was highly viscous, thus making it impossible to wind it several times around the rod. Sharp edges at one end of the bead indicate that at least a part of the bead was finished by grinding.

Obviously some glass beads were very valuable to the owner, since they were repaired after a damage, such as bead no. 1578, which shows repairs on the interior.

2.2.1.7 Bi- or Double Conical Glass Beads (Tabs. 2.2.1.7 a–e)

Bicone beads are 'beads in which the profile consists of two straight lines at an angle to one another and which meet the perforation.' (Beck, 1928, p.7). Most of the bi- or double conical beads found in Veshnaveh are of a simple shape, but one bead is unique. It shows decorated edges (pl. 5, no. 1782c). It is conceivable that this bead was produced with the help of a mould or a tool, because it would be difficult to shape these patterns just on a rod, where the hot glass or the edges would become round when the bead was turned and heated for shaping. It is possible that other bicone beads were also made in a mould or subsequently cut or ground (nos. 4581j, 1957c, 4337f). Due to slight corrosion, it is not possible to find any traces of cutting or grinding. No. 4356a has a quite irregular bicone shape and a rectangular section. This on the other hand indicates that the manufacturing of the bead was not done with a mould, but freehand with a tool. In the end the question must remain unanswered whether these beads were produced in a mould or with a tool. M. Spaer writes (2001, p.64): 'The earlier beads were usually rod-formed and tooled, similar to those uncovered in the Hellenistic glass bead workshops excavated in Rhodes. In Roman-Byzantine times, both rod-formed and drawn beads were made in biconical shapes, but were finished mechanically.' One mention should be made to bead no. 6155a4 that shows very obviously air bubbles in the glass. This could have been caused by the glass material used or in the process of winding, if air was caught (Gam, 1990, p.210).

2.2.1.8 Rectangular Glass Beads (Tabs. 2.2.1.8 a–f)

Beads with a rectangular cross section, as shown in this subsection, are called rectangular beads (Beck, 1928, p.6). In Veshnaveh, mostly blue coloured rectangular beads were found (15 specimens, tab. 2.2.1.8 d). According to H. C. Beck, they are standard in having short 'cylinders' with a square section (Beck, 1928, pls.II, III, IX,B.4.f.b., IX, C.4.f.b.).

Nos. 1836h – 6649c have a quite similar appearance; in addition, beside their shape, they have apparently the same blue colour (tab. 2.2.1.8 d, without 4581i). However, even though these beads look almost alike, they show a certain difference: the colour of the beads deviates from each other slightly. The ancient glass producers were able to colour glass exactly, but the glass used for these Veshnaveh beads does not seem to have come from the same workshop. Another difference concerns the larger or smaller string holes; it is to be assumed that one glass bead maker would use the same kind of metal rod to produce one type of bead. This may characterise different origins. While these beads seem to have belonged to a well-known type of bead in antiquity, they may have been produced at different places and/or in different times. (They probably could even be classed among the group of blue cornerless cube shaped beads; see below tab. 2.2.1.1.10).

Together with the blue rectangular beads described above, three yellow rectangular beads (tab. 2.2.1.8 a); two green, one in Chale Ghar 1, another in Chale Ghar 2 (tab. 2.2.1.8 b-c); one brown (tab. 2.2.1.8 e) and one white bead (tab. 2.2.1.8 f) were found.

2.2.1.9 Tube Shaped Glass Beads/Long Cylinders (Tabs. 2.2.1.9 a–b)

Only few tube shaped beads can be presented here. There are just two green and one white object (tabs. 2.2.1.9 a-b). Beck calls these beads long cylinder (Beck, 1928, pl.II, III,I.D.2.b.). On bead no. 1949f the longitudinal stripes of the drawn glass are easily observable (pl. 5).

2.2.1.10 Cornerless Cube Shaped Glass Beads (Tabs. 2.2.1.10 a–c)

Cornerless cube shaped beads '... are cubes or rectangles which have had all their corners cut off so as to leave triangular surfaces. They are the combination of a cube and an octagon.' (Beck, 1928, p.17). It is not always easy to tell apart the rectangular beads with slightly sloping edges, from cornerless, faceted beads respectively. In this subsection however, distinct shapes are listed first. Other beads, as for example the rectangular bead no. 4596b with very unclear facets, is classified as a rectangular bead (tab. 2.2.1.8 d).

One green cornerless cube bead from Chale Ghar 1, and two from Chale Ghar 2 are presented (tabs. 2.2.1.10 a-b). Nine blue faceted beads of different appearances were found in Chale Ghar 1 (tab. 2.2.1.10 c). One bead differs from the other blue beads. It is translucent, made with more care and shows a different grade of corrosion, which might indicate another composition of the glass (no. 4318b).

Interpretation of the Cornerless Cube Shaped Beads (Tab. 2.2.1.10 d)

Simple shaped monochrome glass beads are usually difficult to date, contrary to the cornerless cube shaped beads; tab. 2.2.1.10 d, below shows examples of blue and green cornerless cube shaped beads from Iran, Iraq, Israel, Russia and ancient Nubia. The beads vary in size. Some comparisons are larger than the finds from Veshnaveh as for example beads of one necklace from Karanòg (no. 7766) or from the Northern Black Sea region. All the examples show that the cornerless cube shaped beads, especially the blue coloured ones, date between the 1st and the 5th century AD. While the early dating of the beads from Al Tar stands out from the dates of other blue faceted beads, one should take note of the missing calibration for this date. This aspect brings the dating of beads found at Al Tar into question. Faceted, respectively cornerless cube crystal beads from Qasr-i Abu Nasr, on the contrary, are dated to the late Sasanian or early Islamic period (Simpson, 2003, p.62). They may indicate a continuation of this shape into much later periods. M. Spaer (2001, p.64, p.74) maintains the view that later faceted beads are larger and cruder, 'In the Roman period, various angular shapes were common, including faceted beads, among them the 'cornerless cube' beads (...), mostly in deep blue or greens, obviously imitating stone. (...) Versions of the cornerless cubes remained popular well into the late Islamic period.' Due to the fact that beads from Veshnaveh were manufactured in rather small sizes, one would stick to the late Arsacid period for dating these. The bead no. 4318b, however, has generally a different appearance than the other blue cornerless cube shaped beads from Veshnaveh and another date must not be excluded for this specimen.

Technically speaking, these beads were most probably made by winding and then shaping by mavering and tooling. First the bead was shaped into a cuboid and then the eight edges were pressed in to obtain a triangle surface. Another possibility would have been the use of moulds. It is unlikely that cornerless cube beads were cut or ground, because this would have resulted in much sharper corners than found on the beads in Veshnaveh. A translucent blue rectangular bead found at Veshnaveh might give an insight to the manufacturing of such beads (pl. 8, no. 1883c22; see chapter of stripe decorated beads, tab. 2.2.3.4 b), it was decorated with wavy white lines that were wound around blue glass while subjected to heat; the bead must have been shaped into a rectangle with the help of tools while hot. Cutting or grinding this bead would have removed its white decoration or damaged it. M. Spaer, however, suggests (2001, p.64) that the faceted beads of better quality were shaped by grinding.

2.2.1.11 Hexagonal Glass Beads (Tab. 2.2.1.11 a)

It is notable that the hexagonal glass beads from Veshnaveh are only present in a green/blueish colour. H. C. Beck classifies this shape within his group XIII, 'Beads in which the perimeter is a hexagon.' (Beck, 1928, p.6).

Six hexagonal beads were unearthed in Chale Ghar 1 (tab. 2.2.1.11 a), five of them are made of opaque glass and one of translucent green glass (pl. 5, no. 1171a). All are of different nuances, the majority was made of light green glass, while no. 4317 is of a dark green blue colour. Lastly, nos. 1776a and 4571b show slight waves of different coloured glass, even in a translucent consistency (pl. 5).

Interpretation of the Green Hexagonal Glass Beads (Tab. 2.2.1.11 b)

Green opaque hexagonal glass beads probably belong to a later period, as shown by examples from Siraf in southern Iran, Samaria in Palestine and (with proviso) from Bard-e Nechandeh/Iran. The green hexagonal bead from Siraf has a terminus ante quem of 803–804 AD and may have come from the fortress complex of around 650–800 AD, which would indicate this bead originated from the late Sasanian and early Islamic period. From Samaria six small greenish hexagonal beads are of the period between the 3rd and the 5th century AD – that means from the Sasanian period (Crowfoot, Crowfoot and Kenyon, 1957, p.391). Another pale green hexagonal glass bead from Bard-e Nechandeh/Iran might have been found in a Arsacid context, although the excavator does not provide closer data than naming the place where it was found: the lower terrace (Ghirshman, 1976, pl. 16, 179 d.). So, the date of the beads remains

unclear. Green hexagonal glass beads were known to be made of opaque glass, therefore one hexagonal bead from Veshnaveh attracts interest, because it is made of translucent glass. A similar hexagonal translucent green glass bead was discovered in a grave in Hanita/Israel. It dates to the 3rd – early 4th century AD.

The hexagonal shape was probably made with the help of mavering, tooling or a mould, from a hot cylindrical bead.

2.2.1.12 Melon Shaped Beads (Tabs. 2.2.1.12 a–b)

The so-called melon shaped beads are spherical beads with 'cannelures' or 'flutes' (Eisen, 1930, 20). H. C. Beck describes them as gadrooned beads (Beck, 1928, p.10).

To produce such beads, a tool was used to press grooves into the spherical hot glass bead. In contemporary Anatolian glass workshops this method is still used (Sode, 1997, p.232 fig.5).

At Veshnaveh one yellow opaque and two blue opaque melon beads were found (tab. 2.2.1.12 a-b). Two further melon shaped beads are likewise of interest; unlike common melon beads they are made of translucent glass. Because their cannelures are not very pronounced and are few, they might not belong to the melon bead type at all (pl. 6, no. 4950; tab. 2.2.1.12 b). The light blue bead (no. 6113) has broad, slight oblique partitions.

Interpretation of the Blue Melon Shaped Beads (Tab. 2.2.1.12 c)

Spherical melon shaped beads were popular over a long period and found in many regions of the Near East, as shown by examples in tab. 2.2.1.12 c. It is not possible to date the spherical melon beads from Veshnaveh on this basis, but they show that the finds in the mines were a part of common Near Eastern adornment. Melon shaped beads usually are known to be blue or greenish blue, as they were found in Tappeh Giyan, Dinkha Tappeh, Persepolis and Veshnaveh.

In addition, yellow melon beads are also known. In Chale Ghar 1, one yellow melon bead with slightly slanting flutes was excavated. This might correspond to the type found in Samaria: a yellow bead with slanting ribs. This comparison shows that yellow melon shaped beads were also common, although not as popular as blue ones. The reason for the popularity of the blue melon beads might be the manufacture of the first melon beads as faience, which for chemical reasons usually has a blue/greenish colour (Lierke, 2009, p.12 fig.94).

G. Eisen (1930, p.27) wrote about lotus and melon beads and gave some indication to their dating, 'In the time of the Roman Empire, after a long period with few lobes, the number of lobes again began to increase, the lobes becoming at the same time irregular and, of course, narrower.' This might concern the spherical melon bead no. 6448 from Veshnaveh, but Eisen's description is too indefinite to provide an exact date for the Veshnaveh bead. The disc shaped melon bead no. 6879a, may be classified among Eisen's no. 40, which he dates to the 6th century AD (Eisen, 1930, p.36 no.40) and clear glass melon beads are dated to the Roman, late Roman or early Mediaeval period; this applies to the colourless beads which imitated crystal (Eisen, 1916, p.22; 1930, p.37 no.45).

An exact comparison to the blue translucent melon shaped glass beads has not yet been found, but one larger turquoise translucent melon shaped bead was found in Germi, Iran (pl. 6, no. 3497). However, from Roman Augst/Kaiseraugst melon shaped beads of translucent monochrome glass are known. They have roughly pushed in ribs and were carelessly manufactured. According to E. Riha (1990, p.82), these beads were distributed in Western Europe in the 1st century AD, with one exception found in the Donau River region. Maybe these rather coarse beads can give an indication on how to categorise such types of melon beads.

2.2.1.13 Tapered Glass Beads (Tabs. 2.2.1.13 a)

Three tapered beads were found in Veshnaveh, two rather small green and one blue one. The green beads are called tapered (nos. 6135a3, 6353a1). The blue one is described as oblong tapered (no. 1771).

Interpretation of the Tapered Glass Bead (Tab. 2.2.1.13 b)

There is no real comparison to the tapered beads from Veshnaveh. One translucent lilac bead from the Black Sea region does not resemble the green tapered beads exactly, it is larger and has another colour and glass consistency, but has a similar shape. Another bead with a tapered shape was found in Persepolis.

2.2.1.14 Segmented Glass Beads (Tab. 2.2.1.14)

Segmented beads or those with collars, present shapes that were found among the so-called gold-in-glass beads at Veshnaveh. One green translucent glass bead found in Chale Ghar 1 is the only monochrome bead that might have been produced with the help of a mould, like the segmented gold-in-glass beads (Spaer, 1993, p.12). The practice of segmentation leads to a chronological classification to the Roman, respectively Arsacid period (Spaer, 1993, p.20).

2.2.1.15 Bicones with Vertical String Hole ('Hammer Head Shape'; Tab. 2.2.1.15)

Two greenish blue, double conical beads differ from the other double conical beads from Veshnaveh. Their string hole is not perforated from one point of the cone to the other, but through the middle. Their appearance is comparable to that of a small hammer head. The two made of opaque glass, were excavated in the rear chamber of Chale Ghar 1, in one feature ('area'). They resemble each other, but they vary slightly in colour and size.

2.2.1.16 Green Spacing Glass Bead (Tab. 2.2.1.16 a)

A so called spacing bead was found in Chale Ghar 1 (pl. 6). It is of a flat ovaloid shape with two string holes. Beads with two or more string holes are called spacing or spacer beads (Beck, 1928, p.14). They should hold a number of strings to generate an elaborate decorated necklace made of several strands.

Interpretation of the Green Spacing Glass Bead (Tab. 2.2.1.16 b)

The green spacing bead from Veshnaveh is of such a simple shape that comparisons are hardly available. A similar bead was found in Tell Mohammed Arab. It is made of another material, though.

Tab. 2.2.1.1 a: Chale Ghar 1, yellow spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1629h	10012	Opaque glass, grey yellow 5-2-6	Spherical, fragmented	D. 0.30 cm, L. 0.30 cm	
1883c28	10013	Opaque glass, blackish yellow 5-0-8	Spherical, complete	D. 0.37 cm, L. 0.29 cm	Funnel shaped string hole, D. 0.15 cm–0.17 cm
6079a2	10022	Opaque glass, light yellow 5-0-3	Two beads: spherical, one bead broken	D. 0.51 cm, L. 0.50 cm	Folded
6282a1	10022	Opaque glass, yellow	Spherical, complete	D. 0.43 cm, L. 0.47 cm	
6282a3	10022	Opaque glass, light yellow 5-0-3	Cylindrical, fragmented	D. 0.30 cm, L. 0.33 cm	
6314	10022	Opaque glass, light reddish yellow 5-16-2	Spherical, complete	D. 0.50, L. 0.35 cm	
6833	10000	Opaque glass, dark yellow 5-0-7	Spherical, fragmented	D. 0.59 cm, 0.50 cm	
6882b	10004	Translucent glass, blackish yellowish red 17-4-8	Spherical, fragmented	D. 0.60 cm, L. 0.50 cm	Folded
6966a	10008	Opaque glass, light reddish yellow 5-16-2	Spherical, complete	D. 0.51 cm, L. 0.44 cm	Funnel shaped string hole, D. 0.10 cm–0.17 cm
6966b	10008	Opaque glass, light reddish yellow 5-16-2	Spherical, complete	D. 0.53 cm, L. 0.49 cm	Funnel shaped string hole, D. 0.12 cm–0.14 cm

Table 2.2.1.1 b: Chale Char, green spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1178a	10013/1	Opaque glass, vivid greenish blue 31-38-5	Spherical, complete	D. 0.6 cm, L. 0.5 cm	
1245	10013	Opaque glass, blackish turquoise blue 31-35-8	Spherical, complete	D. 0.38 cm, L. 0.32 cm	Funnel shaped string hole, D. 0.06 cm–0.08 cm

Table 2.2.1.1 b: Chale Char, green spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1429	10018	Translucent glass, green white 1-39-6	Spherical, complete	D. 0.65 cm, L. 0.6 cm	Funnel shaped string hole, D. 0.22 cm–0.28 cm
1435	10018	Translucent glass, blackish opal green 39-41-8	Spherical, one side planar, complete	D. 0.5 cm, L. 0.35 cm	
1503	10019	Opaque glass, opal green 39-41-6	Spherical, complete	D. 0.75 cm, L. 0.6 cm	Funnel shaped string hole, D. 0.14 cm, 0.21 cm
1538a	10012	Opaque glass, light blue green 39-31-3	Spherical, complete	D. 0.42 cm, L. 0.29 cm	
1611c	10012/3	Translucent glass, blackish opal green 39-41-8	Spherical, complete	D. 0.45 cm, L. 0.5 cm	
1611d	10012/3	Opaque glass, grey white 1-2-6	Spherical, complete	D. 0.35 cm, L. 0.35 cm	
1629l	10012	Opaque glass, grey yellow 5-2-6	Spherical, fragmented	D. 0.5 cm, L. 0.25 cm	
1779g	10013/1	Translucent glass, blackish blueish green 39-30-8	Spherical, complete	D. 0.5 cm, L. 0.32 cm	
1831j	10013/1	Opaque glass, blackish opal green 39-41-8	Spherical, complete	D. 0.41, L. 0.3 cm	
1836g	10013	Opaque glass, vivid blueish green 39-30-5	Spherical, complete	D. 0.43 cm, L. 0.43 cm	
1949h	10013	Translucent glass, blackish blueish green 39-30-8	Spherical, complete	D. 0.42 cm, L. 0.28 cm	
4272a	10012/5	Translucent glass, blackish blue green 39-31-8	Spherical, complete	D. 0.45 cm, L. 0.35 cm	
4347c	10012/5	Opaque glass, dark olive green 39-7-7	Spherical, complete	D. 0.43 cm, L. 0.26 cm	
4494c8	10019	Translucent glass, blackish blue green 39-31-8	Spherical, slightly ribbed on the surface, complete	D. 0.65 cm, L. 0.62 cm	
4581l	10014	Translucent glass, blackish blueish green 39-30-8	Spherical, complete, corroded	D. 0.35 cm, L. 0.3 cm	Funnel shaped string hole, D. minimum 0.09 cm
4975a4	10022	Translucent glass, dark olive green 39-7-7	Spherical, complete	D. 0.5 cm, L. 0.35 cm	Slight funnel shaped string hole, D. 0.09 cm–0.12 cm
6045	10022	Opaque glass, vivid greenish blue 31-38-5	Spherical, fragmented	D. 0.52 cm, L. 0.5 cm	
6276	10022	Opaque glass, blackish green 39-0-8	Spherical, complete	D. 0.5 cm, L. 0.45 cm	
6293a2	10022	Translucent glass, blackish green 39-0-8	Spherical, slight oval section, complete	D. 34 cm, L. 0.35 cm	
6385a3	10022	Opaque glass, light blueish green 39-30-3	Spherical, very fragmented	D. 0.45 cm, L. 0.5 cm	
6438b	10004	Opaque glass, vivid olive green 39-7-5	Spherical, complete	D. 0.5 cm, L. 0.5 cm	
6881	10004	Translucent glass, green	Spherical, complete	D. ca. 0.5 cm	

Table 2.2.1.1 b: Chale Char, green spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6886	10004	Opaque glass, green	Spherical, complete	D. ca. 0.55 cm	
6922	10004	Opaque glass, blackish blueish green 39-30-8	Spherical, complete	D. 0.5 cm, L. 0.36 cm	

Tab. 2.2.1.1 c: Chale Ghar 1, blue spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1790j	10013/1	Opaque light grey ultramarine 29-2-3 glass	Spherical, complete	D. 0.5 cm, L. 0.5 cm	Folded, horizontal grooves in the glass; seam, almost not closed
1797	10013/1	Translucent glass, blackish lilac ultramarine 29-23-8	Spherical, complete	D. 0.7 cm, L. 0.6 cm	Funnel shaped string hole, D. 0.15 cm–0.22 cm
1835c	10013	Translucent glass, dark lilac ultra marine 29-23-7	Spherical, complete	D. 0.2 cm, L. 0.2 cm	Seems to imitate the colour of Lapis Lazuli
1883c20	10013	Translucent glass, blackish lilac ultramarine 29-23-8	Spherical, complete	D. 0.4 cm, L. 0.3 cm	
4000a	10013	Translucent glass, dark lilac ultramarine 29-23-7	Spherical, complete	D. 0.5 cm, L. 0.3 cm	
4062a	10013	Translucent glass, ultramarine 29-0-6	Spherical, complete	D. 0.64 cm, L. 0.58 cm	
4188d	10012	Translucent glass, light violet ultra marine 29-27-3	Spherical, fragmented	D. unknown, L. 0.66 cm	
4311c	10012/5	Translucent glass, blackish greenish blue 31-38-8	Spherical, complete	D. 1.32 cm, L. 1.1 cm	Slightly funnel shaped string hole, D. 0.28 cm, L. 0.37 cm
4318a	10012/5-6	Translucent glass, blackish Prussian blue 31-37-8	Spherical, complete	D. 0.4 cm, L. 0.3 cm	Dented at one side
4419g	10012/5	Translucent glass, blackish lilac ultramarine 29-23-8	Spherical, complete	D. 0.4 cm, L. 0.25 cm	
4441b	10013	Translucent glass, blackish grey ultra marine 29-2-8	Spherical, complete	D. 1.32 cm, L. 1.03 cm	Very slightly funnel shaped string hole, D. 0.32 cm–0.33 cm
4484	10012/6	Translucent glass, blackish greenish blue 31-38-8	Spherical, complete	D. 1.1 cm, L. 1.0 cm	Obviously folded, broken at seam
4732b	10013	Translucent glass, blackish violet ultramarine 29-27-8	Spherical, complete	D. 0.63 cm, L. 0.52 cm	Slight funnel shaped string hole, D. 0.12 cm–0.17 cm
6043a2	10022	Translucent glass, blackish lilac ultramarine 29-23-8	Spherical, complete	D. 0.41 cm, L. 0.40 cm	
6067a3	10022	Slightly translucent glass, blackish blue 31-0-8	Spherical, complete	D. 0.39 cm, L. 0.19 cm	

Tab. 2.2.1.1 c: Chale Ghar 1, blue spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6096b	10022	Translucent glass, blackish lilac ultramarine 29-23-8	Spherical, complete	D. 0.6 cm, L. 0.51 cm	
6226a1	10022	Translucent glass, blackish cobalt 33-0-8	Spherical, complete	D. 0.47 cm, L. 0.3 cm	
6346a1	10022	Translucent glass, blackish lilac ultramarine 29-23-8	Spherical, complete	D. 0.38 cm, L. 0.31 cm	
6560b4	10050	Translucent glass, blackish blue 31-0-8	Spherical, complete	D. 0.43 cm, L. 0.28 cm	
6698c2	10022	Opaque or translucent glass, dark blue 31-0-7	Spherical, fragmented	D. 0.55 cm, L. 0.42 cm	
6961b2	10008	Translucent glass, lilac ultramarine 29-23-6	Spherical, complete	D. 0.28 cm, L. 0.2 cm	

Tab. 2.2.1.1 d: Chale Ghar 2, blue spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7002b	11057	Opaque glass, vivid Prussian blue 31-37-5	Spherical, complete	D. 0.6 cm, L. 0.5 cm	Very light material
7135c1	11097	Translucent glass, dark ultra marine 29-7-0	Spherical, complete, at one side slightly chopped off	D. 1.26 cm, L. 1.08 cm	Folded

Tab. 2.2.1.1 e: Chale Ghar 1, spherical glass beads: brown, orange, red.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1295a1, 1396b1	10012/2 and 10013	Translucent glass, dark violet brown 11-27-7	Two fitting halves: spherical, fragmented	D. ca. 0.5 cm	Funnel shaped string hole, D. 0.13 cm–0.25 cm
1714a	10013	Translucent glass, blackish orange brown 11-13-8	Spherical, complete	D. 0.66 cm, L. 0.6 cm	Oval funnel shaped string hole, D. 0.13 cm–0.16/0.25 cm
1790h	10013/1	Translucent glass, light violet brown 11-27-3	Spherical, complete	D. 0.5 cm, L. 0.3 cm	
1817	10013/1	Glass/frit or clay, brown 11-0-6.	Spherical, complete	D. 0.55 cm, L. 0.55 cm	
1957g	10013	Opaque glass, blackish yellowish orange 13-4-8	Spherical, fragmented	D. 0.5 cm, L. 0.4 cm	
4185c	10012	Translucent glass, blackish brown 11-0-8	Spherical, fragmented	D. 0.57 cm, L. 0.5 cm	
4402c	10012/5	Glass/frit or clay, blackish yellowish orange 13-4-8	Cylindrical, complete	D. 0.43 cm, L. 0.33 cm	
4407d	10012/5	Translucent glass, blackish red brown 11-17-8	Spherical, complete	D. 0.73 cm, L. 0.76 cm	Funnel shaped string hole, D. 0.14 cm–0.18 cm
4496e	10014	Translucent glass, vivid brown red 17-11-5	Spherical, fragmented	D. 0.45 cm, L. 0.5 cm	Funnel shaped string hole, D. 0.07 cm–0.12 cm

Tab. 2.2.1.1 e: Chale Ghar 1, spherical glass beads: brown, orange, red.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6226a2	10022	Light orange opaque glass, light grey 2-0-3 surface	Spherical, very corroded and fragmented	D. 0.54 cm, L. 0.39 cm	
6274a2	10022	Translucent glass, ochre 9-0-6 (‘amber coloured’)	Spherical, complete	D. 0.5 cm, L. 0.47 cm	
6498c2	10022	Glass/frit, orange colour	Spherical, fragmented	D. 0.43 cm, L. 0.34 cm	
6522	10013	Translucent glass, blackish yellow ochre 9-5-8 (‘amber coloured’)	Spherical, complete	D. 0.7 cm, L. 0.5 cm	Large string hole, D. 0.35 cm
6546	10004	Opaque glass, blackish red orange 13-17-8	Spherical, complete	D. 0.43 cm, L. 0.41 cm	
6937b	10004	Opaque glass/frit, blackish yellow brown 11-5-8	Spherical, complete	D. 0.46 cm, L. 0.38 cm	

Tab. 2.2.1.1 f: Chale Ghar 1, colourless/white spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1265a2	10012/2	Translucent glass, white 1-0-6	Spherical, fragmented	D. 0.6 cm, L. 0.43 cm	
1742	10013	Frit or faience? White 1-0-6	Irregular	D. 0.9 cm, L. 0.6 cm	
1744	10013	Frit or faience? Light olive grey 2-7-3	Irregular, hexagonal?	D. 1.1 cm, L. 0.8 cm	
4452	10014	Translucent glass, green white 1-39-6	Spherical, complete	D. 0.8 cm, L. 0.9 cm	Funnel shaped string hole, D. 0.21 cm–0.35 cm
4591h	10013	Opaque glass, white 1-0-6	Spherical, complete	D. 0.45 cm, L. 0.25 cm	
6151a4	10022	Translucent glass, yellow white 1-5-6	Spherical, complete	D. 0.39 cm, L. 34 cm	
6216	10022	Translucent glass, white 1-0-6	Spherical, complete	D. 0.6 cm, L. 0.31 cm	
6317	10022	Opaque glass, white 1-0-6	Spherical, fragmented	D. .3 cm, L. 0.6 cm	Elongated grooves on the surface, Drawn glass
6353a2	10022	Translucent glass, green white 1-39-6	Spherical, complete	D. 0.46 cm, L. 0.43 cm	Funnel shaped string hole, D. 0.10 cm–0.15 cm
6144a1	10022	Translucent glass, white 1-0-6	Spherical, two fragments	D. 0.55 cm, L. 0.52 cm	Drawn glass
6937a	10004	Glass, green white 1-39-6.	Cylindrical, fragmented.	D. 0.3 cm, L. 0.42 cm	Drawn glass

Tab. 2.2.1.1 g: Chale Ghar 2, colourless/white spherical glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7135c3	11097	Opaque glass, grey white 1-2-6	Spherical, complete.	D. 0.5 cm, L. 0.41 cm	Funnel shaped string hole, D. 0.11 cm–0.17 cm

Tab. 2.2.1.1 h: Chale Ghar 1, dark/black coloured spherical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1169	10013/1	Translucent glass, blackish siena 12-0-8	Spherical, complete	D. 0.97 cm, L. 0.7 cm	Funnel shaped string hole, D. 0.27 cm–0.48 cm
1396b3	10013	Opaque glass, black 3-0-6	Spherical, complete	D. 0.53 cm, L. 0.45 cm	Large string hole, 0.26 cm
4188a	10012	Probably translucent glass, black 3-0-6	Spherical, complete	D. 0.7 cm, L. 0.63 cm	Funnel shaped string hole, 0.14 cm–0.16 cm ×0.25 cm
4562a	10014	Translucent? glass, black 3-0-6; two lost, maybe white inlays	Spherical, complete	D. 1.23 cm, L. 0.9 cm	Oval shaped string hole, 0.33 cm×0.43 cm
4590a	10013	Translucent? glass, black 3-0-6	Spherical, complete	D. 0.74 cm, 0.72 cm	Funnel shaped string hole, 0.21 cm–0.25 cm
4672d	10013	Translucent? glass, black 3-0-6; chopped off parts or lacking inlays	Spherical, complete	D. 0.7 cm, 0.72 cm	Oval shaped string hole, 0.2 cm
6263	10013	Opaque glass, black grey blue 31-2-9	Spherical, complete	D. 0.5 cm, L. 0.5 cm	Funnel shaped string hole, D. 0.13 cm–0.2 cm
6939a2	10004	Opaque glass, black 3-0-6	Spherical, fragmented	D. 0.7 cm, L. 0.65 cm	
6939a3	10004	Translucent glass, lilac ultra marine 29-23-6	Spherical, complete	D. 0.27 cm, L. 0.2 cm	

Tab. 2.2.1.2 a: Chale Ghar 1, yellow ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1629a	10012	Opaque glass, grey yellow 5-2-6	Ring shaped, complete	D. 0.5 cm, L. 0.25 cm	Elongated grooves on surface, drawn glass?
1629b	10012	Opaque glass, grey yellow 5-2-6	Ring shaped, complete	D. 0.52 cm, L. 0.22 cm	
1629c	10012	Opaque glass, vivid grey yellow 5-2-5	Ring shaped, complete	D. 0.4 cm, L. 0.2 cm	
1629m	10012	Opaque glass, vivid grey yellow 5-2-5	Ring shaped, fragmented	D. 45 cm, L. 0.2 cm	
1630a	10012	Opaque glass, light reddish yellow 5-16-3	Ring shaped, corroded, complete	D. 0.4 cm, L. 0.25 cm	
1872m	10013	Translucent glass, orange yellow 5-13-6	Ring shaped, complete	D. 0.5 cm, L. 0.35 cm	
1883c29	10013	Opaque glass, blackish yellow 5-0-8	Ring shaped, fragmented	D. 0.34 cm, L. 0.2 cm	Maybe part of a multi coloured bead
1883c30	10013	Opaque glass, dark yellow 5-0-7	Ring shaped, fragmented	D. 0.3 cm, L. 0.05 cm	Maybe part of a multi coloured bead
4419c	10012/5	Opaque glass, dark yellow 5-0-7	Ring shaped, complete	D. 0.4 cm, L. 0.26 cm	
4954c6	10022	Opaque glass, dark yellow 5-0-7	Ring shaped, complete	D. 0.47 cm, L. 0.14 cm	
4975a8	10022	Opaque glass, dark yellow 5-0-7	Ring shaped, complete	D. 0.3 cm, L. 0.09 cm	Maybe part of a multi coloured bead
6688c1	10013	Opaque glass, light yellow	Ring shaped, complete	D. 0.42 cm, L. 0.36 cm	Vertical grooves. Folded?

Tab. 2.2.1.2 b: Chale Ghar 1, green ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1949l	10013	Translucent glass, green 39-0-6	Ring shaped, fragmented	D. 0.45 cm, L. 0.45 cm	
1872o	10013	Opaque glass, olive green 39-7-6	Ring shaped, fragmented, quite corroded	D. 0.53 cm, L. 0.24 cm	
4187e	10012	Translucent glass, light opal green 39-41-3	Ring shaped, fragmented	D. 0.31 cm, L. 0.7 cm	
4549a	10014	Opaque glass, vivid grey olive 7-2-5	Ring shaped, complete	D. 0.45 cm, L. 0.23 cm	
4590c	10013	Opaque glass, vivid yellowish green 39-4-5	Ring shaped, complete	D. 0.45 cm, 0.31 cm	
6238a1	10013	Opaque glass, green	Ring shaped, fragmented	D. 0.35 cm, L. unknown	
6385a1	10022	Slight translucent glass, green 39-0-6	Ring shaped, complete	D. 0.41 cm, L. 0.15 cm	Probably folded
6912c	10022	Opaque or corroded glass, light blueish green 39-30-3	Ring shaped, complete	D. 0.6 cm, L. 0.23 cm	

Tab. 2.2.1.2 c: Chale Ghar 1, blue ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1265a3	10012/2	Translucent glass, dark blue 31-0-7	Ring shaped, fragmented	D. 0.6 cm, L. 0.43 cm	
1716d	10013/1	Translucent glass, blackish blue 31-0-8	Ring shaped, complete	D. 0.36 cm, 0.22 cm	
1821e	10013/1	Translucent glass, blackish lilac ultramarine 29-23-8	Ring shaped, complete	D. 0.3 cm, L. 0.16 cm	
1825a	10013	Translucent glass, dark lilac ultramarine 29-23-7	Ring shaped, complete	D. 0.6 cm, L. 0.3 cm	
1872a	10013	Translucent glass, vivid grey blue 31-2-5	Ring shaped, fragmented	D. of two fragments 0.45 cm and 0.62 cm	
1883c19	10013	Translucent glass, light violet ultramarine 29-27-3	Ring shaped, complete	D. 0.3 cm, L. 0.2 cm	
4179a	10012/4	Translucent glass, blackish lilac ultramarine 29-23-8	Ring shaped complete	D. 0.35 cm, L. 0.2 cm	
4289a	10012/5	Translucent glass, dark blue 31-0-7	Ring shaped, complete	D. 0.6 cm, L. 0.29 cm	
4407g	10012/5	Translucent glass, blackish violet ultra marine 29-27-8	Ring shaped, fragmented	D. 0.32 cm, L. 0.12 cm	
4419f	10012/5	Translucent glass, lilac ultramarine 29-23-6	Ring shaped, complete	D. 0.46 cm, L. 0.25 cm	
4419h	10012/5	Translucent glass, lilac ultramarine 29-23-6	Ring shaped, complete	D. 0.32 cm, L. 0.2 cm	
4457e	10012/6	Translucent glass, blackish violet ultramarine 29-27-8	Ring shaped, complete	D. 0.5 cm, L. 0.3 cm	

Tab. 2.2.1.2 c: Chale Ghar 1, blue ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4468c	10013	Translucent glass, blackish lilac ultramarine 29-23-8	Ring shaped, complete	D. 0.57 cm, L. 0.3 cm	
4570b	10013	Translucent glass, blackish violet ultramarine 29-27-8	Ring shaped, complete	D. 0.62 cm, L. 0.31 cm	
4574h	10013	Translucent glass, blackish blue 31-0-8	Ring shaped, complete	D. 0.24 cm, L. 0.15 cm	
4578d	10014	Translucent glass, lilac ultramarine 29-23-6	Ring shaped, complete	D. 0.45 cm, L. 0.15 cm	
4586c	10013	Translucent glass, blackish turquoise blue 31-35-8	Ring shaped, complete	D. 0.36 cm, L. 0.25 cm	
4666c	10013	Translucent glass, blackish lilac ultramarine 29-23-8	Ring shaped, complete	D. 0.5 cm, L. 0.25 cm	
6218a1	10022	Translucent glass, vivid blue green 39-31-5	Ring shaped, complete	D. 0.34 cm, L. 0.22 cm	
6264a6	10013	Translucent glass, blackish blue 31-0-8	Ring shaped, complete	D. 0.64 cm, L. 0.28 cm	
6274a1	10022	Translucent glass, blackish blue 31-0-8	Ring shaped, complete	D. 0.64 cm, L. 0.28 cm	
6347	10022	Translucent glass, dark lilac ultramarine 29-23-7	Ring shaped, complete	D. 0.51 cm, L. 0.3 cm	
6494c	10022	Translucent glass, blackish turquoise blue 31-35-8	Ring shaped, complete	D. 0.33 cm, 0.14 cm	Probably folded, broken at seam
6841	10000	Translucent glass, blackish blue 31-0-8	Ring shaped, complete	D. 0.59 cm, L. 0.26 cm	
6961b1	10008	Slight translucent glass, blackish lilac ultramarine 29-23-8	Ring shaped, complete	D. 0.56 cm, L. 0.26 cm	

Tab. 2.2.1.2 d: Chale Ghar 1, orange, red and other colours of ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1085	10012	Glass, blackish orange 13-0-8	Ring shaped, complete	D. 0.73 cm, L. 0.3 cm	
1568	10012	Opaque glass, blackish yellow orange 13-5-8	Ring shaped, fragmented	D. 0.45 cm, L. 0.3 cm	Probably folded, broken at seam
1766e	10013/1	Opaque glass, blackish orange 13-0-8	Ring shaped, complete	D. 0.4 cm, L. 0.15 cm	
1768b	10013/1	Opaque glass, blackish yellowish orange 13-4-8	Ring shaped, fragmented	D. unknown, L. of fragment 0.35 cm	
1775d	10013/1	Opaque glass, blackish yellowish orange 13-4-8	Ring shaped, fragmented	Fragment, L. 0.59 cm, W. 0.25 cm	
1834d	10013/1	Translucent glass, light brown red 17-11-3	Ring shaped, fragmented	D. 0.5 cm, L. 0.22 cm	

Tab. 2.2.1.2 d: Chale Ghar 1, orange, red and other colours of ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4750g	10019	Translucent glass, blackish ochre 9-0-8	Ring shaped, complete	D. 0.54 cm, L. 0.4 cm	
6948	10004	Opaque glass, blackish orange 13-0-8	Ring shaped, complete	D. 0.22 cm, L. 0.11 cm	

Tab. 2.2.1.2 e: Chale Ghar 1, colourless/white ring shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1274d	10012/2	Translucent glass, white 1-0-6	Ring shaped, complete	D. 0.46 cm, L. 0.32 cm	Probably folded, broken at seam
1629j	10012	Opaque glass, white	Ring shaped, fragmented, quite corroded	D. 0.4 cm, L. 0.25 cm	
1678	10013/1	Opaque glass, yellowish white 1-4-6	Ring shaped, fragmented, corroded	D. 0.45 cm, L. 0.18 cm	
1883c16	10013	Opaque glass, yellow white 1-5-6	Ring shaped, complete	D. 0.65 cm, L. 0.2 cm	Large string hole D. 0.22 cm
4557b	10014	Opaque glass, white 1-0-6	Ring shaped, complete	D. 0.52 cm, L. 0.37 cm	
6337a1	10022	Translucent glass, green white 1-39-6	Ring shaped, complete	D. 0.47 cm, L. 0.39 cm	Funnel shaped string hole, 0.13 cm–0.26 cm

Tab. 2.2.1.3 a: Chale Ghar 1, yellow ovaloid glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1823b	10013/1	Translucent blackish yellow 5-0-8 glass covers opaque core (material unknown)	Ovaloid to lens shaped, anciently (?) fragmented	D. 1.35 cm, L. 1.36 cm	Repaired?

Tab. 2.2.1.3 b: Chale Ghar 1, green ovaloid glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1799	10013/1	Opaque glass, olive green 39-7-6	Ovaloid, complete	D. 1, 0 cm, L. 1.7 cm	Funnel shaped string hole, D. 0.17 cm–0.2 cm
1834e	10013/1	Opaque glass, dark green 39-7-0	Ovaloid, complete	D. 0.2 cm, L. 0.2 cm	
4460b	10012/5-6	Translucent glass, dark green blue 31-39-7	Ovaloid, complete	D. 0.5 cm, L. 0.5 cm	
4187g	10012	Vivid blue green 39-31-5	Ovaloid, complete	D. 0.4 cm, L. 0.4 cm	
4528a	10012/6	Opaque glass, blackish opal green 39-41-8	Ovaloid, complete	D. 0.82 cm, L. 0.8 cm	
4579h	10013	Opaque glass, vivid olive green 39-7-5	Ovaloid, complete	D. 0.32 cm, L. 0.34 cm	
4674d	10013	Opaque glass, turquoise	Ovaloid, complete	unknown	
6232	10022	Translucent glass, blackish blueish green 39-30-8	Ovaloid, complete	D. 0.49 cm, L. 0.41 cm	
6900	10004	Opaque glass, blackish opal green 39-41-8	Ovaloid, complete	D. 0.23 cm, 0.26 cm	

Tab. 2.2.1.3 b: Chale Ghar 1, green ovaloid glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6957c2	10008	Opaque glass, green white 1-39-6	Ovaloid, complete	D. 0.37 cm, L. 0.61 cm	

Tab. 2.2.1.3 c: Chale Ghar 2, one green ovaloid glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7166c3	11099	Translucent glass, green 39-0-6	Ovaloid, fragmented	L. 0.42 cm, W. 0.46 cm	

Tab. 2.2.1.3 d: Chale Ghar 1, blue ovaloid glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1082	10012	Translucent glass, blackish blue 31-0-8	Ovaloid, slight rhomb shaped section	D. 0.77 cm, L. 0.9 cm	
1154b	10013/1	Opaque glass, blackish turquoise blue 31-35-8	Ovaloid, complete	D. 0.36 cm, L. 0.48 cm	
1845	10013	Opaque glass, blackish turquoise blue 31-35-8	Ovaloid, complete	D. 0.3 cm, L. 0.35 cm	
1973c	10013	Translucent glass, vivid lilac ultramarine 29-23-5	Ovaloid, fragmented	D. 0.43 cm, L. 0.5 cm	
4386c	10013	Opaque glass (maybe originally translucent), turquoise	Ovaloid or spherical, complete	D. 0.5 cm, L. unknown	
6348a2	10022	Opaque glass, opal green 39-41-6	Fragmented	L. 0.39 cm, W. 0.26 cm	
6694c2	10022	Opaque glass, vivid lilac ultra marine 29-23-5	Ovaloid, fragmented	D. 0.32 cm, L. 0.32 cm	

Tab. 2.2.1.3 e: Chale Ghar 2, blue ovaloid glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7135c6	11097	Translucent glass, grey ultra marine 29-2-6	Ovaloid, complete, corroded	D. 0.62 cm, L. 0.93 cm	Funnel shaped string hole, D. 0.2 cm–0.28 cm. Drawn glass
7135c7	11097	Translucent glass, blue colour	Ovaloid, complete corroded	D. 0.65 cm, L. 0.72 cm	Funnel shaped string hole, D. 0.16 cm–0.21 cm. Drawn glass

Tab. 2.2.1.3 f: Chale Ghar 1, one brownish ovaloid glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4448b	10012/5-6	Translucent glass, dark violet brown 11-27-7	Ovaloid, fragmented	D. 0.48 cm, L. 0.47 cm	

Tab. 2.2.1.4 a: Chale Ghar 1, green disc shaped glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6154	10022	Opaque glass, blackish green 39-0-8	Disc shaped (Beck 1928, pl. II, III, I.A. 1.c), complete	D. 0.4 cm, L. 0.1 cm	

Tab. 2.2.1.4 b: Chale Ghar 2, green disc shaped glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7214a3	11099	Opaque glass, light blueish green 39-30-3	Disc shaped (Beck 1928, pl. II, III, I.A. 1.b), complete, corroded	D. 0.39 cm, 0.16 cm	

Tab. 2.2.1.4 c: Chale Ghar 1, blue disc shaped glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4840c1	10013	Opaque glass, dark blue	Disc to lens shaped with de-central crossways string hole/axis.	D. 0.72 cm, L. 0.63 cm	
1718b	10013	Translucent dark lilac ultra marine 29-23-7	Disc shaped bead, complete; traces of a white opaque substance on the surface	D. 0.85 cm, L. 0.8 cm	Wound and shaped with tools.

Tab. 2.2.1.4 d: Chale Ghar 1, red disc shaped glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6672	10013	Blackish vermilion 17-15-8	Disc shaped, complete	D. 0.67 cm, L. 0.67 cm, Th. 0.3 cm	

Tab. 2.2.1.5 a: Chale Ghar 1, yellow cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1629e	10012	Opaque glass, grey yellow 5-2-6	Cylindrical, complete, corroded	D. 0.32 cm, L. 0.27 cm	Obviously cut from one rod, one rounded end, one edgy one. Drawn glass
1629f	10012	Opaque glass, grey yellow 5-2-6	Cylindrical, complete, corroded	D. 0.4 cm, L. 0,32 cm	Obviously cut from one rod, one rounded end, one edgy one. Drawn glass
1629g	10012	Opaque glass, grey yellow 5-2-6	Cylindrical with one oblique end, complete	D. 0.34 cm, L. 0.5 cm	
1629i	10012	Opaque glass, grey yellow 5-2-6	Cylindrical, fragmented	D. 0.4 cm, L. 0.25 cm	Drawn glass
1976a	10013	Opaque glass, light reddish yellow 5-16-3	Cylindrical to barrel shaped (Beck 1928, pl. II, III B 1 b), complete, corroded	D. 0.37 cm, L.0.26 cm	Drawn glass
4666b	10013	Opaque glass, blackish yellow 5-0-8	Cylindrical, complete, folded ends broken or corroded	D. 0.33 cm, L. 0.2 cm	Folded
6274a6	10022	Opaque glass, light yellow 5-0-3	Cylindrical, semi circular fragment	D. 0.29 cm, L. 0.28 cm	Large string hole, D. 0.14 cm
6926	10004	Opaque glass, yellow	Cylindrical, oblique ends, complete	D. unknown, L. 0.5 cm	Large string hole, D. unknown

Tab. 2.2.1.5 b: Chale Ghar 1, green cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1145a	10013/1	Translucent glass, blackish opal green 39-41-8	Barrel shaped, fragmented corroded	D. 0.47 cm, L 0.40 cm	
1274a	10012/2	Opaque glass, blackish yellow green 39- 5-8	Short cylinder with one convex end (Beck 1928, pl. I, II, I.B.4.d.b.), complete	D. unknown, L. 0.25 cm	
1295d	10012/1	Opaque glass, blackish yellow green 39-4-8	Cylinder, complete	D. 0.18 cm, L. 0.22 cm	
1790f	10013/1	Translucent glass, light blue green 39-31-3	Barrel shaped, complete	D. 0.45 cm, L. 0.42 cm	Funnel shaped string hole, D. 0.12 cm–0.2 cm
1790g	10013/1	Opaque glass, green 39-0-6	Short Barrel (Beck 1928, pl. II, III B 1 b), complete	D. 0.48 cm, L. 0.3 cm	
1799m	10013/1	Translucent glass, blackish green 39-0-8	Cylinder, complete	D. 0.4 cm, L. 0.4 cm	
1836c	10013	Slight translucent to opaque glass, blackish opal green 39-41-8	Cylinder with two convex ends, complete	D. 0.34 cm, L. 0.35 cm	
1836d	10013	Opaque glass, green 39-0-6	Cylinder with slight concave wall, complete	D. 0.37 cm, L. 0.34 cm	Probably traces of string on the concave wall
1836e	10013	Translucent glass, greenish colour	Barrel shaped, complete	D. 0.38 cm, L. 0.37 cm	
4187b	10012	Translucent glass, light opal green 39-41-3	Probably cylindrical, very fragmented	D. 0.31 cm. L. 0.70 cm	
4289b	10012/5	Opaque glass, light blueish green 39-30-3	Cylinder with one convex and and one oblique end, complete, corroded	D. 0.35 cm, L. 0.3 cm	
4336f	10012/5	Translucent glass, blackish green 39-0-8	Cylinder, complete	D. 0.55 cm, L. unknown	Folded, overlapping ends. Large string hole, D. 0.31 cm
4419e	10012/5	Opaque glass, dark olive green 39-7-7	Cylinder, complete	D. 0.3 cm, L. 0.2 cm	
4549b	10014	Translucent glass, dark blueish green 39-31-7	Barrel shaped, complete	D. 0.48 cm, L. 0.39 cm	
4578f	10014	Translucent glass, blackish opal green 39-41-8	Barrel shaped, complete	D. 0.29 cm, L. 0.25 cm	
4579f	10013	Translucent glass, blackish green 39-0-8	Cylinder, corroded	D. 0.4 cm, L. 0.55 cm	
4580a	10014	Opaque glass (originally perhaps translucent), vivid blueish green 39-30-5	Cylindrical, fragmented, corroded	D. 0.4 cm, L. 0.5 cm	
4924c5	10022	Opaque glass, green 39-0-6	Cylinder with two convex ends, complete	D. 0.27 cm, L. 0.23 cm	
4975a5	10022	Translucent, blackish opal green 39-41-8	Standard Cylinder, (Beck 1928, pl. II, III C.2b) complete	D. 0.35 cm, L. 0.3 cm	
6014	10022	Translucent glass, olive green 39-7-6	Cylinder, complete, corroded or broken ends	D. 0.39 cm, 0.31 cm	Large string hole, D. 0.24 cm
6024a2	10013	Translucent, blackish opal green 39-41-8	Standard Cylinder, (Beck 1928, pl. II, III C.2b) complete	D. 0.4 cm, L. 0.4 cm	

Tab. 2.2.1.5 b: Chale Ghar 1, green cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6067a2	10022	Opaque glass, olive green 39-7-6	Barrel shaped, complete	D. 0.41 cm, L. 0.29 cm	
6148	10022	Translucent, dark greenish blue 31-38-7	Cylinder, complete	D. 0.4 cm, L. 0.39 cm	
6340a2	10022	Translucent, vivid grey green 39-2-5	Cylinder, heavily corroded	D. 0.42, L. 0.36 cm	
6476c	10022	Translucent glass, dark green 39-7-0	Cylinder, fragmented	D. 0.49 cm, L. 0.29 cm	
6743a3	10050	Translucent glass, blackish green 39-0-8	Barrel shaped, complete	D. 0.44 cm, L. 0.3 cm	
6834	10000	Opaque glass, green 39-0-6	Short cylinder, complete, corroded	D. 0.45 cm, L. 0.2 cm	
6854	10007	Translucent glass, light blue green 39-31-3	Cylinder, fragmented.	D. 0.65 cm, 0.49 cm	Large string hole, D. unknown
6884a1	10009	Opaque glass, light blueish green 39-30-3	Short cylinder, complete.	D. 0.38 cm, L. 0.22 cm	

Tab. 2.2.1.5 c: Chale Ghar 2, green cylindrical glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7166c1	11099	Opaque glass, opal green 39-41-6	Cylinder	D. 0.91 cm, L. 0.51 cm	

Tab. 2.2.1.5 d: Chale Ghar 1, blue cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1638b	10012/3	Translucent glass, dark blue 31-0-7	Cylindrical, complete	D. 0.3 cm L. 0.3 cm	
1723a	10013	Translucent glass, blackish blue 31-0-8	Cylinder with one oblique and one straight end. Complete	D. 0.3 cm, L. 0.43 cm	
1766d	10013/1	Translucent glass, grey blue 31-2-6	Cylinder, fragmented	D. 0.35 cm, L. 0.3 cm	Probably made of drawn glass as corrod-ed grooves show
1883c23	10013	Translucent glass, blackish violet ultrama-rine 29-27-8	Cylinder, one oblique end, complete	D. 0.32 cm, L. 0.42 cm	Drawn glass
1883c25	10013	Translucent glass, dark green blue 31-39-7	Cylinder, complete	D. 0.4 cm, L. 0.32 cm	
1872g	10013	Translucent glass, dark blue 31-0-7	Cylinder, complete	D. 0.3 cm, L. 0.25 cm	
1949c	10013	Translucent glass, dark blue 31-0-7	Barrel shaped, complete	D. 0.44 cm, L. 0.32 cm	
1965c	10013	Translucent glass	Cylinder, complete	D. 0.32 cm, L. 0.46 cm	
4665d	10013	Opaque glass, grey ultra marine 29-2-6	Barrel shaped with oblique ends, complete	D. 0.35 cm, L. 0.37 cm	
6065c5	10022	Opaque glass, blue	Cylinder, complete	D. 0.5 cm, L. unknown	
6071a2	10022	Translucent glass, blackish cobalt 33-0-8	Barrel shaped, complete	D. 0.4 cm, L. 0.3 cm	

Tab. 2.2.1.5 d: Chale Ghar 1, blue cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6135a2	10022	Translucent glass, blackish blue 31-0-8	Long cylinder, complete.	D. 0.27 cm, L. 0.65 cm	
6340a1	10022	Slightly translucent, vivid lilac ultramarine 29-23-5	Cylinder, complete	D. 0.26 cm, L. 0.21 cm	
6698c1	10022	Opaque glass, dark green blue 31-39-7	Cylinder, complete	D. 0.38 cm, L. 0.66 cm	Large funnel shaped string hole, D. 0.15–0.2 cm
6769	10013	Translucent glass, blackish greenish blue 31-38-8	Standard cylinder (Beck 1928, pl. II, III C.2b), complete	D. 0.39 cm, L. 45 cm	
6939a3	10004	Translucent glass, lilac ultra marin 29-23-6	Short cylinder (Beck 1928, pl. II, III C.2b), complete	D. 0.27 cm, L. 0.2 cm	

Tab. 2.2.1.5 e: Chale Ghar 1, brown, red and orange cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1718c	10013	Translucent glass, dark violet brown 11-27-7	Standard cylinder (Beck 1928, pl. II,III C.2b), complete	D. 0.45 cm, L. 0.42 cm	Oval shaped string hole, D. 0.17 cm×0.22 cm
4187c	10012	Translucent glass, blackish yellow ochre 9-5-8	Standard cylinder (Beck 1928, pl. II,III C.2b), complete	D. 0.4 cm, L. 0.45 cm	
4402c	10012/5	Glass/frit or clay, blackish yellowish orange 13-4-8	Cylindrical, complete	D. 0.43 cm, L. 0.33 cm	
4494c5	10019	Opaque glass, blackish brown red 17-11-8	Cylindrical, complete, corroded ends	D. 0.3 cm, L. 0.15 cm	Large string hole, D. 0.15 cm
4975a7	10022	Opaque glass, blackish brown red 17-11-8	Cylindrical, complete. corroded ends	D. 0.3 cm, L. 0.21 cm	
6043a3	10022	Opaque glass, blackish yellowish red 17-4-8	Cylindrical, slightly fragmented	D. 0.15 cm, L. 0.1 cm	
6303a	10022	Opaque glass/frit, blackish yellowish red 17-4-8	Cylindrical, irregular, complete	D. 0.24 cm, L. 0.21 cm	
6926a3	10004	Opaque glass, blackish orange 13-0-8	Cylindrical, complete	D. 0.23 cm, L. 0.21 cm	

Tab. 2.2.1.5 f: Chale Ghar 1, colourless/white cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1952b	10013	Translucent glass, yellow white 1-5-6	Barrel shaped, complete	D. 0.53 cm, L. 0.53 cm	Drawn glass
4954c5	10022	Translucent glass, white 1-0-6	Cylinder, complete	D. 0.43 cm, L. 0.4 cm	Large funnel shaped string hole, D. 0.13 cm–0.23 cm
6064c4	10022	Translucent glass, white 1-0-6	Cylinder, fragmented	D. 0.5 cm, L. 0.5 cm	
6144a1	10022	Translucent glass, white 1-0-6	Barrel shaped, fragmented	D. 0.55 cm, L. 0.52 cm	Drawn glass
6151a5	10022	Translucent glass, yellow white 1-5-6	Cylinder, fragmented	D. 0.53 cm, L. 0.44 cm	

Tab. 2.2.1.5 f: Chale Ghar 1, colourless/white cylindrical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6282a2	10022	Translucent glass, white 1-0-6	Cylinder, fragmented	D. 0.41 cm, L. 0.67 cm	
6385a2	10022	Translucent glass, white 1-0-6	Cylinder, fragmented	D. unknown, L. ca. 0.5 cm	

Tab. 2.2.1.6 a: Chale Ghar 1, green conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1578	10012	Translucent glass, green 39-0-6	Conical, complete	D. 1.7 cm, L. 0.1 cm	Funnel shaped string hole, D. 0.47 cm–0.6 cm. Inside the hole repairs.
1629k	10012	Opaque glass, grey turquoise 35-2-6	Convex cone (Beck 1928, pl. II, III C 1 c), complete	D. 0.46 cm, L. 0.5 cm	Funnel shaped string hole, D. 0.09 cm–0.15 cm
1790f	10013/1	Translucent glass, light blue green 39-31-3	Conical, complete	D. 0.45 cm, L. 0.42 cm	Funnel shaped string hole, D. 0.12 cm–0.2 cm.
1831g	10013/1	Opaque glass, opal green 39-41-6	Convex cone (Beck 1928, pl. II, III C 1 c), complete	D. 0.6 cm, L. 0.6 cm	Funnel shaped string hole, D. largest 0.32 cm
1856d	10013	Opaque glass, vivid grey green 39-2-5	Conical, fragmented	D. 0.31 cm, L. 0.2 cm	Large string hole, D. 0.15 cm
4187f	10012	Opaque glass, dark opal green 39-41-7	Long convex cone (Beck 1928, pl. II, III D.1.c, more steeply sides than the Beck's type). Complete	D. 0.4 cm, L. 0.75 cm	Funnel shaped string hole, D. 0.14 cm–0.17 cm
6403a1	10022	Opaque glass, vivid olive green 39-7-5	Probably truncated cone (Beck 1928, pl. II, III C 1 d), corroded ends.	D. 31 cm, L. 0.46 cm	Large, funnel shaped string hole, D. 0.12 cm–0.19 cm
6837b	10000	Opaque glass, dark opal green 39-41-7	Long convex cone (Beck 1928, pl. II, III D.1.c, more steeply sides than the Beck's type). Complete	D. 0.45 cm, L. 0.75 cm	Slightly funnel shaped string hole, D. 0.2 cm–0.28 cm
6883	10004	Opaque glass, green 39-0-6	Truncated cone (Beck 1928, pl. II, III C 1 d), complete	D. 0.4 cm, L. 0.5 cm	Large, funnel shaped string hole, D. 0.21 cm–0.27 cm

Tab. 2.2.1.6 b: Chale Ghar 1, blue conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1160a	10013/1	Translucent glass, blackish blue 31-0-8	Conical, complete	D. 0.55 cm, L. 0.53 cm	
1508c	10012	Translucent glass, blue	Standard convex cone, square section (Beck 1928, pl. II, III IX.C.1.c.)	D. 0.85 cm, L. 0.73 cm	
4266c	10012/5	Translucent glass, blackish cobalt 33-0-8	Conical, fragmented	D. 0.76 cm, L. 0.9 cm	
4299c	10012/5	Translucent glass, blue	Conical, complete	D. ca. 0.8 cm, L. ca. 1.1 cm	Folded
4320c	10012/4	Translucent glass, blackish lilac ultramarine 29-23-8	Long cone, complete	D. 0.6 cm, L. 1.64 cm	Funnel shaped string hole, D. 0.14 cm–0.24 cm

Tab. 2.2.1.6 b: Chale Ghar 1, blue conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4494c4	10019	Translucent glass, dark turquoise blue 31-35-7	Truncated cone (Beck 1928, pl. II, III C d 1), fragmented	D. 0.57 cm, L. 0.36 cm	String hole with oval section, D. 0.14 cm×0.27 cm
4496f	10014	Translucent glass, greenish blue 31-38-6	Truncated cone (Beck 1928, pl. II, III C d 1), fragmented	D. 0.6 cm, L. 0.5 cm	String hole with oval section, D. 0.14 cm×0.24 cm
4590b	10013	Translucent dark green blue 31-39-7 glass	Fragment of conical bead	D. 0.52 cm, L. 0.85 cm.	Funnel shaped string hole
4975a6	10022	Translucent glass, blackish cobalt 33-0-8	Short truncated convex cone (Beck 1928, pl. II, III B.1.d)	D. 0.21 cm, L. 0.41 cm	Funnel shaped string hole, D. 0.17 cm, L. 21 cm
6155a3	10022	Translucent glass, light ultra marine 29-0-3	Fragmented, maybe conical	D. 0.2 cm, L. 0.44 cm, W. 0.35 cm	
6274a8	10022	Translucent glass, blackish blue 31-0-8	Conical with quadrangular section, complete	D. 0.26 cm, L. 0.35 cm	
6743a10	10050	Opaque glass, light ultra marine 29-0-3	Conical with two oblique truncated ends, complete	D. 0.37 cm, L. 0.48 cm	Slight funnel shaped string hole, D. 0.08 cm–0.14 cm
6743c3	10050	Opaque glass, blue	Conical with irregular ends	D. unknown, L. ca. 0.5 cm	

Tab. 2.2.1.6 c: Chale Ghar 2, blue conical glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7002d	11057	Frit, light greenish blue 31-38-3	Conical, complete, glimmering corrosion	D. 1.0 cm, L. 1.3 cm	

Tab. 2.2.1.6 d: Chale Ghar 1, brown conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1799k	10013/1	Translucent glass, blackish lilac brown 11-23-8	Conical, fragmented	D. 0.6 cm, L. 0.5 cm	
1949d	10013	Translucent glass, blackish orange brown 11-13-8	Long convex cone (Beck 1928, pl. II, III D 1 c), fragmented	D. 0.7 cm, L. 1.0 cm	
4496g	10014	Translucent glass, blackish brown 11-0-8	Conical, complete	D. 0.5 cm, L. 0.5 cm	Funnel shaped string hole, D. 0.11 cm, 0.2 cm

Tab. 2.2.1.7 a: Chale Ghar 1, yellow double conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4581j	10014	Translucent glass, vivid brown yellow 5-11-5	Bicone, round section, sharp arête	D. 0.65 cm, L. 0.50 cm	
6968a (two beads)	10008	Opaque glass, yellow	Bicone, round section, complete	D. 0.5 cm, L. 0.44 cm	

Tab. 2.2.1.7 b: Chale Ghar 1, green double conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1782c	10013	Opaque glass, light blueish green 39-30-3	Truncated bicone, quadrangular section (Beck 1928, pl. II, III, IX. C. 4. D. b.), plastically patterned at the edges, complete	D. 0.5 cm, L. 0.55 cm	
1816e	10013/1	Opaque glass, blackish blue green 39-31-8	Bicone with round section, almost ovaloid complete	D. 1.0 cm, L. 0.95 cm	Wound glass
1839	10013	Translucent glass, light green olive 7-39-3	Truncated convex bicone (Beck 1928, pl. II, III, I.C.1.f.), almost ovaloid. Complete	D. 0.9 cm, L. 1.35 cm	Funnel shaped string hole, D. 0.16 cm, L. 0.24 cm
1957c	10013	Translucent glass, light green 39-0-3	Short truncated convex bicone, square section (Beck 1928, pl. II, III IX.B.1.f)	D. 0.8 cm, L. 0.6 cm	
4185d	10012	Translucent glass, greenish	Bicone, corroded	D. 0.72, L. 0.1 cm	
4337f	10012/5-6	Opaque glass, light blue green 39-31-3	Truncated bicone, quadrangular section (Beck 1928, pl. II, III, IX. C. 4. D. b.), straight walls, complete	D. 0.67 cm, L. 0.44 cm	
4356a	10012/5	Opaque glass, vivid grey olive 7-2-5	Truncated bicone, quadrangular section, complete	D. 0.62 cm, L. 0.51 cm	
4497c	10019	Opaque glass, dark olive green 39-7-7	Short truncated Bicone, straight walls (Beck 1928, pl. II; III, B.3.f.), round section, complete	D. 0.45 cm, 0.3 cm	
4765a	10015	Opaque glass, light blueish green 39-30-3	Bicone, convex, round section, complete.	D. 0.5 cm, 0.4 cm	Funnel shaped string hole, D. 0.07 cm–0.12 cm

Tab. 2.2.1.7 c: Chale Ghar 1, blue double conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1869	10013	Opaque glass, green blue 31-39-6	Bicone almost ovaloid, complete	D. 0.5 cm, L. 0.7 cm	
4962c3	10022	Translucent glass, blackish blue 31-0-8	Long truncated Bicone (Beck 1928, pl. II, III, D. 3.f., even longer!), complete	D. 0.44 cm, L. 1.25 cm	Funnel shaped string hole, D. 0.07 cm–0.15 cm

Tab. 2.2.1.7 d: Chale Ghar 1, red double conical glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1831b	10013/1	Translucent glass, blackish lilac carmine 19-23-8	Long truncated bicone (Beck 1928, pl. II, III, D. 3.f., even longer!), round section, complete.	D. 0.8 cm, L. 1,5 cm	Folded, slightly funnel shaped string hole, D. 0.2 cm–0.25 cm
6155a4	10022	Translucent glass, dark brown ochre 9-11-7	Bicone, complete	D. 0.55 cm, L. 0.77 cm	Air bubbles visible

Tab. 2.2.1.7 e: Chale Ghar 1, colourless/white double conical glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1611a	10012/3	Opaque glass, grey white 1-2-6	Long truncated bicone (Beck 1928, pl. II, III, I.D. 2.f.). Round section, complete.	D. 0.5 cm, L. 1.3 cm	

Tab. 2.2.1.8 a: Chale Ghar 1, yellow rectangular glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1018c3	10012	Opaque glass/frit, white 1-0-6	Rectangular or cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.). Slightly corroded	D. 0.8 cm, L. 0.6 cm	
1764	10013/1	Opaque glass/frit, light yellow grey 2-5-3	Rectangular or cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.). Slightly corroded	D. 0.9 cm, L. 0.7 cm	Funnel shaped string hole, D. 0.11–0.16 cm
4534	10014	Opaque glass	Long rectangular resp. cylinder with convex ends, square section (according to Beck 1928, pl. II, III, IX. D.4. f. b.), complete.		Folded?

Tab. 2.2.1.8 b: Chale Ghar 1, green rectangular glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4587c	10013	Opaque glass, light green 39-0-3	Rectangular, cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.), complete.	D. 0.55 cm, L. 0.39 cm	

Tab. 2.2.1.8 c: Chale Ghar 2, green rectangular glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7156c2	11097	Translucent glass, green white 1-39-6	Rectangular, fragmented	D. 0.74 cm, L. 0.41 cm	

Tab. 2.2.1.8 d: Chale Ghar 1, blue rectangular glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1210b	10013/1	Translucent glass, vivid violet ultramarine 29-27-5	Rectangular, complete	D. 0.4 cm. L. 0.4 cm	
1471	10019	Translucent glass, vivid violet ultramarine 29-27-5	Rectangular, complete	D. 0.48 cm, L. 0.70 cm	
1782b	10013	Translucent glass, blue 31-0-6	Rectangular, complete	D. 0.50 cm, L. 0.60 cm	
1836h	10013	Opaque glass, light violet ultramarine 29-27-3	Rectangular resp. cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.), complete	D. 0.3 cm, L. 0.3 cm	

Tab. 2.2.1.8 d: Chale Ghar 1, blue rectangular glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1883c21	10013	Opaque to slight translucent glass, grey blue 31-2-6	Rectangular resp. cylinder with two convex ends, rhombic section, complete	D. 0.32 cm, L. 0.3 cm	
4581i	10014	Translucent glass, vivid violet ultramarine 29-27-5	Long rectangular resp. long square cylinder (Beck 1928, pl. II, III IX. D. 2. b)	D. 0.54 cm, L. 1.36 cm	
4596b	10013	Opaque to slight translucent glass, lilac ultra marine 29-23-6	Rectangular resp. cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.), complete	D. ca. 0.3 cm, L. unknown	
4672b	10013	Translucent glass, blue 31-0-6	Rectangular resp. cylinder with square section (according to Beck 1928, pl. II, III, IX.C. 2. b.), complete	D. 0.3 cm, L. 0.36 cm	Large string hole, D. 0.15 cm
4750h	10019	Slight translucent glass, grey ultra marine 29-2-6	Rectangular resp. cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.), complete	D. 0.35 cm, L.0.3 cm	Large string hole, D. 0.15 cm
4924c4	10022	Translucent glass, lilac ultra marine 29-23-6	Rectangular, complete	D. 0.31 cm, L. 0.41 cm	
6274a5	10022	Translucent glass, vivid lilac ultra marine 29-23-5	Rectangular, fragmented	D. 0.43 cm, L. 0.56 cm	
6305a	10022	Slight translucent glass, dark blue 31-0-7	Rectangular resp. cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.), complete	D. 0.31 cm, L. 0.31 cm	
6449c	10022	Opaque glass, vivid lilac ultra marine 29-23-5	Rectangular resp. short cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. B.4. f. b.), complete	D. 29 cm, L. 0.24 cm	Large string hole, D. 0.12 cm
6616a1	10052	Translucent glass, dark grey blue 31-2-7	Rectangular, complete	D. 0.44 cm, L. 0.32 cm	
6649c	10013	Opaque glass, blue	Rectangular resp. cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.), complete	D. ca. 0.3 cm, L. unknown	Large string hole, D. more than 0.1 cm

Tab. 2.2.1.8 e: Chale Ghar 1, brown rectangular glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1495	10019	Opaque glass, brown ochre 9-11-6	Rectangular resp. cylinder disc (according to Beck 1928, Pl.II, III, IX. A. 3. b.), complete	L. 0.88 cm, W. 0.77 cm, Th. 0.45 cm	Long grooving along one end of bead through the string hole

Tab. 2.2.1.8 f : Chale Ghar 1, colourless/white rectangular glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1018c3	10012	Opaque glass/frit, white 1-0-6	Rectangular or cylinder with two convex ends, square section (according to Beck 1928, pl. II, III, IX. C.4. f. b.). Slightly corroded	D. 0.8 cm, L. 0.6 cm	

Tab. 2.2.1.9 a: Chale Ghar 1, green tube shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1949f	10013	Opaque glass, vivid grey green 39-2-5	Tube shaped resp. long cylinder (according to Beck 1928, pl. II, III, IX. D. 2. b.)	D. 0.23 cm, L. 0.93 cm	Drawn glass, obvious by the stripes on the surface.
4567a	10013	Translucent glass, blackish opal green 39-41-8	Tube shaped resp. long cylinder (according to Beck 1928, pl. II, III, IX. D. 2. b.)	D. 0.32 cm, L. 0.9 cm	

Tab. 2.2.1.9 b: Chale Ghar 1, colourless/white tube shaped glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6155a1	10022	Translucent glass, white 1-0-6	Tube shaped, complete	D. 0.3 cm, L. 0.57 cm	Funnel shaped string hole, D. 0.13 cm–0.16 cm

Tab. 2.2.1.10 a: Chale Ghar 1, green cornerless cube shaped glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6879b	10004	Translucent glass, blackish green 39-0-8	Cornerless cube, complete (Beck 1928, 17, A. I.)	D. 0.70, L. 0.71	

Tab. 2.2.1.10 b: Chale Ghar 2, green cornerless cube shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
7135c5	11097	Translucent glass, blackish opal green 39-41-8	Cornerless cube, resp. double chamfered cylinder (=according to Beck 1928, pl. II, III, IX. C. 2. b. f.)	D. 0.76 cm, L. 0.65 cm	
7140b	11097	Opaque glass, vivid olive green 39-7-5	Cornerless cube, resp. double chamfered cylinder (=according to Beck 1928, pl. II, III, IX. C. 2. b. f.)	D. 1.4 cm, L. 1.6 cm	

Tab. 2.2.1.10 c: Chale Ghar 1, blue cornerless cube shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1849	10013	Opaque glass, dark green blue 31-39-7.	Cornerless cube resp. double chamfered cylinder (=according to Beck 1928, pl. II, III, IX. C. 2. b. f.)	D. 0.93 cm, L. 1.05 cm	
1957f	10013	Opaque to slight translucent glass, blackish blue 31-0-8	Cornerless cube, complete	D. 0.3 cm, L. 0.36 cm	Large string hole, D. 0.12 cm

Tab. 2.2.1.10 c: Chale Ghar 1, blue cornerless cube shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1965e	10013	Translucent glass, dark blue 31-0-7	Cornerless cube, complete	D. 0.74 cm, L. 0.77 cm	
1973b	10013	Opaque glass, light ultra marine 29-0-3	Cornerless cube complete	D. 0.35 cm, L. 0.43 cm	
4318b	10012/5-6	Translucent glass, dark blue 31-0-7	Cornerless cube, complete	D. 0.78 cm, L. 0.84 cm	
4661	10013	Translucent glass, blackish blue 31-0-8	Cornerless cube, irregular, fragmented	D. 0.95 cm, L. 1.24 cm	
6066	10022	Opaque glass/frit, vivid greenish blue 31-38-5	Cornerless cube, fragmented.	D. 0.4 cm, L.0.5 cm	
6293a1	10022	Opaque glass/frit, vivid greenish blue 31-38-5	Long Cornerless cube resp. double chamfered cylinder (=according to Beck 1928, pl. II, III, IX. C. 2. b. f.), complete	D. 0.49 cm, L. 0.75 cm	
6697a1	10022	Opaque glass, vivid greenish blue 31-38-5	Cornerless cube, complete	D. 0.34 cm, L. 0.52 cm	Large string hole, D. 0.17 cm

Tab. 2.2.1.10 d: Cornerless cube shaped glass beads from the Near East, adjacent regions and Europe.

Date	Object	Provenance	Reference
Unknown	Blue green faceted bead	Samaria/Palestine	Crowfoot, Crowfoot and Kenyon, 1957, p.393 fig.92 no.33, p.395 no.33
170 BC (non-calibrated ^{14}C date!)	Three translucent faceted beads	Al Tar/Iraq	Fujii, 1976, pp.235-236 no. 5-7, p.301, pl.LXXIXb
1st–2nd century AD	Opaque yellowish glass bead, cornerless cube/faceted	Kush/Ancient Nubia	Unpublished; by courtesy of St.J. Simpson, British Museum
2nd century AD	32 faceted blue glass beads	Collection of F. L. von Gans	Greifenhagen, 1975, p.33, pl.29,3.
Middle of the 2nd century AD	Two faceted blue, green violet glass beads	Tibiscum/Dacia (modern Romania)	Benea, 1997, p.287 fig.10,4a-b
2nd–3rd century AD	Cornerless cube shaped glass bead, green opaque	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.12,170.
Late Arsacid period	Faceted blue glass bead, folded	Nowruzmahale/Iran	Egami, Fukai and Masuda, 1966, pl.XXIV,3-4.
1st–3rd century AD	Several necklaces with translucent blue and green faceted beads	Karanòg/Ancient Nubia	Woolley, 1910, no.7837, 7959, 7766, 7826B.
Late Roman, 180–324 AD	Blue faceted glass bead	Meiron/Israel (upper Galilee)	Meyers, Strange and Meyers, 1981, pp.232-233, No.R77725, pl.9.21,5.
3rd–early 4th century AD	Translucent blue faceted glass bead	Hanita/Israel	Barag, 1978, fig.8 no.121.
4th–5th century AD	Yellowish and pink faceted bead	Tell Mohammed Arab/Iraq	Grave 51U:15. Unpublished; personal communication M. Roaf.
4th–5th century AD	Cornerles cube shaped glass bead, translucent blue	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.5,30.
Roman	Two blue faceted glass beads	Roman Empire, from art trade	Spaer, 2001, p.74, nos.48-49.
Roman	Two cornerless cube shaped glass beads	Podgorodnoe/Northern Black Sea region	Simonenko, Marčenko and Limberis, 2008, p.59, pl.23,4a-b.
Late Sasanian, Early Islamic	Two faceted crystal beads	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, fig.6.6, bb, dd.

Tab. 2.2.1.11 a: Chale Ghar 1, green hexagonal glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1171a	10013/1	Translucent glass, light blue green 39-31-3	Hexagonal resp. cylinder with hexagonal section, complete	D. 1.0 cm, L. 1.0 cm	
1776a	10013/1	Opaque glass, vivid green 39-0-3, with translucent stripes	Hexagonal resp. cylinder with hexagonal section, complete	D. 1.55 cm, L. 1.53 cm	
1831e	10013/1	Opaque glass, blackish opal green 39-41-8	Hexagonal resp. cylinder with hexagonal section, complete	D. 1. 24 cm, L. 1.2 cm	Funnel shape string hole, D. 0.32 cm
4317	10012/6	Opaque glass/frit, dark green blue 31-39-7	Hexagonal resp. cylinder with hexagonal section, complete	D. 0.9 cm, L. 1.05 cm	
4335a	10012/6	Opaque glass, vivid emerald green 39-43-5	Hexagonal resp. cylinder with hexagonal section, complete	D. 0.9 cm, L. 1.18 cm	Large string hole, ca. D. 0.40 cm–0.50 cm
4571b	10013	Opaque glass, blackish green 39-0-8	Hexagonal resp. cylinder with hexagonal section, complete	D. 1.05 cm, L. 1.42 cm	Wave-like glass structures /grooves on surface

Tab. 2.2.1.11 b: Green hexagonal glass beads from the Near East and Europe.

Date	Object	Provenance	Reference
Middle of the second century AD	Hexagonal glass bead, green	Tibiscum/Dacia (modern Romania)	Benea, 1997, p.287 fig.10,3.
Arsacid?	Pale green opaque hexagonal glass bead	Bard-e Nechandeh/Iran	Ghirshman, 1976, pl.16,179d.
3rd – early 4th century AD	Translucent green hexagonal glass bead	Hanita/Israel	Barag, 1978, fig.18,122.
3rd – 5th century AD	Six small cylindrical glass beads, hexagonal. Greenish glass	Samaria/Palestine	Crowfoot, Crowfoot and Kenyon, 1957, p.391, p.393 fig.92, no. 34, p.395 no.43.
Terminus ante quem 803 – 4 AD, 650 – 800 AD respectively	Opaque green glass bead, hexagonal shape	Siraf/Iran	Unpublished; by courtesy of the British Museum

Tab. 2.2.1.12 a: Chale Ghar 1, yellow fluted glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1346	10013	Opaque glass/frit, vivid grey yellow 5-2-5	Fluted bead, 8 flutes; complete	D. 1.3 cm, L. 1.2 cm	

Tab. 2.2.1.12 b: Chale Ghar 1, blue melon shaped glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4950	10013	Translucent glass, dark blue 31-0-7	Slightly spherical melon shaped, fragmented	D. 0.58 cm, L. 0.4 cm	
6113	10022	Slight translucent light blue	Melon shaped with broad, slight oblique flutes	D. ca. 0.4 cm, L. ca. 0.35 cm	
6448	10022	Opaque glass/frit, vivid Prussian blue 31-37-5	Spherical melon shaped (Beck 1928, 10 fig. 11a), 16 flutes, complete	D. 1.7 cm, L. 1.1 cm	
6879a	10004	Translucent glass, blackish green 39-0-8	Fluted bead, plano-convex disc. (Beck 1928, 11 fig. 13), complete, corroded	D. 0.5 cm, L. 0.25 cm	

Tab. 2.2.1.12 c: Melon shaped glass and frit beads from the Near East, adjacent regions and Europe.

Date	Object	Provenance	Reference
Tappeh Giyan II and I, 14th–7th century BC	Collier of melon shaped beads, frit of Egyptian blue	Tappeh Giyan/Lurestan/Iran	Mission of R. Girshman 1931. Unpublished; from files of the Musée du Louvre.
Dinkha II, 1000–800 BC	Melon shaped bead of ‚paste'	Dinkha Tappeh/Northern Iran	Muscarella, 1974, p.72, p.74, no.997aP, c.
8th century BC?	Five melon shaped beads, dark blue, greenish blue, pale blue one, dark paste (no.57)	Samaria/Palestine	Crowfoot, Crowfoot and Kenyon, 1957 fig.92,56-58.
8th century BC?	Yellow melon shaped bead, slanting ribs	Samaria/Palestine	Crowfoot, Crowfoot and Kenyon, 1957, p.393 fig.92,59.
7th century BC	Necklace with melon beads, green faience	Collection Campana, Musée du Louvre	Gaultier and Metzger, 2005, p.147 II.130.
Achaemenid	Sharply melon shaped bead made of blue-green glass.	Persepolis/Iran	Rehm 1992, p.105, p.388 fig.D.8.c.
3rd century BC – 3rd century AD	Melon bead of translucent turquoise glass	Gishtakh Usti Van, Germi/ Iran	Kambakhsh Fard, 1998, p.91, bottom right. National Museum of Iran, Tehran, no. 3497.
1st century BC/1st cent AD	Melon shaped bead made of frit	Ed-Dur/UAE	Haerinck 2001, 77 BQ 4 (7), pl. 235, 7.
1st century AD	Spherical bead with ‚ribbed surface', red opaque glass	Black Sea littoral	Alekseeva, 1978, p.71, pl.33,50.
1st century AD	Spherical to ring shaped bead with ‚ribbed surface', turquoise opaque glass	Black Sea littoral	Alekseeva, 1978, p.71, pl.33,50.
1st half of the 1st century AD	Melon shaped faience bead	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.374, p.389, pl.194,9.
2nd half of the 1st century AD	Melon shaped faience bead	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.374, p.389, pl.193,4.
1st – 2nd century AD	Four blue glazed melon bead, 1 complete, 2 fragmented	Dura Europos/Syria	Toll, 1946, p.77 no.3, p.80 nos.6-7, p.86 no.28, pl.LII tomb 40-V, pl.LIV tomb 40-XIV, pl.LVI.
^{14}C cal. 121 ± 206 AD	Melon shaped bead, light yellowish green 39-4-3 glass	Samad al Shan/Oman	Yule, 2001, p.305, pl.284,16.3.
1st –3rd century AD	‚Pumpkin-shaped'/melon bead, amber coloured glass	Hassani Mahale/Dailaman/ Iran	Sono and Fukai, 1968, p.69, pl.XLIII 9, fig.LXXI 19.
3rd – 4th century AD	Melon bead, faience, blue glaze	Hanita/Israel	Barag, 1978, Kokh 9, grave B no. 134.
Roman	Melon shaped faience bead	Northern Black Sea region	Simonenko, Marčenko and Limberis, 2008, p.77, pl.122,3c.
Sasanian	Melon shaped bead of blue frit	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, p.185, pl.69,v.
1000–1399 AD	‚Flower' shaped yellow glass bead, ovaloid in length	Meiron/Israel	Meyers, Strange and Meyers, pp.232-233 no.R74135, pl.9.21,4.
Terminus post quem beginning of 13th century AD or even 14th century (coin with naskhī script!)	Blue-green melon shaped glass bead	Ghubayra/southeastern Iran	Bivar, 2000, p.23, p.245 fig.56,80-917a.

Tab. 2.2.1.13 a: Chale Ghar 1, green and blue tapered glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
1771	10013/1	Opaque glass, blackish turquoise blue 31-35-8	Complete, oblong tapered	D. 0.5 cm, L. 1.1 cm	
6135a3	10022	Opaque glass/frit, olive green 39-7-6	‚yo-yo' shaped/tapered cylinder, complete, slightly corroded surface	D. 0.4 cm, L. 0.38 cm	
6353a1	10022	Opaque glass, green 39-0-6	‚yo-yo' shaped/tapered cylinder, complete	D. 0.34 cm, L. 0.39 cm	

Tab. 2.2.1.13 b: Tapered glass beads from Iran and the Black Sea littoral.

Date	Object	Provenance	Reference
Achaemenid	Concave (‚yo-yo' shaped/ tapered) bead of oval square diameter made of opaque red glass.	Persepolis/Iran	Rehm, 1992, p.105, p.387 fig.D.6.b.; Schmidt, 1957, pl.44,2.
3rd–2nd century BC	Small ‚yo-yo' shaped/tapered bead, translucent lilac glass	Black Sea littoral	Alekseeva, 1978, p.68, pl.33, 23.

Tab. 2.2.1.14: Chale Ghar 1, green segmented glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6149	10022	Translucent glass, blackish green 39-0-8	Cylindrical with one smaller section, fragmented	D. unknown, L. 0.6 cm	

Tab. 2.2.1.15: Chale Ghar 1, blue biconical glass beads with vertical string hole.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
6089	10022	Opaque glass, greenish blue 31-38-6	Bicone with vertical string hole, complete	L. 0.31 cm, W. 1.3 cm	
6129	10022	Opaque glass, light blueish green 39-30-3	Bicone with vertical string hole, complete	L. 0.34 cm, W. 1.38 cm	

Tab. 2.2.1.16 a: Chale Ghar 1, green spacing glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4318c	10012/5-6	Opaque green blue 31-39-6 glass	Oval flat with two string holes; fragmented	D. 0.5 cm, L. 1 cm, Th. 0.3 cm	

Tab. 2.2.1.16 b: Spacing bead from Tell Mohammed Arab.

Date	Provenance	Object	Reference
4th–5th century AD	Tell Mohammed Arab, Iraq	Spacer bead, probably made of shell. Oval flat shape, two holes; fragmented	Unpublished; personal communication M. Roaf.

2.2.2 Overlay and Gold-in-Glass Beads

Twenty beads from Chale Ghar 1 may be addressed as overlay beads; their colourless or yellowish glass core was overlaid or covered with another glass of greenish-to-blueish colour. In a similar, but much more elaborate technique the gold-in-glass beads were produced. They consisted of two layers of glass with gold foil in between (cf. p.18-20).

M. Spaer (1993, p.18) refers to gold-in-glass beads produced in ancient Iran, but she does not mention any evidence. However, these special beads occur frequently in Iranian excavations, and in Chale Ghar 1 at Veshnaveh as many as 20 gold-in-glass beads were found, along with nine fragments and imitations. Chale Ghar 2 lacks any such finds. Some of these ornaments were excavated in situ in Chale Ghar 1, some were washed out of the excavation debris. Additionally, there are some fragments, which at least appear to have been of gold-in-glass beads, or are imitations of them. It is an essential preliminary question to identify whether a gold-in-glass bead is an original or an imitation.

The gold-in-glass beads from Veshnaveh have been categorised into four types: round, ovaloid and cylindrical beads; segmented beads; collared beads; the 'mulberry' bead; and there is an additional fifth category: fragments and imitations.

2.2.2.1 Green or Blue Overlay Glass Beads with Yellow or White Cores (Tab. 2.2.2.1 a)

In total 20 overlay beads were found in Chale Ghar 1. The beads from Veshnaveh mostly have cores of yellow or white glass, and green or sometimes blue translucent glass covers (pl. 6, no. 1872h); their shapes are either spherical or cylindrical, which are not separated within individual tables; their relevant details are summarised in one table.

Interpretation of the Green or Blue Overlay Beads with Yellow or White Cores (Tab. 2.2.2.1 b)

The beads excavated in Chale Ghar 1 may give additional insights into the possible techniques used to produce overlay beads: on some of them horizontal or longitudinal stripes are observable, such stripes indicate the methods of drawing or winding glass depending on the direction of the striations.[10] Interestingly enough, both techniques often seem to have been used in the manufacture of one bead. As can clearly be seen on four beads (pl. 6, no. 1872h; nos. 4517b, 4924c6, 6079a3), their core seems to be made of drawn glass (due to the longitudinal stripes along the string hole), while the cover was probably produced by winding hot glass around the core (due to the horizontal stripes). The cores were pre-manufactured from a drawn glass tube, which was divided into pieces and then covered with different-coloured glass.

At first sight some of the cores appear to consist of a glass different from that of the cover, their state of corrosion suggesting this. Some of the cores seem even to have been made of glass powder or frit. However, it seems quite likely that the same glass was used for both layers, only coloured differently. Because of the problems created by the different thermal expansion coefficients of different types of glass, usually a basic glass was coloured varyingly and used to produce the same bead in several colours (Stern and Schlick-Nolte, 1991, p.21; Lierke, 2009, p.3 fig.91). In fact, white- and yellow-coloured glass is much more prone to corrosion because of the tinting minerals employed (Lierke, 2009, p.9 fig.94); therefore, such glass may have a rather different appearance today. Though geographically and chronologically distant, chemical analysis of mediaeval beads from a hoard in Zawada Lanckorońska in Poland shows that using the same glass for core and cover of overlay beads was usual (Zoll-Adamikova, Dekówna and Nodek, 1999, p.52).

Published studies of overlay beads mostly relate to gold-in-glass beads. However, beads such as those found in Veshnaveh are hardly found in Iranian or Near Eastern contexts; details are sparsely provided. One Roman spacer bead from Augst in Switzerland does reflect the overlay technique, but it is rather different in appearance. Barrel-shaped beads from Tell Mohammed Arab in Iraq are made of an ochre-coloured surface glass. They are dated to the 4th–5th centuries AD, and may correspond closest to the beads from Veshnaveh.

2.2.2.2 Round, Ovaloid and Cylindrical Gold-in-Glass Beads (Tab. 2.2.2.2 a)

The larger part of gold-in-glass beads is presented by simple spherical shapes, which are for the most part well preserved. Few beads are fragmented and the cover ply of one bead is affected in such a manner that it is hardly translucent anymore (no. 1741). The gold foil of all the beads is clearly visible either through a translucent glass cover or because of a sliver, which exposes the interior of the bead.

The group of the spherical gold-in-glass beads has a thick and translucent external ply and some have a quite large string hole with carefully worked ends. They seem to have been produced with care and perhaps individually. Just one object shows a slight appendix, which points to its manufacturing as a segmented multi-row bead and its separation afterwards (pl. 6, no. 4090e; Spaer, 2003, p.12).

One ovaloid (no. 4294d) and one cylindrical piece (no. 1219b) are going to be mentioned here, too. Both were unearthed in the main chamber of Chale Ghar 1; the cover glass of the ovaloid bead shows grooves which suggest the use of a prefabricated drawn tube. The other has remains of gold foil on its fragmented surface.

[10] For technical terms – i. e. 'wound', 'folded', 'funnel shaped string hole' – cf. p.18, and Spaer, 2001, p.55.

Interpretation of the Round, Ovaloid and Cylindrical Gold-in-Glass Beads (Tab. 2.2.2.2 b)

Most Iranian comparable finds come from sites of northern Iran and date to the Arsacid period, as there are Abadije Sheikhlar in eastern Azabeidjan (pl. 6, The National Museum of Iran, Tehran, no. 3473);[11] the beads, which were found in a pithos, correspond to the beads from Veshnaveh in size and seem to be manufactured either individually or originate from segmented tubes. Tappeh Hatam, in the same district as Abadije Sheikhlar, also features gold-in-glass beads (The National Museum of Iran, Tehran, no. 3484). Two very beautiful artefacts comparable to the pieces from Veshnaveh are provided with a thick, colourless and translucent cover, which is effective like a loupe; similar beads also were found in Iranian Azarbeidjan in Khalkhal (pl. 6, The National Museum of Iran, Tehran, no. 4412, 4421).

Outside of Iran, spherical gold-in-glass beads have been found in Hanita/Jerusalem of the 3rd respectively early 4th century AD (Barag, 1978, pp.54-56), two beads with a small extension; as mentioned above, this is an indication for a manufacture of segmented tubes. From tombs in Karanòg/Egypt small gold-in-glass beads were unearthed, which were described by the excavator as 'gilt' (Woolley, 1910, p.81, nos.7810, 7811, 7892), but classified as gold-in-glass beads from C. G. Boon and M. Spaer (Boon, 1977, p.196; Spaer, 2001, p.130).

Many gold-in-glass beads appear in art trade like pieces, which are displayed in the Israel Museum. They might come from Egypt and were referred to the Roman period (Spaer, 1993, p.10-16; 2001, 138 no.240). Debatable is the dating of 50 gold-in-glass beads from the Pfeiffer Founds in the Metropolitan Museum of Arts, which were ascribed to the early Middle Ages (Jenkins, 1986, no.77).

2.2.2.3 Segmented Gold-in-Glass Beads (Tab. 2.2.2.3 a)

Segmented gold-in-glass tubes were manufactured for the quick production of single beads, but also to have two or three rowed beads as were excavated in Chale Ghar 1. Five such beads were unearthed (tab. 2.2.2.3 a; pl. 6, nos. 1202, 1752a, 4581g) and they have two or three spherical segments and a thin exterior glass cover.

Interpretation of the Segmented Gold-in-Glass Beads (Tab. 2.2.2.3 b)

Very often at the same site single glass beads as well as segmented beads were discovered, two, three or four rowed segmented beads were unearthed in Tappeh Hatam/Iran. They are of ovaloid or spherical segments and one bead is covered with an ochre coloured glass, maybe to imitate gold-in-glass or to intensify the gold colour. The segmented gold-in-glass beads from Tappeh Hatam are dated to the Arsacid period. A three rowed gold-in-glass bead was found in Hassani Mahale/Iran and is also dated to the 1st to the 3rd century AD (Hori 1981, 45).

Multi rowed beads dated to the late Hellenistic and early Roman period belong to the Dobkin Collection in the Israel Museum (Spaer, 2001, no.238) or were found in Tanais (Arsen'eva, Bezuglov and Toločko, 2001, pl.12,175). Furthermore, from an excavation in Israel, at Horbat Castra, there are gold-in-glass beads which are segmented more sharply than the beads from Veshnaveh; they date quite late, that is to say to the Roman-Byzantine Period (Spaer, 2001, p.132), which corresponds more or less with the Arsacid-Sasanian period.

2.2.2.4 Collared Gold-in-Glass Bead (Tab. 2.2.2.4 a)

Ancient gold-in-glass bead makers were not bound to round or segmented shapes; they also produced other shapes like the so called collared beads, these are usually oval shaped bodies with one collar at each side of the string hole (Spaer 2001, p.131 fig.57). One such piece was unearthed in Chale Ghar 1, but it differs from the common collar shaped beads; it is not ovaloid but of a lens shape; with two clearly stepped collars at each side (pl. 7, no. 1752b). The surface is corroded, but remains of the glass still cover the gold layer.

Interpretation of the Collared Gold-in-Glass Bead (Tab. 2.2.2.4 b)

'Some time into the Roman period, when most gold-glass beads can already be described as being mass-produced, the addition of 'collars' came into fashion' (Spaer, 2001, p.134). This suggestion by M. Spaer is confirmed by several comparable finds either from excavations in Northern Iran, for instance Tappeh Hatam and Hassani Mahale or by technical observations as made by M. Spaer.

According to the The National Museum of Iran, Tehran, the comparisons from Kaluraz/Iran date to the first millennium BC (tab. 2.2.2.4 b). This date seems debatable because of the technical appearance of the beads, and at least they may be dated with a terminus post quem of the 3rd century BC. Unfortunately, the circumstances of their discovery is not known, which makes further discussions more difficult. Collared beads from Germi dated to the 3rd century BC to the 3rd century AD resemble the bead from Veshnaveh quite well (pl. 7, no. 3490).

Other examples listed below cannot be allocated to their specific excavation site, but according to their editor they date to a quite late period up to the Middle Ages (Spaer, 2001, p.132, p.138, p.139). At Horbat Castra/Israel collared beads were excavated, which date to the 3rd/4th–6th century AD.

[11] This site was dated due to comparisons with other sites in the district of Germi as there are Airi Zamin, Kan Ieri and Gishtagh Usti (Kambakhsh Fard, 1998, p.11, pp.11-12, p.17; Sarkhosh Curtis and Simpson, 2000, pp.158-160).

All above named comparable finds do not exactly reflect the bead, which was found in Chale Ghar 1. The latter is of a lens shape with clearly and broadly stepped collars, while the examples from northern Iran, Israel and the collections are usually ovaloid with a smooth or short transition to the collars. M. G. Dikshit (1952, nos. 178, 180, 188) mentions such flattened collared beads that were published within the scope of excavations at Kondapur (Francis, 2002, p.92). Maybe the piece from Veshnaveh was produced locally or in another workshop than the beads from Germi and Gilan in Iran, or it was exported from another region, e.g. India.

2.2.2.5 One 'Mulberry' Shaped Gold-in-Glass Bead (Tab. 2.2.2.5 a)

An exceptional shape is the one which is described as 'mulberry' from W. G. N. van der Sleen (1973, glossary no.21), a cylindrical body ornamented with round bulges. One such bead was washed out of the earth from Chale Ghar 1 (pl. 7, 1949o). According to M. Spaer there are two possibilities to produce such beads, connected glass granules or a cylindrical basic shape with an ornament of granules (Spaer, 2003, no.14). The latter is qualified for the manufacture with gold-and-glass.

Interpretation of the 'Mulberry' Bead (Tab. 2.2.2.5 b)

In a thoroughly excavated female grave in Hassani Mahale two 'granule decorated' gold-in-glass beads were discovered. The grave dates to the 1st–3rd century AD (Sono and Fukai, 1968, p.9, p.61, colour plate 3.4). 'Mulberry beads' which also date to the centuries AD, were for example found in Tanais (Arsen'eva, Bezuglov and Toločko, 2001, pl.12,167); others are displayed in the Israel Museum and are compared to beads from En Gedi (Spaer, 2001, no.236; Hadas, 1994, p.56 fig.27). Noteworthy are 26 beads, which probably originate in Iran, they are all alike and seem to be produced in the same mould (Spaer, 2001, p.137 no.237).

Mulberry beads which are not made containing a gold foil, but with the use of another metal, come from the black sea region and date to the 1st – 2nd century AD (Alekseeva, 1978, p.32, pl.26,59-61).

S. Fukai (1977, pl.50) dates nine mulberry beads with gold foil inlay probably from Gilan/Iran to the 3rd–4th century AD and finds from the Roman-Byzantine site Horbat Castra belong to the 3rd/4th–6th centuries AD (Spaer, 2001, p.132 fig.58).

Mulberry glass beads were found in graves of Dura Europos and show that this shape was common for glass as well as for gold-in-glass beads (Toll, 1946, p.63 nos.50-61, pl.XLVII, tomb 30, p. 70, nos.14-19, pl. LI, tomb 36-III)

Above listed comparisons confirm that first mulberry beads appeared during the Arsacid period and were probably used as ornaments up until the Sasanian period.

2.2.2.6 Fragments and Imitations of Gold-in-Glass Beads (Tab. 2.2.2.6 a)

Gold-in-glass beads are defined as such when made of two layers of glass with a gold foil in between. In Chale Ghar 1, indeed, beads and fragments without such a gold foil were found, which allow the assumption that they are imitations or at least variations of gold-in-glass beads. In their case a coloured glass cover would imitate or intensify the gold effect and a yellow layer or a sheet of metal instead would replace the gold foil. As P. Francis writes (2002, p.93) 'imported gold-glass beads were desirable and expensive. A good imitation would have a ready market. Most false gold-glass beads in Asia were made with a small tube of semi-opaque white and a larger, outer tube of amber-coloured glass. They lack any gold.'

Nine finds from the mine Chale Ghar 1 feature characteristics of imitating gold-in-glass. First of all, two spherical beads from Chale Ghar 1. They are made of two colourless glass layers, which seemed to have had a third layer in between maybe something perishable which is now lost (nos. 1481, 1883c15). These two beads were produced by drawn glass as the striae show and no. 1481 seems to have belonged to a multi-row bead, because of a remaining extension.

A yellow layer in between two glass layers, which probably should imitate a gold foil, was found on beads no. 4335b and no. 4185a.

Another method to counterfeit gold-in-glass was to use a cover of honey coloured glass as was described by P. Francis (see above); this concept very clearly is visible at one three-row bead made of two glass layers. It has a colourless core and a coloured – partly fragmented – cover (pl. 6, no. 1222b2). Another such cover probably was an orange coloured fragment of a translucent glass layer (no. 1581b). The combination of coloured glass and a cheap metal foil which replaces the precious gold is presented by one completely preserved bead with a honey coloured cover (no. 1174). Its small extension suggests that the bead belonged to a multi-row piece or was produced as a segmented tube.

Last but not least the finds of translucent glass fragments, one of a spherical bead, one of a double-ovaloid bead, seem to be the remains of gold-in-glass beads or belong to variations of them.

Interpretation of the Fragments and Imitations of Gold-in-Glass Beads (Tab. 2.2.2.6 b)

P. Francis states (2002, p.93) that 'false gold-glass beads were made in the Middle East. They are found at Siraf, Aqaba, and Berenike, ports serving Asia.' However, most probably such beads seldom were realised as gold-glass imitations and were described objectively as beads with yellow translucent glass cover or with an ordinary metal foil.[12] By tendency, the imitations date later

[12] In a cemetery in Lembeck/Westfalen/Germany comparable beads without metal foil were unearthed and raise questions due to their lacking foil (Hernö, 2007, pp.88-89).

than the original gold-in-glass beads as for example oriental beads found in eastern Europe are of the 8th century. From there silver foil beads are known, that should imitate gold-in-glass beads (Callmer, 1995, p.50).

It is significant that some of these beads exactly were made with a technique, that was invented to produce gold-in-glass beads: a cored tube of glass coated with a metal foil or a yellowish layer was covered with another (translucent) glass. The more simple procedure to imitate gold-in-glass would be to use a translucent yellowish outer layer on a colourless glass core. This method is also used with differently coloured translucent glass beads, e.g. a bead with a yellow core is covered by translucent green glass. This technique is called overlay and is discussed in the introduction on the techniques of glass beads (cf. p.18).

Some examples for such gold-in-glass imitations from various excavations are listed in tab. 2.2.2.6 b. One segmented bead with an ochre glass cover from Tappeh Hatam/Iran reflects the overlay method as well as two beads from the Crimea. They date to the first century BC up to the second century AD (Kambakhsh Fard, 1998, fig.86; Alekseeva, 1978, p.33, pl.26,73 and 74). One cylindrical bead with a metal foil from the Crimea may date a little later (Alekseeva, 1978, p.33, pl.26,78), as well as three mulberry beads with metal foil from the same region, date from the first to the second century AD (Alekseeva, 1978, p.32, pl.26,59–61).

Tab. 2.2.2.1 a: Chale Ghar 1, overlay beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1068	10012	White opaque core, translucent cover, vivid green-blue 31-39-5	Spherical, fragmented	D. 0.94 cm, L. 0.8 cm	Funnel shaped string hole
1087e	10012	White opaque core, translucent cover, blackish blue-green 39-31-8	Ovaloid, complete	D. 0.7 cm, L. 1.01 cm	Funnel shaped string hole
1831f	10013/1	White opaque core (frit?) with translucent glass coating, blackish blue 31-0-8	Spherical, fragmented, corroded	D. 1.0 cm, L. 0.7 cm	
1437	10018	Translucent glass, blue-green 39-31-6 cover	Spherical cover, fragmented	D. 0.47 cm, L. 0.5 cm	Horizontal stripes, wound glass.
1872h	10013	Translucent glass, colourless core, blackish-blueish green 39-30-8 cover.	Spherical, fragmented	D. 0.5 cm, L. 0.45 cm	Core with longitudinal stripes = drawn glass. Cover with horizontal stripes = wound glass.
1949a	10013	Translucent glass, green 39-0-6 cover	Spherical cover, fragmented	D. 0.45 cm, L. 0.45 cm	Cover with horizontal stripes = wound?
1957e	10013	Translucent cover, blackish green 39-0-8. Opaque core, yellow	Spherical, complete	D. 0.55 cm, L. 0.46 cm	Cover with horizontal stripes = wound?
4185b	10012	Translucent cover, opaque yellow core, light blueish green 39-30-3	Spherical, fragmented. Corroded core!	D. 0.9 cm, L. 0.79 cm	Cover with horizontal stripes = wound?
4189c	10012	Yellowish core (frit?) with translucent cover, light emerald green 39-43-3	Spherical, with ribbed surface, very fragmented and corroded	D. 0.6 cm. L. 0.42 cm	
4187a	10012	Translucent cover with white opaque core (frit?), light opal green 39-41-3	Fragmented, corroded core	D. 0.31 cm, L. 0.7 cm	
4448a	10012/5-6	Translucent cover, green-blue 31-39-6. Opaque yellowish core	Spherical, fragmented	D. 0.9 cm, L. 0.5 cm	
4517b	10012/6	Translucent glass cover, blackish-blueish green 39-30-8. Yellow core	Cylindrical, fragmented	D. 0.6 cm, L. 0.6 cm	Core with longitudinal stripes = drawn glass? Cover with horizontal stripes = wound glass?

Tab. 2.2.2.1 a: Chale Ghar 1, overlay beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4457c	10012/6	Yellowish/greenish opaque core (frit?) with translucent cover, greenish blue 31-38-6	Spherical, very fragmented, corroded	D. 1.15 cm, L. 0.8 cm	
4924c6	10022	Translucent blackish opal green 39-41-8 cover, opaque yellow core	Spherical, fragmented	D. 0.54 cm, L. 0.43 cm	Core with longitudinal stripes = drawn glass? Cover with horizontal stripes = wound glass?
6060b	10022	Translucent bead with colourless core and blackish opal green 39-41-8 cover	Cylindrical, fragmented	D. 0.49 cm, L. 0.49 cm	
6079a3	10022	Translucent glass, cover, blackish green 39-0-8, core, colourless	Cylindrical, fragmented	D. 0.5 cm, L. 0.6 cm	Core with longitudinal stripes = drawn glass? Cover with horizontal stripes = wound glass?
6098c1	10022	Translucent cover, opal green 39-41-6	Conical, fragmented	D. 0.55 cm, L. 0.55 cm	Horizontal stripes and seam, folded
6116a	10022	Translucent dark opal green 39-41-7 cover with remains of opaque filling/core	Cylindrical, cover complete	D. 0.6 cm, L. 0.45 cm	Seam visible and horizontal stripes, single wound/folded bead
6292	10022	Translucent cover, dark opal green 39-41-7. Opaque core, yellow	Ovaloid, fragmented	D. 0.6 cm, L. 0.6 cm	Seam visible, folded glass over yellow core.
6838	10000	Translucent cover, dark green 39-7-0	Cylindrical, fragmented	D. 0.45 cm, L. 0.3 cm	Horizontal stripes, wound/folded

Tab. 2.2.2.1 b: Overlay glass beads from the Near East and Europe.

Date	Object	Provenance	Reference
Last third of the 1st century AD	Flat rectangular spacer bead of yellow core and green overlay	Augst/Switzerland	Riha, 1990, p.92.
4th–5th centuries AD	Two barrel-shaped composition beads. White material (possibly a type of faience) with an ochre surface	Tell Mohammed Arab/Iraq	Graves 49T/13 and 41. Unpublished; personal communication M. Roaf.

Tab. 2.2.2.2 a: Chale Ghar 1, round, ovaloid and cylindrical gold-in-glass beads.

Find Number	Feature	Material	Shape	Measurements
1171b	10013/1	Gold-in-glass	Spherical	D. 0.93, cm L. 0.67 cm
1195c	10013/1	Gold-in-glass	Spherical	D. 0.75 cm, L. 0.47 cm
1195d	10013/1	Gold-in-glass	Spherical	D. 0.65 cm, L. 0.48 cm
1219b	10013/1	Gold-in-glass	Cylindrical	D. 0.35 cm, L. 0.34 cm
1253b	10012/2	Gold-in-glass	Spherical	D. 0.6 cm, L. 0.57 cm
1400e	10013	Gold-in-glass	Spherical	D. 0.6 cm, L. 0.46 cm

Tab. 2.2.2.2 a: Chale Ghar 1, round, ovaloid and cylindrical gold-in-glass beads.

Find Number	Feature	Material	Shape	Measurements
1632	10012/3	Gold-in-glass	Spherical	D. 0.4 cm, L. 0.25 cm
1741	10013	Gold-in-glass	Spherical	D. 0.6 cm, L. 0.4 cm
4090e	10019	Gold-in-glass	Spherical	D. 0.42 cm, L. 0.4 cm
4294d	10012/4	Gold-in-glass	Ovaloid	D. 0.5 cm, L. 0.55 cm
4356b	10012/5	Gold-in-glass	Spherical	D. 0.83 cm, L. 0.62 cm
6267	10013	Gold-in-glass	Spherical	D. 0.8 cm, L. 0.6 cm

Tab. 2.2.2.2 b: Gold-in-glass beads from the Near East and the 'eastern Mediterranean' region.

Date	Object	Provenance	Reference
Middle of 1st century BC – early 2nd century AD	Two spherical gold-in-glass beads	Abadije Sheikhlar/Germi/ Eastern Azarbeidjan/Iran	The National Museum of Iran, Tehran, no. 3473. Kambakhsh Fard, 1998, p.8, pp.11-12, p.17; Sarkosh Curtis and Simpson, 2000, pp.158-160.
Middle of 1st century BC – early 2nd century AD	Spherical gold-in-glass bead	Tape Hatam/Germi/Eastern Azarbeidjan/Iran	The National Museum of Iran, Tehran, no. 3484.
3rd century BC – 3rd century AD	Two spherical gold-in-glass beads	Khalkhâl/Eastern Azabeidjan/Iran	The National Museum of Iran, Tehran, no. 4412, 4421.
1st – 3rd century AD	Two spherical to ovaloid shaped gold-in-glass beads	Hassani Mahale/Gilan/Iran	The National Museum of Iran, Tehran, no. 3258. Sono and Fukai, 1968, pp.8-9, colour pl.3.4, HAS T.4-26.
3rd – 7th century AD	38 spherical to ovaloid gold-in-glass beads	Miâne/Eastern Azarbeidjan/ Iran	The National Museum of Iran, Tehran, no. 3165.
3rd – 4th century AD	Two spherical gold-in-glass beads	Hanita/Israel	Barag, 1978, nos.113-114, fig.18.54-56.
1st – 3rd century AD	Several spherical gold-in-glass beads	Karanòg/Egypt	Woolley, 1910, p.81 nos.7810, 7811, 7892; Boon, 1977, p.196; Spaer, 2001, p.130.
2nd century BC – 4th century AD	14 spherical to ovaloid gold-in-glass beads	Egypt	Spaer, 1993, pp.10-16; 2001, p.138 no.240.
Early Middle Age	50 spherical gold-in-glass beads	'Eastern Mediterranean'	Jenkins, 1986, no.77.

Tab. 2.2.2.3 a: Chale Ghar 1, segmented gold-in-glass beads.

Find Number	Feature	Material	Shape	Measurements
1195b	10013/1	Gold-in-glass	Three spherical segments	D. 0.8 cm, L. 0.33 cm
1202	10013/1	Gold-in-glass	Three spherical segments	D. 0.45 cm, L. 1.16 cm
1752a	10013	Gold-in-glass	Two spherical segments	D. 0.35 cm, L. 0.7 cm

Tab. 2.2.2.3 a: Chale Ghar 1, segmented gold-in-glass beads.

Find Number	Feature	Material	Shape	Measurements
4062h	10013	Gold-in-glass	Two spherical segments	D. 0.43 cm, L. 0.73 cm
4581g	10013	Gold-in-glass	Two spherical segments	D. 0.43 cm, L. 0.6 cm

Tab. 2.2.2.3 b: Segmented gold-in-glass beads from the Near East and the 'eastern Mediterranean' region.

Date	Object	Provenance	Reference
1st century BC – 1st century AD	7 segmented (up to 7 rows) gold-in-glass beads	Eastern Mediterranean?	Spaer, 2001, no.238
Middle of 1st century BC – early second century AD	Three rowed segmented bead with ochre glass cover	Tape Hatam/Germi/Eastern Azarbeidjan/Iran	Kambakhsh Fard, 1998, fig.86. The National Museum of Iran, Tehran, no. 3352
Middle of 1st century BC – early second century AD	Three rowed and two two rowed segmented gold-in-glass beads	Tape Hatam/Germi/Eastern Azarbeidjan/Iran	The National Museum of Iran, Tehran, all no. 3487
1st – 3rd century AD	Three rowed segmented gold-in-glass bead	Hassani Mahale/Gilan/Iran	Sono and Fukai, 1968, pp.8-9, colour pl.3.4, HAS T.4-26. The National Museum of Iran, Tehran, no. 3258.
2nd – 3rd century AD	Three rowed segmented gold-in-glass bead	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.12,175.
3rd/4th – 6th century AD	8 two- and three- and more-rowed segmented gold-in-glass beads	Horbat Castra/Israel	Spaer, 2001, p.132 fig.58.

Tab. 2.2.2.4 a: Chale Ghar 1, collared gold-in-glass bead.

Find Number	Feature	Material	Shape	Measurements
1752b	10013	Gold-in-glass	Collared bead	D. 0.54 cm, L. 1 cm

Tab. 2.2.2.4 b: Collared gold-in-glass beads from the Near East and the 'eastern Mediterranean' region.

Date	Object	Provenance	Reference
First millennium BC	Two collared gold-in-glass beads	Kaluraz/Gilan/Iran	The National Museum of Iran, Tehran, no. 6579.
100 BC – 200 AD	Three lenticular collared beads of amber coloured glass and transparent glass	Kondapur/India	Dikshit, 1952, p.1, p.30, nos.178, 180, 188; Francis, 2002, p.92.
Middle of 1st – early 2nd century AD	Collared gold-in-glass bead	Tape Hatam/Germi/Eastern Azarbeidjan/Iran	Kambakhsh Fard, 1998, fig.86. The National Museum of Iran, Tehran, no. 3352.
3rd century BC – 3rd century AD	Two collared gold-in-glass beads	Germi/Iran	The National Museum of Iran, Tehran, Nos. 3490, 3500. Kambakhsh Fard, 1998, p.82 top right.
1st – 3rd century AD	Collared gold-in-glass bead	Hassani Mahale/Gilan/Iran	Sono and Fukai, 1968, p.33, HAS T.4-26. The National Museum of Iran, Tehran, no. 3258.
3rd – 4th century AD?	Collared gold-in-glass bead	Gilan?	Fukai, 1977, pl.50.
1st century BC – 4th century AD	Four collared gold-in-glass beads	Eastern Mediterranean?	Spaer, 2001, p.138 no.238, pl.20 no.238.

Tab. 2.2.2.4 b: Collared gold-in-glass beads from the Near East and the 'eastern Mediterranean' region.

Date	Object	Provenance	Reference
1st century BC – 15th century AD?	26 collared gold-in-glass beads	Eastern Mediterranean?	Spaer, 2001, p.139 no.241, pl.20 no.241.
3rd/4th – 6th century AD	Several collared gold-in-glass beads	Horbat Castra/Israel	Spaer, 2001, p.132 fig.58.

Tab. 2.2.2.5 a: Chale Ghar 1, one 'mulberry' shaped gold-in-glass bead.

Find Number	Feature	Material	Shape	Measurements
1949o	10013	Gold-in-glass	Mulberry shaped	D. 0.6 cm, L. 1.05 cm

Tab. 2.2.2.5 b: 'Mulberry' gold-in-glass beads from the Near East and the Crimea.

Date	Object	Provenance	Reference
1st – 3rd century AD	Two mulberry gold-in-glass beads	Hassani Mahale/Gilan/Iran	Sono and Fukai, 1968, p.9, p.61, colour pl.3.4.
2nd century BC – 1st century AD	Two mulberry gold-in-glass beads	Iran?	Spaer, 2001, no.236; cf. Hadas, 1994, p.56, fig.27.
2nd century AD	26 mulberry gold-in-glass beads	Iran?	Spaer, 2001, nos.137, 237.
1st – 2nd century AD	Three mulberry metal foil-in-glass beads	Crimea	Alekseeva, 1978, p.32, pl.26.59-61.
2nd century BC – 1st century AD	Twelve glass mulberry beads	Dura Europos/Syria	Toll, 1946, p.63 nos.50-61, pl.XLVII, Tomb 30.
1st – 2nd century AD	Six mulberry glass beads	Dura Europos/Syria	Toll, 1946, p.70, nos.14-19, pl.LI, Tomb 36 III.
2nd – 3rd century AD	Mulberry shaped gold-in-glass bead	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.12,167.
3rd – 4th century AD	Nine mulberry gold-in-glass beads	Gilan/Iran?	Fukai, 1977, pl.50.
3rd/4th – 6th century AD	Two mulberry gold-in-glass beads	Horbat Castra/Israel	Spaer, 2001, p.132 fig.58.

Tab. 2.2.2.6 a: Chale Ghar 1, fragments and imitations of gold-in-glass beads.

Find Number	Feature	Material	Shape	Measurements
1174	10013/1	Glass, metal	Spherical	D. 0.63 cm, L. 0.63 cm
1222b2	10013/1	Glass	Three-rowed	L. 2.1 cm D. unknown
1481	10019	Glass	Spherical	D. 0.45 cm, L. 0.52 cm
1581b	10012	Glass	Spherical, fragmented	D. 0.59 cm, L. 0.8 cm, W. 0.72 cm
1883c15	10013	Glass	Spherical	D. 0.53, L. 0.64 cm

Tab. 2.2.2.6 a: Chale Ghar 1, fragments and imitations of gold-in-glass beads.

Find Number	Feature	Material	Shape	Measurements
1883c32	10013	Glass	Fragmented, spherical?	D. 0.43 - 0.55 cm
4185a	10012	Glass, foil (material?)	Fragmented	L. 1.24 cm
4335b	10012/6	Glass, foil (material?)	Fragmented, spherical	D. 0.9 cm, L. 1.18 cm
6057c	10022	Glass	Segmented, double ovaloid	D. 0.6 cm, L. 1.1 cm

Tab. 2.2.2.6 b: Imitations of gold in glass beads from Iran and the Crimea.

Date	Object	Provenance	Reference
Middle of the first century BC to early 2nd century AD	Three-row bead with ochre coloured glass cover	Tape Hatam/Germi/eastern Azarbeidjan/Iran	Kambakhsh Fard, 1998, fig.86. The National Museum of Iran, Tehran, no. 3352
Second half of the 1st to 1st half of the 2nd century AD	Two multi-row beads with a yellow translucent glass cover	Crimea	Alekseeva, 1978, p.33, pl.26,73 and 74.
1st century BC to 4th century AD	Cylindrical glass bead with metal foil	Crimea	Alekseeva, 1978, p.33, pl.26,78.

2.2.3 Stripe-/Trail-Decorated Glass Beads

A total of 45 beads are covered by the section about the stripe- and trail-decorated beads, although they are very different in appearance. Their common characteristic is an adornment of stripes in horizontal or vertical alignment, although techniques of applying these trails or stripes may differ in detail. A set of twelve beads with concentric multi-coloured rings is a homogeneous group, while sixteen so-called stone imitation beads were manufactured individually, as well as the beads with various horizontal stripe decorations, with vertical applications, or one bead with vertical and horizontal stripes, and a blue bead with white wavy lines, a so-called zoned bead. Three beads with white vertical stripe decorations, again, seem to belong to one type.

2.2.3.1 Glass Beads of Parallel Colour Rings (Tab. 2.2.3.1)

Twelve cylindrical beads of several colours were found in Chale Ghar 1. These were made of up to seven alternating glass rings of four colours (e. g. nos. 6790, 6813): opaque yellow; red; white; and translucent green or blue. Some of the beads appear complete, but on inspection it is evident they have lost one or more colour rings. These beads are mostly described as fragmented here. Some beads or rather fragments are just constituted of one, two or three remaining rings, but they still can reasonably be categorised among the cylindrical beads described above (nos. 4692f, 4759b, 4954c9, 6120a3; cf. pl. 7, no. 4596d). These multi-coloured beads were made either by winding or folding. Glass of several colours was wound around a rod, colour by colour, so that, as each successive ring was attached, it formed a cylindrical bead. Another possibility would be to fold pre-manufactured stripes of multi-coloured glass around a rod (Kanungo, 2004, p.123): in this case the two fused ends of the stripe tend to show the same slight misalignment.

2.2.3.2 Stone Imitation Glass Beads (Tab. 2.2.3.2 a)

The here so-called stone imitation beads, they were previously named agate beads by P. Francis (2002, p.94), indicate a combination of opaque white and translucent dark blue and/or translucent brown glass. The technique used to produce most of these beads was to wind or fold rings of different-coloured glasses side by side around a rod. This is obvious, because the glasses penetrate the interior; otherwise the different-coloured glasses would remain on top of a basic glass and would not be visible in the inner area of the bead.

The makers of stone imitation beads obviously tried to copy real stones by using natural colours and patterns. In Veshnaveh different kinds of glass beads that obviously imitate agate, were discovered, a total of sixteen specimens, which can be divided into four groups (A–D) according to their appearance and/or technique of manufacture.

A) Characteristic are the spherical, cylindrical or ovaloid beads of translucent brown or opaque black glass with an opaque white central stripe (pl. 7, no. 1799i; 1803e, 1831c, 1831h, 4243b).

B) Similar in technique are the beads with several stripes. They were probably made from wound or folded glass, each colour next to a contrasting one, mostly shaped to reveal wavy stripes (nos. 1432, 1550, 4494c1, 4494c13; pl. 7, no. 4768b; nos. 4962c1, 6064c3). Their colours are also translucent brownish or opaque black with white stripes. Among this group two beads are very similar, both being of ovaloid shape with alternating black and two off-centre white stripes (nos. 4962c1, 6064c3).

C) Two beads were probably made of pre-manufactured stripes, which were then folded:

No. 1210c is made of alternating white and and black stripes. The glass was probably pre-manufactured and then folded around a rod. Along the seam another stripe of glass was attached lengthways. Maybe this bead was repaired.

The conical bead no. 4924c3 (pl. 7) is made of seven alternating black and white horizontal stripes. At the seam, which is clearly visible, the stripes do not touch each other exactly, but each colour is slightly displaced, and, so it seems, by an equal measure. This evidence indicates that a stripe of glass was pre-manufactured and then folded around a conical rod (Kanungo, 2004, p.123).

D) Technically bead no. 4494c11 (pl. 7) differs from the other stone imitation beads. While they seem to be made of pre-manufactured stripes, this bead is very clearly made of a monochrome black basic glass (folded or wound), on top of which two parallel white stripes were then applied. Very clearly these stripes sit on the basic glass and do not penetrate the interior: they are applied onto the bead.

Interpretation of the Stone Imitation Glass Beads (Tab. 2.2.3.2 b)

Although these beads have not been found at Fustat, Berenike, or Siraf, P. Francis (2002, p.95) believes that the Near East is likely to have been an important source for the so-called agate beads. As he writes, such beads were common in South Asia during the first millennium BC.[13] However, beads from a collection in the Israel Museum are dated to the 15th–13th centuries BC, and so an even earlier date for these beads is possible (Spaer, 2001, p.107, nos.142, 145, pl. 10,135, 142, 145).

The comparisons that resemble the Veshnaveh beads according to the broadest set of criteria have been listed below, and they date to periods ranging roughly from the 2nd century BC to the 3rd century AD, namely the Arsacid era. These parallels were found around the northern Black Sea littoral (Alekseeva, 1978, pp.40-41, pl.27); and also – to rely merely on a probable attribution – in Gilan in Iran, beads that now reside in private collections in Tokyo (Fukai, 1977, pl.46).[14] One necklace of blue stone imitation beads was unearthed in a children's grave, found together with that of a female adult, in Karanòg in Egypt (Woolley, 1910, no.7765 G 83); and it was dated to the 1st–3rd centuries AD.

All in all, it is difficult to date the so-called stone imitation or agate beads from Veshnaveh exactly, although it seems worth noting that comparable beads predominantly come from northern Iran and from areas to the north and west of the country, as well as from Mesopotamia and further south, the modern UAE, and that such beads tend to date to the Arsacid and Sasanian periods.

2.2.3.3 Glass Beads with Various Horizontal Stripe Decorations (Tab. 2.2.3.3)

Besides the stone imitation beads, eight beads of different colours are also decorated with horizontal lines and stripes: of yellow and green glass (pl. 7, no. 1396b2; pl. 8, no. 1831n (just green); nos. 4496h, 4570b, 4579e; pl. 8, no. 4582b); or of blue and white glass (pl. 8, nos. 1592d, 1844). In the following they are described according to their probable technique of manufacture.

Wound

Different-coloured wound beads were found in Chale Ghar 1. They were produced of alternating yellow and green glass: this process of adding alternating layers is obvious from fragments nos. 4496h, 4570b, 4579e, 4582b (pl. 8), with both colours – green and yellow – emerging from the interior of the bead. But no. 4582b appears like a faceted bead with yellow inlays, now corroded (pl. 8). Due to similarities of colour and appearance, it is suggested that these glass fragments (nos. 4496h, 4570b, 4579e and 4582b) belonged to one bead, or at least to one type of bead. They were found in the main chamber of Chale Ghar 1, two fragments in layer 10013, and two in a layer above this feature.[15]

Fortunately, bead no. 1396b2 is also fragmented, so one can observe that in this case the green translucent wavy lines were applied on top of the yellow glass core and do not penetrate it (pl. 7). A little more elaborate is the cylindrical bead no. 1844, which obviously was

[13] Examples have been found at Alishar Hüyük from the second half of the first millennium BC (Von der Osten, 1937, fig.120, e 289, c 1679).

[14] Four beads, each decorated with four white lines, from the same collections, and also probably found in Gilan, should be mentioned due to their 'agate' appearance in each case; but strictly speaking they do not correspond to the Veshnaveh beads, and so their earlier dating (to the 4th–2nd centuries BC) is not considered here (Fukai, 1977, pl.46).

[15] Although unearthed in different features (10014 and 10013), this suggestion is not as implausible as it sounds. The layers are stratified one above the other, and small beads and fragments can easily slip through the layers. The glass fragments are very similar in appearance, colour and state of corrosion!

produced by winding translucent blue and opaque white glass several times around the rod, the white colour remaining visible beneath the translucent glass (pl. 8).

One spherical bead (no. 1592d) consists of translucent blue glass with two fine white rings around the string holes at each end of the bead. In this case, probably the blue glass was folded or wound around the rod, then white glass was attached to the ends just one turn around.

Folded

Bead no. 1831n is obviously a folded bead (pl. 8). It is made of horizontal stripes of alternating shades of green. Probably this bead was manufactured from a stripe made of numerous glass streaks, which was then folded around the rod (Spaer, 2001, p.99). This assumption is based on inspecting the inward-turned stripes along the seam.

2.2.3.4 Blue Glass Beads with Vertical White Lines (Tab. 2.2.3.4 a); and One Zoned Glass Bead (Tab. 2.2.3.4 b)

Among the group of beads with vertical ornaments three beads form one type: they are very similar, and produced of translucent blue glass with carefully fused-in vertical white lines (Tab. 2.2.3.4 a, pl. 8, nos. 1434, 4960c1; no. 6151a1).[16]

One translucent blue bead has a rectangular shape, and is decorated with two white wavy lines (Tab. 2.2.3.4 b**,** pl. 8, no. 1883c22).

Interpretation of the Blue Glass Beads with Vertical White Lines (Tab. 2.2.3.4 c)

The blue beads with vertical white lines found in Chale Ghar 1 have a translucent core and well fused-in lines. The ends of the beads remain undecorated, and this suggests that they may have been cut from line-decorated – most probably drawn – tubes and reheated or hot-finished, to give them a spherical or ring shape.[17] Two comparisons are known from the northern Black Sea littoral: one made of red glass, another of blue glass with six to eight white lines on it. They date to the 3rd century BC (Alekseeva, 1978, p.43).

Interpretation of one Zoned Glass Bead from Veshnaveh (Tab. 2.2.3.4 d)

The decoration of this bead from Veshnaveh suggests that the bead was shaped when hot, and was not cut to a rectangular shape after cooling down: had that been done the white lines would have been abraded.

Ovaloid or barrel-shaped beads with similar decorations are known at least among beads of the stone imitation type (see above 2.2.3.2); but rectangular beads of such quality have been found less often, possibly because their period of production was quite limited. Comparisons point towards the 1st–3rd or even 4th centuries AD for these kinds of bead.

2.2.3.5 Glass Beads with Vertical Applications (Tab. 2.2.3.5 a)

In this subsection four very different beads are presented, they commonly feature a decoration mostly applied with vertical stripes. These stripes seem more likely to have been applied on a basic bead than pre-manufactured and drawn; nonetheless the production technique must remain an open question.

Though they are quite different in appearance, the four spherical and ring-shaped beads are summed up as a type of bead with vertical stripes, because on an opaque core vertical stripes of differently coloured glass were applied:

no. 1529 has a pattern of five vertical translucent green and five red streaks alternating with yellow glass, which is very corroded (pl. 8); no. 1834a is made of an opaque basic bead, decorated with translucent light green and dark green lines at a slightly oblique angle (pl. 8); no. 4522a shows vertical white and black streaks; ring bead no. 4586b has vertical green and (corroded) yellow stripes.

Interpretation of Glass Beads with Vertical Applications (Tab. 2.2.3.5 b)

From a collection in the Israel Museum one bead, described as made of drawn glass, has an appearance similar to bead no. 1529 (pl. 8). The white bead is decorated with vertical red, yellow and green glass stripes. Both beads even have almost identical measurements (varying by just 0.1 cm). Unfortunately, this example came to the museum through an anonymous donor, and not through an excavation (Spaer, 2001, p.117 no.199). Although this bead cannot indicate a dating, it shows that the specimen from Veshnaveh was not unique, but known elsewhere.

A note should be made about the white and yellow glass found on the beads: as beads from Veshnaveh as well as the example from the Israel Museum show, white- or yellow-coloured glass is more prone to corrosion than other glasses (Lierke, 2009, p.9 fig.94). This can be observed also on beads nos. 4496h, 4570b and fragments nos. 4496h, 4579e and 4582b (pl. 8).

[16] Similar beads are sometimes termed Venetian beads: see Spaer, 2001, p.142, p.145 no.250, pl.21 no.250.

[17] Glass tends to form a most minimal surface when hot and and left untouched. Winding a rod with hot glass usually forms a spherical bead.

2.2.3.6 Glass Bead with Both Vertical and Horizontal Stripes (Tab. 2.2.3.6)

Beads with stripe decoration were probably made of drawn glass, but decoration with both vertical and horizontal stripes suggest that trails were added to a core of monochrome glass (Spaer, 2001, p.105). Maybe this description is applicable to bead no. 4416b, which was made of vertical and horizontal stripes of opaque black, yellow/white, red and green colours. Very confusing is a further layer of translucent blue glass in the interior of this bead (pl. 9).

Tab. 2.2.3.1: Chale Ghar 1, glass beads of several, coloured parallel rings.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1874	10013	Multi-coloured bead of five rows of glasses, opaque yellow, red and white, translucent green/blue and again opaque white	Cylindrical, fragmented	D. 0.4 cm, L. 0.3 cm	Wound or folded
4189a	10012	Multi-coloured bead of five rows of glasses, opaque yellow, red and white, translucent green/blue and again opaque white	Cylindrical, fragmented	D. 0.35, L. 0.43 cm	Wound or folded
4274e	10012/5	Fragment of multi-coloured bead, opaque yellow and red	Cylindrical, fragmented	D. 0.3 cm, L. 012 cm	Wound or folded
4596d	10013	Multi-coloured bead of six rows of glasses, opaque blackish-brownish red 17-10-8 and white 1-0-6, translucent blackish opal green 39-41-8, opaque white, red and reddish yellow 5-16-6 colours	Cylindrical, fragmented	D. 0.75 cm, L. 0.33 cm	Wound or folded
4692f	10013	Multi-coloured bead of three rows of glasses: opaque red and white; translucent dark greenish blue 31-38-7; opaque white.	Cylindrical, fragmented	D. 0.3 cm, L. 0.23 cm	Wound or folded
4759b	10021	Multi-coloured bead of two rows of glasses: opaque light reddish yellow 5-16-3; and blackish yellowish red 17-4-8	Cylindrical, fragmented	D. 0.25 cm, L. 0.2 cm	Wound or folded
4954c9	10022	Multi-coloured bead of two rows of glasses: opaque light yellow 5-0-3; and blackish vermilion red, 17-15-8	Cylindrical, fragmented	D. 0.3 cm, L. 0.24 cm	Wound or folded
6095a5	10022	Multi-coloured bead of five rows of glasses, opaque yellow, red and white, translucent blue, again opaque white	Cylindrical, fragmented	D. 0.32 cm, L. 0.5 cm	Wound or folded
6120a3	10022	Fragment of multi-coloured bead, opaque blackish yellowish red 17-4-8 glass	Cylindrical, fragmented	D. 0.3 cm, L. 0.14 cm	Wound or folded
6790	10050	Multi-coloured bead of seven rows of glasses, opaque light reddish yellow 5-16-3, red and white, translucent green-blue and again opaque white, red and light reddish yellow 5-16-3	Cylindrical, complete	D. 0.7 cm, L. 1.2 cm	Wound or folded

Tab. 2.2.3.1: Chale Ghar 1, glass beads of several, coloured parallel rings.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
6813	10008	Multi-coloured bead of seven rows of glasses, opaque yellow, red and white, translucent olive green 39-7-6 and again opaque white, red and yellow	Cylindrical, complete	D. 0.45 cm, L. 0.7 cm	Wound or folded
6901a	10004	Multi-coloured bead of six rows of glasses, opaque light reddish yellow 5-16-3, red and white, translucent olive green 39-7-6 and again opaque white, red and light reddish yellow 5-16-3		D. 0.33 cm, L. 0.78 cm	

Tab. 2.2.3.2 a: Chale Ghar 1, glass stone imitation beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1210c	10013/1	Four opaque black and white 1-0-6 glass stripes alternating, remains of purple glass at one end of bead.	Cylindrical, fragmented	D. 0.47 cm, L. 0.63 cm	Folded?
1432	10018	White opaque glass attached to dark orange-brown 11-13-7 translucent glass	Cylindrical, fragmented	D. 0.6 cm, L. 0.75 cm	Funnel shaped string hole, D. 0.13–0.21 cm. Wound
1550	10012	Fragments of one striped glass bead, grey, yellow 5-2-6 and black alternating	Fragmented, corroded	D. 0.85 cm, L. 0.75 cm	
1799i	10013/1	Brown translucent (?) glass with white opaque central stripe	Conical, complete	D. 0.6 cm, L. 0.6 cm	Funnel shaped string hole, D. 0.09–0.18 cm. Wound
1803e	10013/1	Translucent dark brown ochre 9-11-7 glass, white opaque and blackish glass, wound in waves	Spherical to cylindrical, complete	D. 0.7 cm, L. 0.5 cm	Wound
1831c	10013/1	Translucent blackish sienna 12-0-8 glass with central opaque white stripe	Ovaloid, complete	D. 0.45 cm, L. 0.45 cm	Funnel shaped string hole, D. 0.04–0.7 cm. Wound.
1831h	10013/1	Translucent blackish sienna 12-0-8, central opaque white stripe	Ovaloid, complete	D. 0.4 cm, L. 0.6 cm	Funnel shaped string hole, D. 0.15–0.2 cm. Wound
4243b	10013	Black 3-0-6 glass with central opaque stripe	Cylindrical, fragmented, corroded	D. 0.75 cm, L. 0.69 cm	Wound
4494c1	10019	Translucent vivid orange-brown 11-13-6 glass with opaque white wavy stripes	Ovaloid, complete	D. 0.72 cm, L. 0.4 cm	Funnel shaped string hole, D. 0.1–0.23 cm. Wound
4494c9	10019	Translucent blackish red-brown 11-17-8 glass with centre opaque white glass	Cylindrical, fragmented	D. 0.55 cm, L. 0.53 cm	Wound. Large string hole, D. 0.25 cm.
4494c11	10019	Glass, black-grey 2-0-9 with two white stripes	Ovaloid complete, iridescent surface (because of corrosion)	D. 0.73 cm, L. 0.74 cm	Folded. Seam clearly visible. White stripes applied onto the black glass.

Tab. 2.2.3.2 a: Chale Ghar 1, glass stone imitation beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4494c13	10019	Light green-grey 2-39-3 opaque glass with translucent carmine grey 2-19-6 (or purple) glass	Ovaloid, complete	D. 0.5 cm, L. 0.75 cm	Funnel shaped string hole, D. 0.15–0.19 cm.
4768b	10015	Translucent blackish brown 11-0-8 glass with opaque white and black waves	Ovaloid fragmented	D. 0.4 cm, L. 0.75 cm	Funnel shaped string hole, D. 0.06–0.24 cm. Wound
4924c3	10022	Opaque glass, black and blue white 1-31-6 striped	Conical, complete	D. 0.46 cm, L. 0.58 cm	Funnel shaped string hole, D. 0.1–0.16 cm. Folded?
4962c1	10022	Opaque glass, black and two off-centre blue white 1-31-6 stripes	Ovaloid, fragmented (broken along string hole)	D. 0.7 cm, L. 1 cm	
6064c3	10022	Opaque glass, black and two off-centre white irregular-shaped stripes	Ovaloid, fragmented (broken along string hole)	D. 0.7 cm, L. 1 cm	

Tab. 2.2.3.2 b: Agate or stone imitation glass beads from the Near East and the northern Black Sea littoral.

Date	Object	Provenance	Reference
2nd–1st century BC	Spherical blue bead with central white stripe	Northern Black Sea littoral	Alekseeva, 1978, p.41, pl.27,11.
1st century BC–1st century AD	Four spherical beads of blue glass, each with a central white stripe (penetrating the interior)	Northern Black Sea littoral	Alekseeva, 1978, p.40, pl.27,3-6.
1st century AD	Barrel-shaped bead of black glass with central white stripe	Northern Black Sea littoral	Alekseeva, 1978, p.40, pl.27,12.
1st century AD	Spherical bead of translucent glass (colour?) with two central wavy white stripes	Northern Black Sea littoral	Alekseeva, 1978, p.41, pl.27,27.
1st–2nd centuries AD	Ellipsoid glass bead with white zone	Dura Europos/Syria	Rostovtzeff, et al., 1946, p.76 no. 17, pl.LII tomb 40-IV.
1st–3rd centuries AD	Necklace of spherical beads of opaque blue glass with central white line	Karanòg/Egypt	Woolley, 1910, no. 7765, G83.
1st–3rd centuries AD	Four spherical glass beads made of black, blue and dark red glass with one central white stripe	Gilan/Iran	Fukai, 1977, pl.46.
1st–3rd centuries AD	Ovaloid bead with three stripes, ochre, white and ochre	Gilan/Iran	Fukai, 1977, pl.46.
2nd half of the 3rd century AD	Ovaloid-to-double-conical bead of translucent blue-greenish glass with three central white and black stripes	Northern Black Sea littoral	Alekseeva, 1978, p.41, pl.27,29.
300–500 AD	Eleven spherical, keg-shaped brown glass beads with white stripes	Tell Mohammed 'Arab/Iraq	Roaf, 1984, p.149, figs.6, 10, 14, 16, 17, 19, 20, 26, 29, 30.
Roman-Byzantine Period	Two barrel-shaped-to-ovaloid beads of black glass with central white line	Alishar Hüyük/Turkey	Von der Osten, 1937, p.191, p.192 fig. 210 nos. e 1887, e 374.

Tab. 2.2.3.3: Chale Ghar 1, wound or folded glass beads of different colours from Veshnaveh.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1396b2	10012/2	Opaque glass or frit bead with four applied translucent greenish-blue wavy stripes	Spherical, fragmented	D. 0.93 cm, L. unknown	Stripes applied onto the surface of the bead by winding.
1592d	10012	Blueish opaque glass with fine white rings around the string hole at each end of the bead	Spherical, complete	D. 0.36 cm, L. 0.26 cm	Folded. Seam, not closed!
1831n	10013/1	Bead of blackish opal green 39-41-8 and of green white 1-39-6 wavy glass stripes	Cylindrical, fragmented	D. 0.95 cm. L. 0.93 cm	Folded. Seam visible!
1844	10013	Bead made of translucent grey ultra marine 29-2-6 and opaque white glass, stripes/ spirals	Cylindrical, complete	D. 0.5 cm, L. 0.8 cm	In turns the glass was wound several times around the rod: white glass is visible under the translucent blue.
4496h	10014	Fragmented bead of stripes? of translucent light blueish green 39-30-3 and yellow (now corroded) glass	Fragmented	D. 0.5 cm, L. 0.82 cm, W. 0.82 cm	Wound?
4570b	10013	Fragmented bead of stripes? of translucent light blueish green 39-30-3 and yellow (now corroded) glass	Fragmented	D. 0.46 cm, L. 0.9 cm, W. 0.84 cm.	Wound?
4579e	10013	Fragmented bead of stripes (?) of translucent light blueish green 39-30-3 and yellow (now corroded) glass	Fragmented	D. 0.42 cm. L. 0.8 cm, W. 0.76 cm.	Wound?
4582b	10014	Fragmented bead of light blueish green 39-30-3 glass. Faceted with yellow inlays	Fragmented	D. 0.55 cm, L. 1.06 cm, W. 0.8 cm	Wound?

Tab. 2.2.3.4 a: Chale Ghar 1, blue spherical glass beads with vertical white stripes.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1434	10018	Translucent grey ultramarine 29-2-6 coloured glass with twelve vertical white stripes	Cylindrical-to-bar-rel-shaped, complete	D. 0.5 cm, L. 0.8 cm	Drawn?
4960c1	10013	Translucent blackish blue 31-0-8 coloured glass with twelve vertical white stripes	Spherical-to-bar-rel-shaped, complete	D. 0.52 cm, L. 0.36 cm	Drawn?
6151a1	10022	Translucent blackish cobalt 33-0-8 coloured glass with sev-en white stripes: different-sized spaces between them	Ring-shaped, complete, slightly chopped off at one side	D. 0.4 cm, L. 0.22 cm	Drawn?

Tab. 2.2.3.4 b: Chale Ghar 1, 'zoned' glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1883c22	10013	Translucent lilac ultrama-rine 29-23-6 glass, with ornament of two central wavy lines ('zoned')	Rectangular, complete	D. 0.32 cm, L. 0.5 cm	

Tab. 2.2.3.4 c: Glass beads with white line decoration from the northern Black Sea region.

Date	Object	Provenance	Reference
3rd century BC	Spherical-to-conical glass bead of red colour with vertical white line decoration BC	Northern Black Sea region	Alekseeva, 1978, p.43, pl.27,88.
3rd century BC	Spherical-to-conical glass bead of blue colour with vertical decoration consisting of 6-8 white lines	Northern Black Sea region	Alekseeva, 1978, p.43, pl.27,89.

Tab. 2.2.3.4 d: 'Zoned' glass beads from the Near east and adjacent regions.

Date	Object	Provenance	Reference
1st–2nd centuries AD	Rectangular faceted bead, blue glass with yellow and white zones	Dura Europos/Syria	Rostovzeff, et al., 1946, p.76 no.22, pl.LII tomb 40-IV.
2nd–3rd centuries AD	Rectangular bead of dark green glass with two light-coloured wavy stripes	Northern Black Sea littoral	Alekseeva, 1978, p.42, pl.27,33.
3rd–4th centuries AD	Four beads of blue glass with white horizontal stripes	Collection F.L. von Gans: maybe from southern Russia	Greifenhagen, 1975, p.28, pl.21,5.

Tab. 2.2.3.5 a: Chale Ghar 1, glass beads with different-coloured, mostly vertical applications.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1529	10012	Opaque glass with vertical applications of blackish-blueish green (39-30-8) and blackish vermilion red (17-14-8) stripes, five of each and alternating; between the stripes another yellowish glass, corroded away	Spherical, complete, except for corroded yellow glass stripes	D. 1.1 cm, L. 0.91 cm	
1834a	10013/1	Blackish-blueish green 39-30-8 bead made of opaque glass/frit core with translucent, greenish glass coating, oblique stripes of light and dark green glass	Spherical, fragmented	D. 1.0 cm, L. 0.9 cm	
4522a	10012/6	Bead of opaque glass or frit ornamented with white and black vertical stripes; cf. no. 1529	Spherical, corroded	D. 1.2 cm, L. 0.92 cm	
4586b	10013	Translucent (?) vivid olive green 39-7-5 glass; pattern: alternating green and yellow (corroded) vertical stripes	Ring-shaped, corroded	D. 1.3 cm, L. 0.29 cm	The stripes were clearly applied onto the surface of the bead, and end just before string hole

Tab. 2.2.3.5 b: Trail decorated glass bead of unknown origin.

Date	Object	Provenance	Reference
Post-Roman period	Trail-decorated bead of white core with stripes in brownish red, greenish yellow and greyish green colour	Unknown	Spaer, 2001, p.117 no.199, pl.15,199.

Tab. 2.2.3.6: Chale Ghar 1, glass beads with different-coloured ornaments made with different techniques.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4416b	10012/5-6	Opaque bead, ornaments of vertical and horizontal stripes, colours black 3-0-6, yellowish white 1-4-6, vivid reddish brown 11-16-5, vivid grey-green 39-2-5; opaque core, inside translucent blue glass	Spherical, fragmented	D. 2.04 cm, L. 1.26 cm	Mosaic technique?

2.2.4 Variously Ornamented Glass Beads

Though technically probably similar to the stripe- and trail-decorated beads, five very different beads are discussed in the section about variously ornamented beads. They are simply labelled on the basis of their appearance, examples including: two marbled beads, two 'sun-decorated' beads and one 'black-and-white' bead.

2.2.4.1 Two Marbled Glass Beads (Tab. 2.2.4.1 a)

One bead of blue and green glasses in different nuances with opaque red inclusions was unearthed in Chale Ghar 1. It has a marbled appearance (pl. 9, no. 4273), and was probably made by winding differently coloured hot glass around a rod, but in an unstructured manner deliberately to produce the marbling effect. No. 1831a is made of three different glasses, white and red opaque glass and green translucent glass that seem to have been fused into each other without comprehensive pattern.

Interpretation of one Marbled Glass Bead (Tab. 2.2.4.1 b)
Marbled beads of different colours have been found in various regions, ranging from Egypt to northern Iran.

2.2.4.2 Disc-Shaped Sun-Decorated Glass Bead (Tab. 2.2.4.2 a)

Bead no. 1115a is made of three layers of opaque glass, white (centre), surrounded by brown and dark red glass with fine brownish stripes on the rim (pl. 9). It might be a fragmented bead, but more probably it was worked off, perhaps in a cold condition. Other possible methods may have included: using a mould to shape such a flat bead with several clearly marked-off glasses; or using glass powder in a mould.

Interpretation of one Sun(?)-Decorated Glass Bead (Tab. 2.2.4.2 b)
The bead that was found in Veshnaveh is very fragmented, and to compare it with sun-decorated beads, such as the one found in the northern Black Sea region, is only a suggestion. The brownish stripes on bead no. 1115a may be the remains of rays from the sun motif (pl. 9).

2.2.4.3 Spherical Bead with a Sun- or Eye Motifs and Rays (Tab. 2.2.4.3 a)

No. 4451 has a noteworthy motif: on both sides of the opaque blue bead the pattern of a red sun or eye is applied, surrounded by a greyish white glass. Circa ten greyish, partly wavy, rays connect the two suns with each other around the bead (pl. 9).

Interpretation of one Glass Bead with a Sun or Eye Motif and Rays (Tab. 2.2.4.3 b)
Elaborate patterns could easily have been made by an experienced bead-maker on a rod, using pre-manufactured glass sticks in different colours: these could be heated and applied to make an ornament (Lierke, 2009, p.15 fig.96).

No close comparisons exist for the unusual bead no. 4451 (pl. 9), found in Chale Ghar 1, though one bead from the Israel Museum might resemble its pattern in the broadest sense. It is a translucent purple glass bead with a decoration of two white-and-blue eyes, connected with white rays or lines. It seems to be a variation of the ornament from Veshnaveh, and so it is arguable that these two beads may represent an established pattern.

2.2.4.4 Black-and-White Decorated Bead (Tab. 2.2.4.4)

Bead no. 4475a was given a unique pattern, and the technical means used to create this ornament remain unclear (pl. 9). One suggestion is that four opaque white glass caps were applied and fused onto a black glass core; in this way the black rectangle around the string hole may have appeared. Additionally, on each of the four sides of the bead a black vertical stripe was applied and melted in.[18]

Tab. 2.2.4.1 a: Chale Ghar 1, marbled glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1831a	10013	Opaque white and red glass with translucent blackish opal green 39-41-8 glass	Fragmented	D. 1.24 cm, L. 1.2 cm	
4273	10012/5	Blackish blue-green 39-31-8 translucent glass in miscellaneous nuances with red opaque glass inclusions: marble effect	Spherical, fragmented	D. 1.05 cm, L. 0.85 cm	

[18] A first and uncertain suggestion from R. Lierke.

Tab. 2.2.4.1 b: Marbled glass beads from Egypt and Iran.

Date	Object	Provenance	Reference
1st–3rd centuries BC	14 large spherical beads of blue, black and red glass	Karanòg/Egypt	Woolley, 1910, no.7913, G639.
1st–3rd centuries BC	32 large spherical glass beads of brown-and-white marbled paste	Karanòg/Egypt	Woolley, 1910, no.7847, G307.
1st–3rd centuries BC	Marbled glass bead of yellow, black, green and red colours	Gilan/Iran	Fukai, 1977, p.47 top left.

Tab. 2.2.4.2 a: Chale Ghar 1, disc-shaped glass bead with decoration.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1115a	10012	3 layers of opaque glass, white (centre), brown and blackish red 17-0-8; fine brownish stripes on the rim	Disc-shaped, fragmented	D. 0.7 cm, L. 0.2 cm	Fragment of bead or secondary worked-off specimen. Fully functional string hole!

Tab. 2.2.4.2 b: Sun-decorated glass bead from the Northern Black Sea region.

Date	Object	Provenance	Reference
Roman	Cylindrical mosaic bead with sun decoration	Kalantaevo/Northern Black Sea region	Simonenko, Marčenko and Limberis, 2008, p.59., pl.20,6e.

Tab. 2.2.4.3 a: Chale Ghar 1, spherical glass bead with sun/eye decoration.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4451	10012/6	Opaque blackish green-blue 31-39-8 glass with red-and-white sun pattern, red centre, white rays	Spherical, complete	D. 0.92 cm, L. 0.85 cm	

Tab. 2.2.4.3 b: Glass bead with ray decoration from Egypt (?).

Date	Object	Provenance	Reference
Roman period (early Roman?)	Translucent purple bead with decoration of two white/blue eyes, connected with white lines	Eastern Mediterranean region (Egypt?)	Spaer, 2001, p.95, no.118, pl.9,118.

Tab. 2.2.4.4: Chale Ghar 1, black-and-white decorated glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4475a	10014	Opaque white 1-0-6 glass with black-grey 2-0-9 patterns, four vertical stripes and a rectangle around the string hole	Spherical, complete	D. 0.72 cm, L. 0.59 cm	

2.2.5 Mosaic Glass Beads

Owing to technical aspects six beads have been described as mosaic beads. Four so-called chessboard beads, one vegetable- and one bird-decorated bead represent a mature mosaic technique produced by craftsmen with advanced technical knowledge.

2.2.5.1 The Chessboard Pattern Glass Beads (Tab. 2.2.5.1 a)

So-called chessboard beads were made of rectangular cold-bundled rods, usually in two colours (Spaer, 2001, p.120). Typical shapes of these beads are flat rectangles. At Veshnaveh two complete chessboard beads and two fragments were unearthed. They are made of green and white or yellow rectangles. The tabular sides exhibit the chessboard pattern while the edges show the streaks of the canes (cf. pl. 9. no. 4732a). However, on the plane part of bead no. 4732a and along the 'rim' the chessboard pattern streaks of the mosaic canes are visible (pl. 9). They indicate that the bead or the mosaic stripe was squeezed to a flat bead when hot.

Another striking observation is that the pattern continues through the perforation exactly; it seems as if the mosaic stripes from Veshnaveh were perforated after bundling the canes and melting them. However, due to its texture the glass would have been difficult if not impossible to perforate when hot (Lierke, 2009, pp.2-5 fig.91-92). Probably these beads were drilled in a cold condition, or a symmetrical mosaic stripe was precisely folded around a rod; another possibility is that one mosaic bar was cut into two corresponding stripes, and that these were then placed flanking the rod and melted together. The lack of traces of drilling and a slight groove collateral to the string hole rather point to the fold method.

The similarity of the two fragments nos. 4517e and 4582c is striking: they have exactly the same colours and length. Even though they were found in different features of Chale Ghar 1, it is quite possible that they are two fragments of the same bead. If so, a total of three chessboard beads were found in Chale Ghar 1.

Interpretation of Chessboard Pattern Glass Beads (Tab. 2.2.5.1 b)

Chronologically the chessboard pattern does not appear before the 4th century BC; then it is known from inlays, and, according to M. Spaer (2001, p.120), chessboard designs hardly predate the late Hellenistic period. Based on examples from the northern Black Sea littoral and the eastern Mediterranean, it is much more likely that chessboard beads in Iran belong to the Arsacid period – and most probably later still – than to any earlier era.

2.2.5.2 Flower-Decorated Glass Bead (Tab. 2.2.5.2)

An inspection of bead no. 1472 suggests that the term 'millefiori' may be appropriate for this context (pl. 10); however, this term is not as yet precisely defined or used. M. Spaer (2001, p.120) uses it as 'a catchword for mosaic beads with a repeat pattern of 'flowers' (mostly concentrically patterned cane sections), covering much or all of the bead surface.' In the case of bead no. 1472 it seems more reasonable to stick to the general word 'mosaic'. The bead is neither decorated all over its surface with countless ornaments nor is it made of concentric cane sections. Its decoration fairly closely follows a symmetrical pattern.

The cylindrical bead is made of a well developed mosaic technique, with a yellow background being divided into two parts by a central circular stripe. On each side of the stripe, red flowers, each with three angular petals and green rhombic-shaped leaves, alternate each other. The petals and the leaves are framed with thin lines of dark glass. These lines may have appeared either as a result of chemical reactions between the differently coloured glasses – or perhaps it was done on purpose (Lierke, pers. comm).

The pattern penetrates the whole basic glass and a seam is very clearly visible along the cylindrical glass bead. These attributes point to the manufacture of a mosaic stripe, which was folded to a cylindrical bead. The canes for the mosaic probably were shaped by tools or with moulds in advance – e.g. to the rhombic leaf – and then arranged to form an ornament.

Interpretation of the Flower-Decorated Glass Bead

The flower-decorated bead is a unique and high-quality specimen. To produce such a glass artefact, specialist knowledge and skill were needed, and for such technical reasons it seems very likely that this bead was not manufactured before the early 'Imperial' or mid-Arsacid period (Spaer (2001, p.121).

2.2.5.3 The 'Bird Glass Bead' (Tab. 2.2.5.3 a)

An exceptional mosaic bead with a bird pattern was found as the only artefact of its kind in Chale Ghar 1 (pl. 10, no. 6885). It is a flat, rectangular bead of red opaque glass. On the plane side a bird in profile is visible made of blue, yellow, white and black glass. The ornament is continuous and both sides of the bead are virtually heraldic. The bird is 'drawn' with black lines. Body and head feathers are filled with white glass; the head is coloured in blue, while the beak is made yellow; the tail feathers contain blue and yellow stripes in turn; and the feet are black.

Similar to the method described for the chessboard beads (subsection 2.2.5.1), the 'bird bead' was probably

made of a mosaic stripe, which was perforated in some way. Either two corresponding stripes with the same bird motifs (cut from one mosaic bar), were heated and placed around a rod, or the bead was perforated in a cold condition. The latter suggestion may be wrong, because it was not possible – at least with the naked eye – to detect traces of drilling at the string hole.

Interpretation of the Bird Decorated Glass Bead' (Tab. 2.2.5.3 b)

From the northern Black Sea region a rectangular pendant with a bird (a falcon?) made in mosaic technique is dated to the 1st century AD. Other bird motifs were found on spherical beads with mosaic birds applied onto them. These originate from Egypt or from the northern Black Sea littoral. A bird from the latter region is quite comparable to the bird on the bead from Veshnaveh: both animals have a rather depressed appearance, and correspond to the rectangle of the background or bead. The heads are displaced slightly to the back, while the neck is in an 'S'-shape. The feathering is in streaky fashion. According to E. M. Alekseeva (1982, p.36), beads with surrounding, non-random mosaic patterns date to between the second half of the 1st century BC and the first half of the 2nd century AD. However, due to lacking exact comparisons the bead from Veshnaveh cannot chronologically be ranged in for sure.

Tab. 2.2.5.1 a: Chale Ghar 1, chessboard patterned mosaic glass beads.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1461	10019	White and green opaque glass in chessboard pattern	Rectangular, complete	L. 0.72 cm, W. 0.63 cm, Th. 0.4 cm. Rectangles (of pattern) size about 0.1 cm	Mosaic technique, funnel shaped string hole, D. 0.12–0.16 cm.
4517e	10012/6	Blackish green 39-0-8 and yellow opaque glass in chessboard pattern; belongs to 4582c?	Rectangular, fragmented; broken alongside string hole.	D. 0.31 cm, L. 0.55 cm	Mosaic technique
4582c	10014	Blackish green 39-0-8 and light reddish yellow 5-16-3 opaque glass in chessboard pattern, belongs to 4517e?	Rectangular, fragmented; broken alongside string hole	D. unknown, L. 0.55 cm Rectangles (of pattern) size about 0.1 cm, but also smaller	Mosaic technique. Funnel shaped string hole
4732a	10013	Opal green 39-41-6 and white opaque glass in chessboard pattern	Rectangular, complete	D. 0.72 cm, L. 0.70 cm, Th. 0.35 cm Rectangles (of pattern) between 0.05 and 0.1 cm	Mosaic technique. Funnel shaped string hole, D. 0.09–0.13 cm

Tab. 2.2.5.1 b: Chessboard patterned mosaic glass beads from the northern Black Sea littoral and the eastern Mediterranean region.

Date	Object	Provenance	Reference
1st century AD	Rhombic-shaped glass bead with chessboard pattern of yellow and red	Northern black Sea littoral	Alekseeva, 1982, pp.39-40. pl.48,69.
2nd–4th century AD	Rectangular glass pendant with chessboard pattern of yellow and red	Northern black Sea littoral	Alekseeva, 1982, pp.39-40. pl.48,70.
Roman period	Rectangular glass bead with chessboard pattern of dark blue and white	Eastern Mediterranean?	Spaer, 2001, p.124, no.213, pl.16, no.213.

Tab. 2.2.5.2: Chale Ghar 1, flower decorated mosaic glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1472	10019	Bead of yellow 5-0-6 opaque glass with red flower and green leaf pattern along a central red stripe	Cylindrical, complete. Corroded ends	D. 0.6 cm, L. 0.85 cm	Mosaic technique; folded, seam visible

Tab. 2.2.5.3 a: Chale Ghar 1, bird decorated mosaic glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
6885	10004	Bead of opaque blue, yellow, white, black and blackish vermilion red 17-15-8 glass; bird ornament	Rectangular, complete	D. 0.31× 0.61 cm, L. 0.95 cm	Mosaic technique

Tab. 2.2.5.3 b: Mosaic glass beads with bird pattern from the northern Black Sea littoral and Egypt.

Date	Object	Provenance	Reference
1st century AD	Rectangular glass pendant with bird (maybe a falcon?) pattern of different colours	Northern Black Sea littoral	Alekseevy, 1982, p.42, pl.48, no. 48.
2nd half of the first century BC to the 1st half of the 2nd century AD	Spherical glass bead with ornament of three similar birds arranged in stripes around the bead	Northern Black Sea littoral	Alekseeva 1982, p.36, pl.48, no.49.
Hellenistic to Early Roman?	Mosaic glass bar with a bird (ibis) motif	Egypt	Cooney, 1976, no.1177; Spaer, 2001, p.270 no.643.

2.2.6 Eye Glass Beads

In a final section on glass beads eye beads are discussed; some eyes were produced by the mosaic technique, as is described in the selected literature (Spaer, 2001, p.77). G. Eisen (1916, p.2) defines eye beads in the following way: 'An eye bead is one ornamented with one or more spots resembling eyes, which, however, may be circular, oval, triangular or square.' According to this description, at Veshnaveh 28 beads and nine fragments with various circular designs were identified as blue beads with white/blue eyes that had been impressed or applied onto a basic bead. Also greenish and blueish beads with eyes of red and yellow colour were discovered, along with one compound eye bead. Of special interest are the fragments, which indicate the technical considerations involved in manufacturing eyes. One so-called eye (stone) bead deserves special attention. The cylindrical bead is shaped to a single eye with white iris and brownish black pupil (pl. 11, no. 1847).

2.2.6.1 Blue eye Glass Beads with Impressed White-and-Blue Eyes (Tab. 2.2.6.1)

Twelve eye beads are classified here as blue beads with impressed eyes. They have a translucent blue or turquoise basic glass and are decorated with white-and-blue eyes. The decoration obviously was pressed into the basic glass using pieces of rods of blue and white glass when the glass was hot. A stripe so decorated was probably then folded around a rod.

Beads nos. 1163 (pl. 10), 1875 (pl. 10), 4188b, 4326 (pl. 10), 4835, 4962c4 support this suggestion: they were obviously made with the technique described; the white extensions of the cylindrical impressed rods are still visible under the translucent blue glass (cf. no. 1163). Bead no. 4326 is particularly interesting because of its state of corrosion: this explains the loss of its white iris, whereas the blue pupil remains slightly raised. Under the blue glass, white glass is still observable: these are most probably the remains of the impressed rods. A seam along the bead indicates the fold technique. No. 4924c1 also was made of blue glass with impressed pieces of rods to obtain an eye decoration. In this case the folding or winding method seems very evident (pl. 10): the white extensions of the eyes, which are visible under the blue glass, are stretched in the direction of the winding or folding. As a result, the eyes are quite irregular and distorted. No. 4835 was manufactured in the same manner. At the seam the glass is overlapping as well as remains of the eye decoration.

Four beads also are embellished with white impressed rods (nos. 4975a9, 6924a1, 6323a, 6871b). Due

to their fragmentation or their unclear decoration it cannot be decided whether they were made with the help of a pre-manufactured stripe or decorated on the rod.

2.2.6.2 Blue Eye Glass Beads with White-and-Blue Eyes Applied (Tab. 2.2.6.2 a–b)

Two beads from Veshnaveh were made of a basic bead of greenish-blue (no. 4311b, pl. 10) and maybe white (pl. 10, no. 7002a) glass, and were decorated with white-and-blue eyes. Unlike the beads with impressed rods, in these beads the colour of the pupil differs from the colour of the basic bead. This generates a combination of three colours: the basic colour, the white iris and a blue pupil. An eye decoration that is applied does not penetrate the basic glass. The decoration was attached onto the hot glass using heated glass rods or pre-manufactured eyes. Most probably this kind of technique was carried out on hot beads as part of the rod. As bead no. 4311b (pl. 10) shows, the eye decoration is not distorted; in the case of using a pre-manufactured and decorated stripe that was folded around a rod the eyes could be deformed, as the beads with the impressed eyes show (see above paragraph 2.2.6.1). One blue eye bead found in Chale Ghar 1 obviously shows the attributes of an applied embellishment: it is fragmented, and at least eight oval or round eyes remain (pl. 10, no. 4311b). Additionally the evidence of slightly protruding eyes proves that the application was put on the bead with a technique described above: first, opaque white glass for the iris was fused in, then the translucent blue glass for the pupil was added. The bead was then rotated in a flame to melt the decoration in. This bead stands out as very beautiful and special among the eye beads from Veshnaveh: it differs from the other eye beads in colour, thorough decoration and technique of manufacture.

Another eye bead was excavated in Chale Ghar 2, and it is different from the beads found in mine 1. It was probably made of opaque glass, and is decorated with eyes with a blue pupil and a white iris on a white iridescent background. The shine is possibly owed to chemical reactions occurring during the weathering of the glass (Stern and Schlick-Nolte, 1994, p.21). The decoration of the nine remaining eyes is preserved only on less than the half of the bead, the rest of the bead being too corroded and with no ornament visible (pl. 10, no. 7002a). It is unclear what technique was used to produce this bead, but a seam indicates that it was folded.

Interpretation of the Blue Eye Glass Beads with White/Blue Eyes Applied (Tab. 2.2.6.2 c)

The beads listed in the table below, are all decorated with applied eyes, either with pre-manufactured eyes that were pushed onto the hot basic bead or into a low viscous glass stripe.[19] Basically, the eyes remain quite round and were not being deformed in their manufacturing process. Sometimes they are even slightly raised from the bead. The examples of spherical, cylindrical or barrel-shaped beads with simple white/blue eyes are mostly decorated with many tightly arranged eyes. Bead no. 4311b from Chale Ghar 1, however, has just a few large eyes (pl. 10). It can be compared to an Arsacid bead decorated with eight eyes from Germi (pl. 10, no. 3497). The eye bead from Chale Ghar 2, no. 7002a, was obviously provided with quite a number of eyes (pl. 10).

Beads with simple white/blue eyes seem to have been excavated rarely. Details of them have hardly been published. The comparisons listed in the table below show that similar beads have been found in the Near East and the Mediterranean and Black Sea regions from the late Bronze Age to the Hellenistic period. Unfortunately, the techniques by which the eye beads were decorated are not known, therefore only beads similar in appearance are listed. M. Spaer (2001, p.78) writes that glass eye beads are generally known from the mid-Bronze Age, or the second half of the 15th century BC onwards. On this basis and because of the lack of wide-ranging documentation and publication, including data of technique and colour, it is hardly possible to define a chronological range for the eye beads found in Veshnaveh.

2.2.6.3 Fragments or Single Glass Eyes: Insight into Technical Aspects (Tab. 2.2.6.3)

Nine fragments of eye beads are listed together. They are of a special interest, because they prove the application of impressing rods to generate an eye decoration. No. 6135a4 very clearly reveals the pieces of rods that were pressed into the blue glass as an eye decoration (pl. 11). This fragment is deformed, and seems to have been reheated. Fragment no. 1018c2, however, appears to be manufactured of four single eyes that were then directly fused into another (pl. 11). Nos. 1436, 4960c2 (pl. 11), 6043a1, 6120a1 are remains of oval blue rings, which were also melted into each other. Traces of white glass in the rings indicate that these fragments had been eye decorations, too.

Two eye fragments are made of translucent ochre and opaque white glass with a blue glass centre (pl. 11, no. 6098c2; no. 6151a10). No other ochre bead with eye decoration was found in Veshnaveh. So these fragments stand as single objects and may have been wastage or remains of a production. It is unknown where this production might have taken place.

Interpretation of the Fragments or Single Glass Eyes: Insights into Technical Aspects

The fragments allow good insights into technical aspects of eye bead production. One fragment proves that white cylindrical beads were impressed or embedded in blue glass (pl. 11, no. 6135a4). Furthermore, there are

[19] Pre-manufactured eyes are also called mosaic or millefiori eyes (Haevernick, 1972, p.80).

fragments of eyes, connected to each other in pairs or groups of three. They are blue, and have white traces in their centres, or they are ochre with white/blue centres. Obviously, canes overlaid with blue and ochre glass were cut in pieces and then fused next to each other. This technique differs from the methods described above, namely pressing pieces of rods into hot glass, or applying cane sections onto the hot bead. Therefore these fragments stand as unique specimens, and it is unclear whether they were parts of beads or represent individual items.

2.2.6.4 Probable Blue-and-White Eye Glass Beads, Eyes Being Indistinct (Tab. 2.2.6.4)

Some glass beads were excavated at Veshnaveh that are categorised among the eye beads just because of their colours: blue and white. They are made of opaque or translucent blue basic glass with marbled inclusions of opaque white glass. In a rather rough manner they may represent eye beads. It remains an open question whether these beads were wound or folded, and how the indistinct white decoration was then applied onto or into the basic glass. But few of these beads seem to have an applied embellishment of opaque white and translucent blue glasses (pl. 11, no. 6151a3).

2.2.6.5 Blue Eye Glass Bead with Red and Yellow Eyes: the Powder Method (Tab. 2.2.6.5 a)

A fragment of a multi-coloured bead is made of a blueish basic glass (pl. 11, no. 4483): the entire bead was then decorated with ornaments of red-coated yellow ovals or eyes. The decoration, most probably made of pre-manufactured rods, is packed quite tightly into the blue glass with different-sized spaces and in an irregular manner; and it penetrates the interior. The red and yellow eyes were most probably embedded in the blueish glass. The eyes probably were made of yellow sticks overlaid with red glass. The stick was cut into small parts, which were then placed into a mould filled with blue glass powder.[20]

Interpretation of one Blue Eye Glass Bead with Red and Yellow Eyes Made of Glass Powder (Tab. 2.2.6.5 b)
The term ‘powder’ is used for want of a better one. Because the technique of using powder glass for coloured ornaments has hardly been recognised, let alone described, it is not possible to find exact parallels for the bead from Veshnaveh. A smooth transition led from the ‘powder’ process to the mosaic technique, where glass powder or fragments are spread between the mosaic slices (Stern and Schlick-Nolte, 1994, p.63; Lierke, 2009, p.19 fig.97). In the case of the fragment presented here it can be inferred that it came from a bead made from cut off rods of yellow and red glass that were embedded in blueish glass powder and melted to fuse into an entity that was a bead.

Here comparisons from the eastern Mediterranean region and Iran are selected because of their similar appearance to the specimen from Veshnaveh, and/or based on the assumption that they too were possibly made by the powder technique. However, this hypothesis remains unsubstantiated because information regarding these objects is lacking.

2.2.6.6 Green Eye Glass Beads with Yellow and Red Eyes (Tab. 2.2.6.6 a)

One spherical and one ovaloid bead were made of either opaque (pl. 11, no. 1087c) or translucent (pl. 12, no. 1087d) glass, and were then decorated with yellow (corroded) and red ‘eyes’. These applications may have been either pre-manufactured or broken off from a stick, and then pressed onto the hot bead. Another possibility would have been, to melt the ‘eyes’ onto the hot bead from a glass stick. However, if the latter option had been chosen the applications would probably be expanded or slightly raised from the basic glass, which they are not.

Interpretation of Green Eye Glass Beads with Yellow-Red Eyes (Tab. 2.2.6.6 b)
Usually eye beads are described as blue beads with a decoration of white/blue or yellow/blue eyes. Here, the green beads with red or yellow/red inlays are categorised as eye beads as well, because they have the same features as the blue eye beads and only differ in colour. When a bead is heated, the ornaments tend to acquire an irregular shape with blurred border after a while. So it is remarkable, that the applications on the beads obviously did not melt completely into the basic glass, since there are still straight and in an angular shape.

G. Eisen (1916, p.3) argues, ‘The intensely bright emerald green can be called characteristic of the beads of the sixth century AD’. It is debatable whether the eye beads with a green basic glass such as nos. 1087c and 1087d can be described by this colour (pl. 11, 12); European finds present comparisons from the 2nd to the 3rd centuries AD.

2.2.6.7 Eye Glass Bead with Yellow/Red/Brown Striped Eyes (Tab. 2.2.6.7 a)

Bead no. 1718a (pl. 12) is an outstanding specimen among the eye beads from Veshnaveh. It is made of a basic turquoise-blue glass that is decorated with three elaborately decorated eyes. The iris of each is made of a ring with stripes of opaque red, yellow and translucent

[20] Gratitude is owed to R. Lierke for her comments (Aug. 2010).

brownish colour. The pupil has a yellow centre and a red surround. These eyes slightly protrude from the basic bead: obviously, they were cut from a pre-manufactured cane and fused onto the spherical basic bead.

Interpretation of Green Eye Glass Beads with Striped Yellow-Red Eyes (Tab. 2.2.6.7 b)

The green bead with striped eyes seems to be a common type in the Near East and Iran, as well as in the eastern Mediterranean and Black Sea regions (Andrae, 1973, pp.156-158). Variants in different colours of the basic bead as well as of the striped eyes are known from different periods. In Carolingian contexts such beads have a striped green iris, and yellow, red, white-and-blue layered pupils are known. It has been suggested that they came from Egypt (Andrae, 1973, p.111, p.165). Obviously this type of eye bead had a long tradition and was widespread.

T. E. Haevernick (1972, p.78) and G. Eisen (1916, p.17, fig.14) describe so-called compound eye beads of opaque light greenish or blueish glass with compound eyes of brown colour or on a brown base (Spaer, 2001, p.86). They narrow this group down to those beads decorated with eyes made up of seven smaller eyes in a circular shape. However, this decoration has similar characteristics to the striped eye decoration of bead no. 1718a from Veshnaveh (pl. 12). The latter also has brown hues in its decoration, and the stripes are arranged around a central eye or pupil, as was done with the circular eyes. In both cases the mosaic method had to be used: preformed canes set out in different patterns. These were cut in section and applied or pressed onto the basic bead. Because of this resemblance the type – one that was termed compound eye beads by T. E. Haevernick (1972, p.78) – should perhaps be expanded to include beads with striped eyes. R. Lierke (in an E-mail from the 3rd of June 2011), however, counts the beads described to the type of the mosaic eye beads and declines to name them compound eye beads.

2.2.6.8 Eye 'Stone' Bead (Tab. 2.2.6.8 a)

In Chale Ghar 1 one bead of brownish black and white layers was discovered. It sticks out from the assemblage of eye beads, not least because it is unclear of what material this bead is made (pl. 11, no. 1847). Probably it was made of glass, but it is just possible that it was made of a smooth stone. The string hole was drilled lengthwise through the cylinder. On the two planar sides a brownish black pupil with a white surround was applied.

Interpretation of the 'Stone' Eye Bead (Tab. 2.2.6.8 b)

Although no exact match to the Veshnaveh-type of bead could be found, many disc-shaped or flat cylindrical eye beads, sometimes with one concave side, have been found frequently in the Near East. Mostly these beads are made of agate, and sometimes they are imitated with glass or frit, as examples from western Asia, Egypt, Uruk or Tell Sheikh Hamad show. Based on this evidence it is hardly possible to give a chronological range for the unique specimen from Veshnaveh. Nonetheless it is clear that this bead belongs to a long tradition of flat cylindrical agate eye beads in Iran and the Near East.

Tab. 2.2.6.1: Chale Ghar 1, eye glass beads with impressed eyes.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1163	10013/1	Slightly translucent glass, blackish violet ultramarine 29-27-8. Inlays of 10 blue/white eyes	Spherical, complete	D. 0.8 cm, L. 0.74 cm	Funnel shaped string hole, 0.17–0.35 cm
1875	10013	Slightly translucent glass, blackish green-blue 31-39-8. Inlays of three rows of blue-white eyes	Spherical, complete	D. 0.63 cm, L. 0.7 cm	
4188b	10012	Glass of vivid grey ultramarine 29-2-5 colour with inlays of white/blue eyes	Cylindrical, fragmented	D. 0.35 cm, L. 0.83 cm	
4326	10012/5	Opaque (slightly translucent?) glass, dark violet ultramarine 29-27-8, eye decoration, corroded/lost white rings with blue centre	Spherical, complete	D. 0.51 cm. L. 0.5 cm	Funnel shaped string hole, 0.1–0.15 cm
4835	10013	Slightly translucent glass of blackish-greenish blue 31-38-8 colour; eleven inlaid eyes (white/blue)	Spherical, complete	D. 0.8 cm, L. 0.7 cm	Funnel shaped string hole, D. 0.13–0.2 cm. Folded?

Tab. 2.2.6.1: Chale Ghar 1, eye glass beads with impressed eyes.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4924c1	10022	Slightly translucent glass of dark ultramarine 29-7-0 colour with white/blue eye decoration	Spherical, complete	D. 0.46 cm, L. 0.41 cm	Maybe folded or wound with a pre-manufactured stripe
4962c4	10022	Translucent glass of dark blue 31-0-7 colour with 12 blue/white eyes	Spherical, complete	D. ca. 0.5 cm, L. ca. 0.6 cm	
4975a9	10022	Translucent glass of light blueish green 39-30-3 colour with decoration of one eye (white/blue)	Spherical, fragmented	D. 0.3 cm, L. 0.09 cm	
6024a1	10013	Translucent glass: vivid grey-blue 31-2-5 colour with pattern of three white/blue eyes	Spherical, complete	D. 0.35 cm, L. 0.31 cm	
6323a	10022	Translucent glass of grey ultramarine 29-2-6 colour with pattern of three white/blue eyes	Spherical, complete	D. 0.34 cm, L. 0.30 cm	
6871b	10008	Translucent (?) light violet ultramarine 29-27-3 glass with pattern of three white/blue eyes	Spherical, fragmented, broken in three pieces	D. 0.69 cm, L. 0.49 cm	

Tab. 2.2.6.2 a: Chale Ghar 1, eye glass bead with applied eyes.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4311b	10012/5	Opaque glass, blackish violet-blue 31-27-8 with eight white/blue (translucent glass) eyes	Spherical, fragmented	D. 1.43 cm, L. 1.06 cm	Funnel shaped string hole, 0.51–0.65 cm

Tab. 2.2.6.2 b: Chale Ghar 2, eye glass bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
7002a	11057	Opaque glass or frit of white colour with remains of ca. nine white/blue eyes	Spherical, fragmented, corroded	D. 0.8 cm, L. 0.6 cm	Folded

Tab. 2.2.6.2 c: Blue eye glass beads with white/blue applied eyes from the Near East, adjacent regions and Europe.

Date	Object	Provenance	Reference
12th–7th centuries BC	Two beads of greenish blue glass with several dark blue and white eyes	Alishar Hüyük/Turkey	Von der Osten, 1937, p.455 fig. 510 nos.405, 2329, p.456.
7th–6th centuries BC	Necklace with eye beads among others	Tarquinia/Italy	Gaultier and Metzger, 2005, p.145 no.II.129
6th–4th centuries BC	18 spherical-to-barrel-shaped eye beads of white/blue eyes	Northern Black Sea region	Alekseeva, 1975, p.63, pl.15 nos.1-9, 11-19.
6th–4th centuries BC	3 light blue beads with white/dark blue eye decoration	Northern Black Sea region	Alekseeva, 1975, p.63, pl.15 nos.27-29

Tab. 2.2.6.2 c: Blue eye glass beads with white/blue applied eyes from the Near East, adjacent regions and Europe.

Date	Object	Provenance	Reference
6th–4th centuries BC	Blueish green glass bead with four eyes of violet-blue on white	Mediterranean region	Spaer, 2001, p.90 no.87
Probably 5th century BC	Large translucent bead with layered eye decoration of many white/blue eyes	Probably Mediterranean region	Stern, 2001, p.384 no.217.
Probably 5th century BC	Large translucent bead with layered eye decoration of many white/blue eyes	Probably Mediterranean region	Stern, 2001, p.385 no.218.
Terminus post quem 450–40 BC (until probably 370–60 BC/Achaemenid period)	Light blue, grey-blue glass bead with 4 symmetrical (dark) blue/ white eyes	Kamid el-Loz/Lebanon	Poppa, 1978, pp. 83, 86, pl.10,10,1, pl.15,28,7, pl.16,34,3; Rehm, 1992, pp.108, 391 fig.D.13.a.
Ca. 4th–3rd centuries BC	Violet-blue (?) basic beads with 48, 21 and 14 violet-blue on white eyes	Eastern Mediterranean region	Spaer, 2001, p.93 nos.102-104.
4th–2nd centuries BC	Dark blue beads with decoration of several white/blue eyes	Gilan/Iran	Fukai, 1977, pl.45, 1st row, 2nd from left; 3rd row, 2nd from left; 4th row, 3rd from left.
3rd century BC–3rd century AD	Blue bead with applied blue-white eyes	Germi/Iran	Kambakhsh Fard, 1998, p.91, bottom right. National Museum of Iran, Tehran, no. 3497.
1st half of the 1st century AD	Glass bead with eye decoration; colour unclear	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, pp.364, 386, pl.127,7.
1st century BC–1st century AD	Three eye glass beads, opaque or slightly translucent with decoration of three white blue eyes	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.63,795-797.
2nd/3rd quarters of the 1st century AD	Two glass eye beads with obviously applied eyes, slightly articulated	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, pp.371, 388, pl.172,4.
End of the 2nd century AD	Glass bead decorated with a few large eyes	Adygeen/Kuban Region	Simonenko, Marčenko and Limberis, 2008, pp.375, 389, pl.198,15.
End of the 2nd century AD	Six glass beads decorated with a few large eyes	Adygeen/Kuban Region	Simonenko, Marčenko and Limberis, 2008, pp.376, 389, pl.202,17.

Tab. 2.2.6.3: Chale Ghar 1, fragments or single glass eyes.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1018c2	10012	Translucent blue and opaque white glass, eye decoration	Fragmented	W. ca. 0.45 cm	Four blue-white-blue eyes, joined together
1436	10018	Translucent blue glass, remains of opaque white glass	Fragmented	L. 0.7 cm, W. 0.65 cm	Fragments of at least 3 eyes, joined together. White glass corroded?
4960c2	10013	Translucent blackish blue 31-0-8 glass	Fragmented	D. 0.71 cm, L. 0.27, W. 0.45 cm	Fragments of at least 2 eyes, joined together. White glass corroded?
4960c3	10013	Translucent light ultramarine 29-0-3 glass with opaque white remains	Fragmented	L. 0.46 cm, W. 0.45 cm	
6043a1	10022	Translucent dark blue 31-0-7 glass	Fragmented	D. 0.6 cm, L. 0.21 cm	Single eye decoration, one oval ring!

Tab. 2.2.6.3: Chale Ghar 1, fragments or single glass eyes.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
6098c2	10022	Vivid ochre 9-0-5, white and blue glass	Fragmented	L. 1.13 cm, W. 0.47 cm	Two eyes attached to each other
6151a10	10022	Eye of three layers: translucent vivid ochre 9-0-5; opaque white and blue glass	Fragmented	L. 0.73 cm, W. 0.3 cm, Th. 0.2 cm	A single eye!
6120a1	10022	Translucent vivid lilac ultramarine 29-23-5 glass	Fragmented	L. 0.67 cm, W. 0.65 cm	Two to three eyes attached to each other, lost (white?) pupil
6135a4	10022	Translucent grey-blue 31-2-6 glass with opaque white bead inlays	Fragmented	L. 0.86 cm, W. 0.63 cm, Th. 0.24 cm	Fragment with four white bead inlays

Tab. 2.2.6.4: Chale Ghar 1, blue glass beads with white marbled 'inclusions'.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
4578e	10014	Opaque (?) light ultra-marine 29-0-3 glass with lighter and darker nuances	Spherical, complete	D. 0.5 cm, L. 0.4 cm	
4684a	10013	Opaque (?) vivid grey ultra-marine 29-2-5 glass with lighter and darker nuances	Spherical, complete	D. 0.4 cm, L. 0.4 cm	
4924c2	10022	Slightly translucent glass, dark lilac ultramarine 29-23-7 with opaque white inclusions	Spherical, complete	D. 0.55 cm, L. 0.46 cm	
6113	10022	Light ultramarine 29-0-3 glass with opaque white stripe/eye decoration	Spherical, complete	D. 0.4 cm, L. 0.3 cm	
6135a1	10022	Translucent dark blue 31-0-7 with white inclusions	Spherical, complete	D. 0.48 cm, L. 0.48 cm	
6151a3	10022	Translucent dark blue 31-0-7 with white marmoreal pattern	Spherical, fragmented	D. 0.23 cm, L. 0.48 cm, W. 0.39 cm	
6200a	10013	Translucent? Blue 31-0-6 glass with white inclusions	Spherical, complete	D. 0.43 cm, L. 0.36 cm	
6274a3	10022	Translucent? dark blue 31-0-7 glass with white inclusions	Spherical, complete, quite corroded	D. 0.5 cm, L. 0.4 cm	
6346a2	10022	Translucent blue 31-0-6 glass with white inclusions	Spherical, complete	D. 0.44 cm, L. 0.41 cm	Funnel shaped string hole, D. 0.09–0.20 cm
6398a	10022	Translucent? dark blue 31-0-7 glass with white inclusions	Spherical, complete	D. 0.44 cm, L. 0.40 cm	
6408	10022	Translucent? blackish blue 31-0-8 glass with white inclusions: eye-like	Spherical, complete	D. 0.5 cm, L. 0.5 cm	
6694c1	10022	Translucent light grey ultramarine 29-2-3 glass with indistinct white eye decoration	Spherical, complete	D. 0.33 cm, L. 0.27 cm	

Tab. 2.2.6.5 a: Chale Ghar 1, glass bead with yellow-red eye decoration.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Specifics
4483	10012/6	Bead of blueish glass/ glass with blackish vermilion 17-15-8 and light reddish yellow 5-16-3 ovals	Spherical, fragmented	D. 2.4 cm, L. 1.7 cm	Made by powder technique

Tab. 2.2.6.5 b: Glass beads with eye decoration of yellow and other colours from Iran and the 'eastern Mediterranean' region.

Date	Object	Provenance	Reference
1st–3rd centuries AD	Spherical blue glass bead with decoration of white, red and yellow eyes	Gilan/Iran	Fukai, 1977, pl.47, 2nd row, 3rd from left.
1st–3rd centuries AD	Cylindrical light green bead with eyes of yellow and red as well as yellow, white and dark coloured glass	Gilan/Iran	Fukai, 1977, pl.47, 1st row, 4th from left.
Probably early Roman period	Spherical dark-greyish green bead with concentrically patterned cane section with black (?) central spot and white, brownish red, yellow, and dark-greyish green rings	Eastern Mediterranean (?)	Spaer, 2001, p.123 no.204.

Tab. 2.2.6.6 a: Chale Ghar 1, green glass beads with yellow-red eye decoration.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1087c	10012	Opaque vivid greenish olive 7-38-5 glass with 10 inlays of irregular shape, red on yellow (now corroded) ground	Spherical, complete	D. 1.34 cm, L. 1.12 cm	Inlays applied onto green glass bead
1087d	10012	Translucent blackish grey-green 39-7-8 glass with two opaque inlays (one lost), red on yellow eye	Ovaloid, complete except for one lost inlay	D. 1.0 cm. L. 1.15 cm	Applied inlay

Tab. 2.2.6.6 b: Green eye glass beads with red or yellow-red inlays from the 'Central European Barbaricum'.

Date	Object	Provenance	Reference
Ca. 10 AD – 1st half or beginning of 2nd half of the 3rd century AD	Spherical green glass bead with red/yellow eyes	"Central European Barbaricum"	Tempelmann-Maczyńska, 1985, pp.49-51, pl.4 no.221c.
2nd half of the 2nd century AD	Spherical green bead with red spots	"Central European Barbaricum"	Tempelmann-Maczyńska, 1985, p.48, pl.4 no.207.

Tab. 2.2.6.7 a: Chale Ghar 1, compound eye bead.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements	Technical Details
1718a	10013	Opaque turquoise-blue 31-35-6 glass: three eyes with a red-yellow pupil and irises of translucent brown, opaque red and yellow (?) glass	Spherical, complete	D. 0.9 cm, L. 0.75 cm	Elaborate eyes applied. Funnel shaped string hole, D. 0.22 – 0.27 cm

Tab. 2.2.6.7 b: Glass beads with striped eyes from the Near East and adjacent regions.

Date	Object	Provenance	Reference
4th–3rd centuries BC	Green opaque glass bead with decoration of striped eyes, yellow pupil encircled by a red ring, then by brownish and white streaks.	Gilan/Iran	Fukai, 1977, pl.49, 1st row, 2nd from left.
1st–3rd centuries AD	13 small beads of red, green and yellow glass. Decoration of striped eyes	Karanòg/Egypt	Woolley, 1910, no.7906 G648.
2nd–3rd centuries AD	Spherical bead with eye of red and violet streaks	Northern Black Sea littoral	Alekseeva, 1982, pp.39, 36.
Roman period or later	Cylindrical bead of opaque white glass, three eyes with opaque yellow spot and one striped ring in white and dark brown	Eastern Mediterranean (?) region	Spaer, 2001, p.96 no.124.
Roman period or later	Barrel-shaped black (?) glass bead; eyes of black spot and one striped ring in white and black; surrounded by a double wave pattern	Eastern Mediterranean region and elsewhere	Spaer, 2001, p.96 no.126.
Roman or Byzantine periods	Cylindrical, slightly translucent green glass bead; eyes with stripe decoration, white-yellow-dark-blue-brownish red	Eastern Mediterranean (?)	Spaer, 2001, p.125 no.219.
5th–7th centuries AD	Spherical translucent dark green bead; eyes with blue (?) spot, one white ring, and one striped ring in white and reddish brown	Eastern Mediterranean region or Persia	Spaer, 2001, p.96 no.122.
5th–7th centuries AD	Spherical bead of translucent light brown glass; eyes with opaque green spot, one yellow ring, and one ring striped in white and brownish red	Eastern Mediterranean region or Persia	Spaer, 2001, p.96 no.123.

Tab. 2.2.6.8 a: Chale Ghar 1, eye 'stone' bead.

Find Number	Feature	Material	Shape	Preservation	Measurements
1847	10013	Limestone?	Flat cylindrical	Complete	D. 1.2 cm, L. 0.75 cm

Tab. 2.2.6.8 b: Stone eyes and eye glass beads imitating 'stone' eyes from the Near East.

Date	Object	Provenance	Reference
3rd Dynasty of Ur	Agate eye bead	Ur/Iraq	Maxwell-Hyslop, 1971, p.68, fig.49b.
2170–1900 cal. BC	Two agate (?) eye beads	Tape Hissar/Iran	Maxwell-Hyslop, 1971, p.79, fig.55.
Late 2nd century/early 1st century BC	Disc-shaped stone eye bead	Marlik/Iran	Negahban, 1964, p.57, fig.129.
15th(?)–12th centuries BC	Flat cylindrical glass eye bead with one concave side	Western Asia	Spaer 2001, p.88 no.65.
13th–12th centuries BC	Approximately oval disc-shaped glass eye bead	Egypt	Spaer, 2001, p.88, no.66.
Late Babylonian Period	Flat cylindrical eye bead of frit	Uruk/Iraq	Boehmer, Pedde and Salje, 1995, p.53, pl.61b1.
Middle Assyrian Period	Flat cylindrical eye bead (stone?)	Assur/Iraq	Musche, 1992, p.185, pl.LXIV,2; Andrae, 1954, p.62, pl.16f.
8th–7th centuries BC	Agate eye bead	Ziwiyeh (?)/Iran	Maxwell-Hyslop, 1971, p.207, fig.164.
Terminus post quem 450/440 BC (until probably 370/60 BC)	Flat cylindrical eye bead of agate with one convex side	Kamid El-Loz/Lebanon	Poppa, 1978, p.76, pl.5,4, pl.8

Tab. 2.2.6.8 b: Stone eyes and eye glass beads imitating 'stone' eyes from the Near East.

Date	Object	Provenance	Reference
Achaemenid	Necklace with inter alia 14 small cylindrical and two large ovaloid eye beads of agate	Susa/Iran	Harper, Aruz and Tallon, 1993, p.249 no.177.
4th century BC	Flat cylindrical eye bead of agate	Lachish/Israel	Tufnell, 1953, pl.47, pl.120.
3rd century BC	Flat cylindrical eye bead of agate	Taxila/Pakistan	Beck, 1941, p.43 no.10, pl.I.
100 BC – 150 AD and 100 – 250 AD	Two flat cylindrical eye beads made of glass or frit	Tell Sheikh Hamad/Syria	Novák, Oettel and Witzel, 2000, p.60, fig.131,B1.
Late Samad period 600 – 900 AD	Flat cylindrical eye bead of agate	Samad al Shan /Oman	Yule, 2001, pp.168, 354, pl.439,10.4.

2.2.7 Metal Beads

Besides the numerous glass and stone beads, metal beads were also found in the mines. Though there are only 28 such artefacts, they are of miscellaneous shapes and of various metals such as gold, silver, lead and copper/bronze. The beads have not been analysed scientifically, hence specifications of their materials may vary. About two thirds of the beads are of such simple shapes as spherical, ring-shaped, keg-shaped, cuboid or double-conical shape. Nine golden and one silver bead, however, are identified as 'granular' beads due to their appearance. They are made of small golden spherules, which are joined to ring beads or which are attached to a cylindrical body.

2.2.7.1 Hollow Spherical Gold Beads (Tab. 2.2.7.1 a)

Three hollow spherical beads – made of thin gold sheet – are preserved fragmented. No. 1986 (pl. 12) seems not to have any ornamentation aside from a bulge where the string hole appears. No. 4924d1 (pl. 12) has a special decoration: a petal-shaped border around the end of the string hole.

Interpretation of Hollow Spherical Gold Beads (Tab. 2.2.7.1 b)
Other spherical gold beads – for example from early Bronze Age Troy and Iron Age I Marlik – show that such simple beads were not uncommon in the Near East. However, due to their fragmented condition, it is not possible to compare or to date the Veshnaveh beads.

2.2.7.2 Melon-Shaped Gold Beads (Tab. 2.2.7.2 a)

Two golden beads were manufactured from a thin gold foil, which was then shaped to form decorated hemispheres or caps. The two halves were fitted together to form a spherical melon (pl. 12, nos. 1206a, b). The flutes may have been embossed after they were joined or on a fitting model, since the halves fit each other perfectly.

Interpretation of Melon-Shaped Gold Beads (Tab. 2.2.7.2 b)
Melon-shaped gold beads are known from different periods. Early examples from the British Museum with lengths of 1.4 cm are larger than the beads from Veshnaveh, which have diameters of not more than about 1 cm. Despite numerous examples it is not possible to date our melon-shaped beads due to our lacking a typology and technical analysis of melon-shaped gold beads. Considering the comparable finds, questions arise such as: do sizes correlate to a particular chronology? How were these beads manufactured? Are they more likely to have been made of one grooved gold sheet or of two halves like the Veshnaveh ones?

2.2.7.3 Keg- and Ring-Shaped Gold Beads (Tab. 2.2.7.3)

One ring- and one keg-shaped bead are each of quite a small size. No. 1206c (pl. 12) is made of a thin wall with a large string hole, while the ring-shaped bead no. 4270 (pl. 12) seems to be made of two hoops of different size, a larger and a smaller one. They were probably fitted one into the other and soldered.

2.2.7.4 'Granular' Golden Beads: Single-Rowed, Multi-Rowed, Attached, Fragmented (Tab. 2.2.7.4 a)

Nine beads are made of small golden balls, which suggest granulation, a technique particular to goldsmiths, whereby small metal spherules are attached to a metal surface in an ornamental fashion (Rosenberg, 1918, pp.8; Wolters, 1983, p.11; Moorey, 1985, p.89).

J. Wolters (1983, p.15) describes ring beads made of six single granules similar to those presented here as 'granular beads' (cf. pl. 13, no. 4962c2). Some of

the granules unearthed in Chale Ghar 1 are impressed, and seem to be hollow. Aside from simple ring beads, one bead from the mines is made of ten differently sized spherules (pl. 13, no. 1349). The balls seem to have the same measurements three by three. Another bead is made of a hollow, cylindrical body with five granules at each end (pl. 13, no. 1195a). Unlike the other granular beads, this one hardly shows impressions or fractures.

Interpretation of the Granular Gold Beads: Single-Rowed, Multi-Rowed, Attached and Fragmented (Tab. 2.2.7.4 b)

Most 'granular beads' from Veshnaveh are fragmented (e.g. nos. 6357a, 6407a2). They could have belonged to multi-row beads like no. 6326, which is made of three rows of each five granules. This suggestion is strengthened by no. 1589a. It is made of a ring of five golden spherules and has the remains of a second row. However, most beads are too fragmented to decide how many rows they were made of (nos. 6095a1, 6218c).

It is very interesting that the granules found at Veshnaveh can be characterised as impressed, 'pushed in' or fragmented, because such descriptions usually reveal that these granules are hollow. Granules are seldom described as hollow in literature, and it is not normal to make them as such in modern handicraft. Additionally, ancient granulated jewellery does not generally show impressions or fragmented granules as the beads from Veshnaveh do (Wolters, 1983, pp.45-48). However, two pairs of jewellery made of hollow spherules are mentioned among collections (Geifenhagen, 1975, p.105, pl.73,14-15). One pair of these ring beads is dated to the Etruscan period (6th–5th centuries BC), though. Observation of hollow spherules – which reveals obvious traces of soldering – might exclude the beads from Veshnaveh from the definition of the granulation technique (Wolters, 1983, pp.11, 34). However, definitions of this method differ, and D. L. Carroll (1974) classifies granulation in three categories, in which category A is described as having large granules and traces of soldering. J. Wolters, too, (1983, p.67) does not exclude jewellery with obvious soldering from the granulation technique; he writes about two groups, one with clearly noticeable traces of soldering, one without. Two questions remain: how were the hollow spherules produced, and how should they be categorised?

In Iran traces of soldering are detectable from the end of the Arsacid period (1st–2nd centuries AD) onwards, and granulation became rougher and continued into the Sasanian period (Wolters, 1983, p.79). These characteristics correspond with the appearance of the beads from Veshnaveh. They are made of quite large granules (e.g. no. 1589a, D. 0.1 cm), and the join between them is easily observable in some cases (e.g. pl. 13, no. 1349).[21]

Even though ring-shaped beads of six granules were first excavated in the royal tombs of Ur (Wolters, 1983, p.69) and seem to appear in Etruscan contexts, the appearance and the technical evidence – together with comparisons from Tell Sheikh Hamad and Tell Mohammed Arab (see tab. below) – support a late dating of the beads from Veshnaveh, to the late Arsacid era, extending into the Sasanian period indeed.

2.2.7.5 'Granulated' Silver Bead (Tab. 2.2.7.5 a)

Silver is rarely used for granulation, except in Viking and recent popular art (Wolters, 1983, p.13). Therefore the silver ring bead of 64 granules from the mines at Veshnaveh is of the utmost interest, since it is the only silver granular bead made in such an elaborate fashion to survive in Chale Ghar 1 or 2. The outer granules are flattened, probably due to abrasion by wearing (pl. 13, no. 4296c).

Interpretation of the Granulated Silver Bead (Tab. 2.2.7.5 b)

Comparisons to the granulated silver bead from Veshnaveh are made of silver and gold; these have been found in contexts from the Achaemenid to Arsacid eras. However, three granular gold beads quite similar to the silver find from Veshnaveh have been dated to ca. 1000 BC. They are supposed to originate in Iran. Golden beads from the National Museum in Tehran correspond to the silver bead from Veshnaveh in the widest sense of the word: protruding rows of granules are visible (pl. 13, nos. 2473, 2478). Similar are the bronze beads from Susa and the Black Sea littoral. The latter were made from ring beads, which were then decorated with bulges, the 'granules'. It is possible that the shape of the granulated silver bead from Veshnaveh was already common before the Achaemenid period, but especially when made of gold; in later periods perhaps other materials were used such as silver or bronze. These are just assumptions awaiting verification.

2.2.7.6 Cylindrical and Ring-Shaped Silver Beads (Tab. 2.2.7.6 a)

One slightly decorated bead was formed to a cylindrical shape from a silver sheet that was curled round to overlap (pl. 13, no. 1086). A much smaller bead is of a ring shape, and is impressed in one area (pl. 13, no. 4494d).

[21] The earliest known granules come from the royal tombs of Ur (2560–2400 BC) with a size of 0.2 cm. In Troy II (2350–2100 BC) granules of 0.04–0.11 cm were found, and from classical Greece (510–330 BC) examples of 0.025 cm are known. Etruscan (700–475 BC) granules are the smallest with 0.014 cm. Very coarse granules are known from 9th-century Awarian Hungary with a size of up to several mm (Wolters, 1981, p.120). It seems that the size matters in question of dating the granules.

Interpretation of Cylindrical and Ring-Shaped Silver Beads (Tab. 2.2.7.6 b)
The cylindrical and ring-shaped silver beads described above have simple shapes, and hardly any comparable finds exist for them. One example dates to the Sasanian period, and to make it, a metal sheet was obviously bent inwards. This 'technique' seems to be a particularly uncomplicated method of producing simple metal beads, probably used in different periods, for instance from early-1st-century-BC Kaluraz in the Iranian province of Gilan (pl. 13, no. 5644).

2.2.7.7 Cuboid Lead Beads (Tab. 2.2.7.7)

Four cuboid beads are obviously made of lead. Three are fragmented, and just one is preserved almost complete (pl. 14, no. 1295b).

2.2.7.8 Double-Conical Lead Bead (Tab. 2.2.7.8 a)

One double-conical bead was found in the mines. The centre seam of the bead had been polished smooth owed to the item's actually being worn (pl. 14, no. 1342).

Interpretation of the Double-Conical Lead Bead (Tab. 2.2.7.8 b)
Such simple lead beads as were found at Veshnaveh are hardly to be found in the oriental collections of museums or treated in literature about the ancient Near East. Among the few comparable finds surviving similar objects, albeit made of different metals, come from Mesopotamia of the third millennium and Iran of the first millennium BC. But it is possible that this simple shape was also produced in other periods, as is suggested by a comparable bronze bead from late Arsacid Nowruzmahale.

2.2.7.9 Spherical Bronze and Copper Beads (Tab. 2.2.7.9)

Just a few bronze or copper beads were found in Chale Ghar 1. One has a bag shape (pl. 14, no. 1501), while another has no string hole: it is an unfinished bead, or maybe just a small metal ball.

2.2.7.10 Ring-Shaped Bronze Beads (Tab. 2.2.7.10 a)

Further bronze beads found in Chale Ghar 1 have simple ring shapes and were made from a metal sheet. Unlike the cylindrical and ring-shaped silver beads described above, the bronze beads were obviously not produced with overlapping ends, but have a clean seam (pl. 14, no. 1872f).

Interpretation of Ring-Shaped Bronze Beads (Tab. 2.2.7.10 b)
There are no exact parallels to the bronze ring beads of Veshnaveh in later periods, but similar beads are known from early Bronze Age Ghalekuti (Egami, Fukai and Masuda, 1965, p.77-81, pl.LXXV). Bronze ring beads from Macedonia have a noticeably concave wall, and the Georgian examples are rather larger. Other bronze examples were found in a tomb from late Arsacid Nowruzmahale.

Tab. 2.2.7.1 a: Chale Ghar 1, spherical gold beads.

Find Number	Feature	Material	Shape	Measurements
1883b	10013	Gold	Spherical, fragmented	D. 0.6 cm Th. 0.2 cm
1986	10013	Gold	Spherical with bulge at the string hole, fragmented	D. 0.53 cm L. 0.65 cm Th. 0.02 cm
4924d1	10022	Gold	Fragment of spherical bead with petal-shaped border around the string hole	L. 0.49 cm W. 0.51 cm

Tab. 2.2.7.1 b: Spherical gold beads from the Near East.

Date	Object	Provenance	Reference
Early Bronze Age II	Spherical gold beads	Troy II/Turkey	Musche, 1992, p.121 no.2, and pl.XLI.
Iron Age I, 12th century BC	Necklace with inter alia spherical beads of gold sheet, made of two halves	Marlik/Iran	Stöllner, Slotta and Vatandoust, 2004, p.754 no.438.

Tab. 2.2.7.2 a: Chale Ghar 1, melon-shaped gold beads.

Find Number	Feature	Material	Shape	Measurements
1206a	10013/1	Gold	Melon-shaped	D. ca. 1 cm
1206b	10013/1	Gold	Melon-shaped	D. ca. 1 cm

Tab. 2.2.7.2 b: Melon-shaped gold beads from the Near East.

Date	Object	Provenance	Reference
Early Bronze Age III	Golden melon-shaped beads	Ebla/Tell Mardikh II B 1	Musche, 1992, p.105 no.4, pl.XXXIV.
Early Dynastic	Necklace with melon-shaped gold beads, lapis and cornelian spacer beads	Unknown	Maxwell-Hyslop, 1971, pp.5, 7, 9, 10, fig.6d. Stored in the British Museum
Early Elamite period	Necklace of melon-shaped gold beads and dark stone beads	Ğeoj Tappeh/Iran	Musche, 1992, p.160, p.LVI no.2.
Middle of the 2nd millennium BC	Necklace with melon-shaped gold beads and dark stone beads	Gök Tappeh/Iran	Maxwell-Hyslop, 1971, p.159, fig.122.
11th–10th centuries BC	Necklace with melon-shaped gold bead	Tell el Ajjul/Palestine	Maxwell-Hyslop, 1971, p.227, fig.208.
Arsacid period	Necklace with 9 melon-shaped gold beads	Niniveh/Iraq	Curtis, 1976, p.55, pl.101,14; Musche, 1988, p.123, pl.XXIV,2.1.5.

Tab. 2.2.7.3: Chale Ghar 1, keg- and ring-shaped gold beads.

Find Number	Feature	Material	Shape	Measurements
1206c	10013/1	Gold	Keg-shaped	D. ca. 03 cm
4270	10013	Gold	Ring–shaped	D. 0.33 cm L. 0.13 cm

Tab. 2.2.7.4 a: Chale Ghar 1, 'granular' gold beads.

Find Number	Feature	Material	Shape	Measurements
1195a	10013/1	Gold	Cylindrical with five granules at each end of the string hole	D. 0.37 cm L. 0.44 cm
1349	10013	Gold	Ring bead made of 10 granules of different sizes	D. 0.38 cm
1589a	10018	Gold	Ring bead made of 5 granules, impressed; attached to them two further granules: originally two-rowed?	D. 0.4 cm D. of granules: 0.1 cm
4962c2	10022	Gold	Ring bead of 8 granules, impressed; remains of two further rows preserved	D. 0.45 cm L. 0.19 cm
6095a1	10022	Gold	Ring of 5 to 6 deeply impressed granules	D. 0.3 cm L. 0.25 cm
6218c	10022	Gold	Remains of a ring of deeply impressed granules	L. 0.45 W. 0.35 cm
6357a	10022	Gold	Three joined granules, originally belonging to a ring bead	L. 0.5 cm W. 0.2 cm

Tab. 2.2.7.4 a: Chale Ghar 1, 'granular' gold beads.

Find Number	Feature	Material	Shape	Measurements
6326	10022	Gold	Cylindrical bead of three rows of 5 granules, impressed	D. 0.31 cm L. 0.39 cm
6407a2	10022	Gold	Remains of 2½ joined granules, deeply impressed	Unknown

Tab. 2.2.7.4 b: 'Granular' beads from the Near East and Europe.

Date	Object	Provenance	Reference
Unknown	Two pyramids of four hollow balls	Italic?	Greifenhagen, 1975, p.105, pl.73,13. Collection of the Bishop of Lichfield.
6th–4th century BC	Two silver ring beads made of six spherules. Type I.1 according to Golani 2013, 272, nos. 1, 2.	Tel Michal/Israel	Herzog and Levy, 1999, fig. 8.36, 41; Golani. 2013, pp.272-273, fig.28,1-2.
6th–5th centuries BC	Two ring beads of six hollow balls around a wire ring	Etruscan?	Greifenhagen, 1995, p.105, pl.73,14.
104 BC = teminus post quem	Ring bead with circular row of 6 spherules, material not determined	Tell Sheikh Hamad/Syria	Novák, Oettel and Witzel, 2000, p.72, fig.137 H3.
25–50 and 75 AD	Golden bead made of 5 hollow globules	Ed-Dur/UAE	Haerinck, 2001, pp.44, 46; De Waele, 2008, 2008, pp. 54, 87.
4th–5th centuries AD	Ten beads made of granules, gold alloyed with silver	Tell Mohammed Arab/Iraq	Unpublished; personal communication M. Roaf.

Tab. 2.2.7.5 a: Chale Ghar 1, 'granulated' silver bead.

Find Number	Feature	Material	Shape	Measurements
4296c	10012/4	Silver	Ring bead of 8 pyramids each made of 8 granules	D. 1.23 cm L. 0.58 cm

Tab. 2.2.7.5 b: 'Granular' metal beads from the Near East and the northern Black Sea littoral.

Date	Object	Provenance	Reference
ca. 1000 BC	Three granular gold ring beads, with five pyramids of granules around the ring	Iran	Dubin, 1957, 52 fig.40. Collection Henry Anavian.
Terminus post quem 450/440 BC (until probably 370/360 BC) According to Rehm: Achaemenid period	Three silver beads made of 6 granules – single-, double-rowed or with a further outer row of six beads	Kamid El-Loz/Lebanon	Poppa, 1984, pp.77, 82, 88, 93, 122, pl.4, 2, 5-6, pl.9,9, 3, 5, pl.12,12,11-13, pl.12,22, 13, pl.23, 76, 64, 68; Rehm, 1992, pp. 107, 390 fig. D.11.a
Achaemenid period?	Two golden beads with granule decoration applied on a ring. One row of larger granules accompanied each by one or two rows of smaller granules.	Unknown	The National Museum of Iran, Tehran, nos. 2473, 2478.
End of the 4th century BC	Cylindrical bronze bead with decoration of bulges or ‚granules'.	Northern Black Sea littoral	Alekseeva, 1982, p.24, pl.40-46.
Arsacid period	Bronze bead with two rows of bulges	Susa/Iran	The National Museum of Iran, Tehran, no. 2545.
1st – 2nd centuries AD	Two cylindrical bronze beads with decoration of three rows of bulges or ‚granules'	Northern Black Sea littoral	Alekseeva, 1982, p.24, pl.40,46, 48.

Tab. 2.2.7.5 b: 'Granular' metal beads from the Near East and the northern Black Sea littoral.

Date	Object	Provenance	Reference
1st–3rd centuries AD	Ring-shaped bronze bead with decoration of bulges or ‚granules' also at the sides	Northern Black Sea littoral	Alekseeva, 1982, p.24, pl.40, 49.

Tab. 2.2.7.6 a: Chale Ghar 1, cylindrical silver beads.

Find Number	Feature	Material	Shape	Measurements
1086	10012	Silver?	Cylindrical with overlapping ends; groove decoration on the arête of the sheet	D. 1.3 cm L. 1.05 cm
4494d	10019	Silver	Ring-shaped bead. Probably made of a simple stick, which was then bowed to a ring and soldered at the ends	D. 0.4 cm

Tab. 2.2.7.6 b: Metal beads with overlapping ends from Iran.

Date	Object	Provenance	Reference
Beginning of the 1st century BC	Ring- to keg-shaped bronze beads made of sheet bent to a ring	Kaluraz/Iran	Excavation Hakemi. The National Museum of Iran, Tehran, all no. 5644.
100–700 AD (Sasanian)	Cylindrical-to-ovaloid lead bead. Made by bending a metal sheet almost to a spiral	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, p.185, pl.69,ii.

Tab. 2.2.7.7: Chale Ghar 1, cuboid lead or silver beads.

Find Number	Feature	Material	Shape	Measurements
1295b	10012/2	Lead?	Fragment of cuboid bead	L. 0.56 cm W. 0.44 cm
4954c3	10022	Lead	Cuboid	Unknown
6095a3	10022	Lead	Fragment of cuboid bead	D. 0.6 cm L. 0.3 cm
6401	10022	Silver or lead?	Fragment of cuboid bead	Unknown

Tab. 2.2.7.8 a: Chale Ghar 1, double-conical lead bead.

Find Number	Feature	Material	Shape	Measurements
1342	10013	Lead? Orange filling?	Double-conical	D. 0.65 cm L. 1.13 cm

Tab. 2.2.7.8 b: Double-conical metal beads from Iran and Iraq.

Date	Object	Provenance	Reference
2370–2200 BC	Necklace of double-conical and other shaped metal beads	Tell Brak/Iraq	Maxwell-Hyslop, 1971, p.30, fig.30.
Beginning of 1st millennium BC	Recently threaded double-conical bronze beads	Kaluraz/Iran	Excavation Hakemi. The National Museum of Iran, Tehran, no. 5643.
1st millennium BC	Recently threaded double-conical bronze beads	Rudbar/Iran	Excavation Shahidzade. The National Museum of Iran, Tehran, no. 5861.
Late Arsacid period	Double-conical bronze bead	Nowruzmahale/Iran	Egami, Fukai and Masuda, 1966, pl.XLV,14.

Tab. 2.2.7.9: Chale Ghar 1, spherical bronze and copper beads.

Find Number	Feature	Material	Shape	Measurements
1501	10019	Bronze	Spherical-to-bag-shaped	D. 0.98 cm L. 0.9 cm
1637	10012/3	Copper?	Spherical, no string hole	D. 0.6 cm L. 0.7 cm

Tab. 2.2.7.10 a: Chale Ghar 1, ring-shaped bronze beads.

Find Number	Feature	Material	Shape	Measurements
1872f	10013	Bronze	Ring-shaped, ripped at the surface, corroded	D. 0 4 cm L. 0.25 cm
1872k	10013	Bronze	Ring-shaped, corroded	D. 0.5 cm

Tab. 2.2.7.10 b: Ring-shaped bronze beads from the Near East and adjacent regions.

Date	Object	Provenance	Reference
Late 2nd/early 1st millennium BC	5 beads made of bronze sheet	Ghalekuti/Iran	Egami, Fukai and Masuda, 1965, pl.LXXV.
8th - 7th centuries BC	Necklace of bronze beads made of a sheet (and joined?)	Ergeta/Georgia	Gambaschidze, et al., 2001, p.391 no.338.
7th century BC	17 ring-shaped bronze beads with large string hole	Boemitsa/Macedonia	Personal observation in the exhibition: Musée du Louvre Br. 4590.
Late Arsacid period	2 ring-shaped bronze beads	Nowruzmahale/Iran	Egami, Fukai and Masuda, 1965, pl.XLV,15-16.

2.2.8 Undecorated Cornelian Beads

A total of 449 cornelian beads, mainly undecorated, were unearthed in Chale Ghar 1 and 2, including 233 undecorated spherical cornelian beads, which amounts to more than half of all the cornelian beads found. Despite the large number of cornelians, the number of their shapes is only moderate. Twelve types were classified, and, besides the spherical-shaped beads, the others are: double-conical, hexagonal, ovaloid/conical, disc-shaped, ring-shaped, keg-shaped, rhombic, quadrangular, triangular, and ovaloid/with cannelures. Remaining beads are irregularly shaped or fragmented. Most of the cornelian beads from Veshnaveh have an irregular colouring that varies between light orange and dark red. Due to their large number and their simple appearance these beads are listed with their find numbers only, because a detailed list with individual data about the beads would unnecessarily enlarge this subsection without contributing valuable insights.

2.2.8.1 Spherical Cornelian Beads (Tab. 2.2.8.1 a–b)

The 233 spherical beads are generally roughly worked, and many have a shallow concave depression in the stone at one side of the string hole (pl. 14, no. 1516). This depression is clearly a mark left by the drilling of the string hole (cf. p.22). The average bead has a diameter of 0.5 to 0.8 cm, and only a few exceed 1 cm, like nos. 1801 (D. 1.25 cm) and 1855 (D. 1.15 cm). Only few very small cornelian beads were available within the assemblage, e.g. nos. 1883c5 (D. 0.34 cm), 4579i (D. 0.36 cm) and 6043a4 (D. 0.15 cm).

2.2.8.2 Double-Conical, Conical and Hexagonal Cornelian Beads (Tab. 2.2.8.2 a–e)

60 double-conical and conical beads were unearthed at Veshnaveh. Some of them were carelessly manufactured, however, and these beads may therefore also be described as keg-shaped or ovaloid (e.g. pl. 14, no. 1212e). Double-conical beads correspond with the shape of two cones that are connected to each other at the base. This means that the bead has two narrowing ends. The cones are straight or oblique, with a round (pl. 14, 1212e; nos. 1214, 1217b, 1463, 1885, 1953) or a rectangular cross section (pl. 14, 1843; nos. 1511, 1864, 4819, 6762), and have points or are blunt (frusta).

Also double-conical, but of hexagonal cross section, are the so-called hexagonal beads (pl. 15, no. 1148).

Some of the 45 unearthed specimens were manufactured with care, but most have a fairly rough shape.

2.2.8.3 Ovaloid Cornelian Beads (Tab. 2.2.8.3 a–b)

33 ovaloid beads were found mainly in Chale Ghar 1. These may be described as 'egg shaped', or their cross section is oval.

One bead stands out among the ovaloid beads: It is an ovaloid bead of a beautiful translucent stone, manufactured with great care (pl. 15, no. 6290). The colour changes from very light to a dark red. Because of the translucency of the stone, the string hole with an edge is very well visible, and it is obvious that the hole was drilled from two sides.

2.2.8.4 Disc and Ring-Shaped Cornelian Beads (Tab. 2.2.8.4 a–c)

Only 15 disc-shaped cornelian beads were discovered in the mines. These are quite flat, sometimes slightly double-conical or irregular in shape. Such beads that have a rather large perforation and are flat in appearance are categorised as ring-shaped and number 15 specimens.

2.2.8.5 Keg-Shaped or Cylindrical Cornelian Beads (Tab. 2.2.8.5)

A keg has flat ends and slightly convex or bulging sides. This shape is very close to the cylindrical shape, and both designations may be used on the beads as categorised as keg-shaped here. Only six beads from Veshnaveh have this shape, which may appear in beads longer or shorter in length.

Among the keg-shaped beads, there is one noteworthy specimen. It is fashioned from an opaque stone with beautiful veins (pl. 15, no. 1230) which are visible at the sides. It is worth noting that traces of drilling are visible on the bead, but it was not finished.

2.2.8.6 Rectangular, Triangular, Cube and Irregularly Shaped Cornelian Beads (Tab. 2.2.8.6)

Two rectangular and two triangular cornelian beads were found in the mines (cf. pl. 15, 1592b). Although several glass beads in the shape of a cube with rounded corners were discovered at Veshnaveh, only two specimens of this shape made of cornelian are known (pl. 15, no. 4581h).

Twelve irregularly shaped beads and six fragmented beads could not be linked to a certain type.

2.2.8.7 Fluted Cornelian Beads (Tab. 2.2.8.7)

The last of the shapes to be presented here is a very special form of fluted cornelian bead: three specimens are of ovaloid shape with eight grooves worked into the surface (cf. pl. 15, no. 1540).

2.2.8.8 Notes on the Dating and Technique of the Undecorated Cornelian Beads from Veshnaveh

Dating

Cornelian beads have been found all over the Near East over a wide stretch of time.[22] They are mostly simply shaped, and share a common appearance.[23] Beads of this kind, including the techniques used in their drilling, are usually not studied in detail. Because of this, the cornelian beads of Veshnaveh cannot be dated, except perhaps for some shapes: The cornerless, cube-shaped cornelian and glass beads that were found at Veshnaveh resemble a rather flat cuboid with trimmed edges. This shape is often described as faceted. In the form as found at Veshnaveh, they are known especially from the Roman period, but cornelian beads of slightly differing shapes have been found to date from as early as the 4th century BC (Beck 1941, 9). Cornerless, cube-shaped cornelian beads of the Roman or Arsacid period were, for instance, found at Dura Europos or at Tell Sheikh Hamad in Syria (Toll, 1946, p.64, pl.XLIX tomb 31 no.5, p.50, pl.XLIII tomb 23 no.16; Novák, Oettel and Witzel, 2000, p.63 no.K2), and several examples made of glass are listed in the chapter on monochrome glass beads. The latter resemble the cornerless, cube-shaped beads from Veshnaveh and may indicate a dating to the Arsacid period.

[22] Corneilan beads of different shapes are common in different periods and regions, e.g. in the tombs of two Elamite Princesses manifold such beads have been found and date to the 6th century BC (Shishegar, 2015, colour pl.4-3-1b – 4-3-11b). According to E. Rehm (1992, p.89), oblong double-conical beads were common in all periods, starting from the Jemdet Nasr period. For the double-conical beads from Iran that were dated to different periods see: Shahr-i Sokhta, Tappeh Marlik, Dinkha Tappeh and Pasargadae (Stöllner, Slotta and Vatandoust, 2004, vol.2, p.595 no.77; Negahban. 1996, vol.2, pl.64, pl.65; Muscarella, 1974, p.65, fig.36, q.67; Rehm, 1992, pp. 101, 387 fig.D.1; Stronach, 1978, fig.102,14-16).

[23] See e.g. spherical cornelian beads from different periods in Iran: Tappeh Marlik, Tape Guran, Tappeh Sialk, Tappeh Giyan, Dinkha Tape, Siraf and Ghubayra (Negahban, 1996, vol.2, pls.64-65; Thrane, 2001, pl.66,1-17; De Miroschedij, 1981, p.111 fig.39; public collection of the Musée du Louvre AO 18015, AO 16535; Muscarella, 1974, p.65 fig.36, q.67; Whitehouse, 1972; Bivar, 200, pp.38, 248, fig.56,80-933). For ovaloid and conical beads from Iran see: Tappeh Sialk, Susa and Pasargadae (Public exhibition of the Musée du Louvre AO 18015, Sb 21853; Stronach, 1978, fig.102,17; Rehm, 1992, pp.103, 387 fig.D.3.b). For hexagonal beads from Iran see: Persepolis, Siraf and Ghubayra (Rehm, 1992, pp.106, 398 fig.D.10.i; Schmidt, 1957, pl.44,9; Whitehouse, 1972, p.84; Bivar, 2000, p.248, fig.56, 80-930a). For disc-shaped beads from Iran see: Tappeh Sialk (Stöllner, Slotta and Vatandoust, 2004, vol.2, p.731 no.401).

Technique

Depressions close to the string hole have been observed mostly on the spherical cornelian beads from Veshnaveh, but hexagonal beads also show this trait. These depressions probably indicate a special drilling technique that was applied on these beads: a larger drill was used first, to produce an indentation, in which a finer drill could then be steadied (Wright, 1982, p.98).

One quite carefully produced cornelian bead from Veshnaveh is broken along the string hole, maybe on purpose, or during the drilling process, and this affords a nice insight into the interior (pl. 14, no. 4518). A clear edge and a tapering towards the centre show that the bead was drilled from two sides. On some completely preserved beads, the characteristic edge inside the string hole is visible through the translucent stone or by looking into the string hole. About 48 beads from Veshnaveh, however, seem to have a straight and completely funnel shaped string holes (e.g. no. 1203c; pl. 14, no. 1516). It remains unclear whether this aspect indicates a drilling from only one side. However, different drilling techniques can be distinguished on the cornelian beads from Veshnaveh. These traits point to different origins of the beads and/or to different workshops or craftsmen who performed the drilling.

Among the numerous cornelian beads, only few were manufactured with any great care or are of a special shape: One spherical bead that is, however, fragmented (pl. 14, no. 4518), one ovaloid bead (pl. 15, no. 6290), one unfinished keg-shaped bead (pl. 15, no. 1230), as well as three fluted beads (nos. 1088, 1113; pl. 15, no. 1540). The latter seem to appear as unique specimens at Veshnaveh. No references could be found to them. The keg-shaped bead no. 1230 might indicate that cornelian beads were also manufactured in the region of Veshnaveh or at least drilled there, because it does not seem plausible that unfinished beads would have been traded. The question is whether these beads had been loaded up with a special meaning and were dedicated to the mines since they are coarse and unfinished.

Tab. 2.2.8.1 a: Chale Ghar 1, spherical cornelian beads.

Find Number	Feature	Shape
1092, 1102, 1112, 1116, 1143, 1146, 1149, 1150, 1153, 1156, 1162, 1173, 1343, 1433, 1484, 1486, 1487, 1492, 1493, 1496, 1502, 1515, 1516, 1579, 1582, 1622, 1631, 1633, 1634, 1655, 1729, 1740, 1774, 1798, 1801, 1818, 1822, 1833, 1841, 1852, 1853, 1855, 1861, 1867, 1868, 1870, 1873, 1877, 1878, 1881, 1884, 1943, 1944, 1945, 1946, 4224, 4344, 4417, 4418, 4423, 4427, 4499, 4500, 4501, 4503, 4507, 4518, 4552, 4836, 4923, 4953, 4955, 4966, 4967, 4985, 6047, 6061, 6068, 6077, 6128, 6147, 6194, 6214, 6287, 6288, 6534, 6696, 6705, 6738, 6746, 6748, 6856, 6904, 6908, 6918, 6924, 6945, 1155a, 1198a, 1198b, 1203c, 1206f, 1210a, 1212a, 1212d, 1212f, 1222b1, 1289a, 1611b, 1717a, 1749a, 1766b, 1775c, 1779f, 1790b, 1790i, 1790l,1791b, 1799f, 1799g, 1803d, 1831k, 1835d, 1835e, 1842a, 1842b, 1856b, 1856c, 1856f,1857a, 1866a, 1866b, 1866c, 1872j, 1872n, 1883c1, 1883c2, 1883c3, 1883c4, 1883c5, 1941a, 1958a, 1973a, 4040b, 4084a, 4188c, 4306d, 4336a, 4367a, 4457d, 4459a, 4460a, 4475b, 4476b, 4488a, 4494c3, 4494c6, 4494c7, 4496b, 4496c, 4496d, 4497b, 4516d, 4517f, 4562b, 4574d, 4574e, 4578a, 4578c, 4579i, 4580c, 4581k, 4584f, 4586d, 4586h, 4587b, 4591c, 4591f, 4595b, 4599a, 4673a, 4732c, 4750c, 4750d, 4750f, 4840c2, 4924c7, 4924c8, 4924c9, 4962c5, 4962c6, 4975a1, 4975a2, 4975a3, 6043a4, 6079a1, 6079a5, 6141a, 6141b, 6144a3, 6151a8, 6218a2, 6218a3, 6222a2, 6237a2, 6237a5, 6274a7, 6284a1, 6318a2, 6348a1, 6353a3, 6371a, 6391a, 6391b, 6560b6, 6563a1, 6694c4, 6697a2, 6698c4, 6698c6, 6698c7, 6698c8, 6718c, 6743a4, 6743a7, 6882a, 6894c, 6905a, 6910b, 6957c1	10012, 10012/2, 10012/3, 10012/5, 10012/5-6, 10012/6, 10013, 10013/1, 10014, 10018, 10019, 10022	Spherical

Tab. 2.2.8.1 b: Chale Ghar 2, spherical cornelian beads.

Find Number	Feature	Shape
7134a, 7156c6, 7214a1	11097, 11099	Spherical

Tab. 2.2.8.2 a: Chale Ghar 1, double-conical cornelian beads.

Find Number	Feature	Shape
1078, 1079, 1081, 1089, 1170, 1463, 1482, 1483, 1485, 1488, 1511, 1576, 1621, 1750, 1802, 1827, 1837, 1838, 1843, 1850, 1854, 1862, 1864, 1865, 1879, 1880, 1885, 1953, 1983, 4225, 4307, 4420, 4425, 4443, 4540, 4819, 6145, 6762, 1212e, 1589b, 1592a, 1799n, 1839b, 1883c8, 1965d, 4040a, 4188e, 4299a, 4402c1, 4556a, 4579b, 4584e, 4586f, 4674b, 4692e, 4750b, 4768a, 6698c3	10012, 10012/3, 10012/5, 10012/6, 10013, 10013/1, 10015, 10014, 10018, 10019, 10022	Double-conical, conical

Tab. 2.2.8.2 b: Chale Ghar 2, double-conical cornelian bead.

Find Number	Feature	Shape
7181c1	11099	Double-conical

Tab. 2.2.8.2 c: Chale Ghar 2, conical cornelian bead.

Find Number	Feature	Shape
7181c2	11099	Conical

Tab. 2.2.8.2 d: Chale Ghar 1, hexagonal cornelian beads.

Find Number	Feature	Shape
1148, 1345, 1499, 4952, 6097, 6146, 6223, 6270, 6332, 6504, 6735, 1790k, 1791e, 1791g, 1799e, 1799o, 1800e, 1883c6, 1883c7, 1957d, 4402c, 4488b, 4573a, 4579d, 4582e, 4591d, 4596e, 4672c, 4675d, 6151a7, 6237a3, 6389a2, 6540a, 6560b5, 6563a2, 6694c3, 6768c, 6832a, 6873a1, 6881a2, 6885a1, 6887a3, 6893d, 6910a	10000, 10004, 10008, 10013, 10013/1, 1012/5, 10019, 10022, 10050	Hexagonal

Tab. 2.2.8.2 e: Chale Ghar 2, hexagonal cornelian bead.

Find Number	Feature	Shape
7156c5	11097	Hexagonal

Tab. 2.2.8.3 a: Chale Ghar 1, ovaloid cornelian beads.

Find Number	Feature	Shape
1094b, 1158, 1214, 1278, 1489, 1540, 1584, 1623, 1871, 4291, 4502, 4506, 4694, 4949, 6036, 6150, 6153, 1217b, 1831l, 1866d, 4339b, 4441a, 4579c, 4582d, 4586g, 4841b, 4960c4, 4960c5, 6191a, 6290, 6498c1, 6891e	10004, 10012, 10012/3, 10012/5, 10012/6, 10013, 10013/1, 10014, 10019, 10022.	Ovaloid

Tab. 2.2.8.3 b: Chale Ghar 2, ovaloid cornelian beads.

Find Number	Feature	Shape
7002f, 7181c2	11057, 11099	Ovaloid

Tab. 2.2.8.4 a: Chale Ghar 1, disc-shaped cornelian beads.

Find Number	Feature	Shape
1167, 1177, 1494, 1882, 4343, 4421, 4504, 4698, 6702, 4407f, 4419b, 4468b, 4574g, 4662a, 6284a2	10012/5, 10012/6, 10013, 10013/1, 10019, 10022	Disc-shaped

Tab. 2.2.8.4 b: Chale Ghar 1, ring shaped cornelian beads.

Find Number	Feature	Shape
1620, 4957, 1856e, 1952a, 4306a2, 4470a, 4579g, 4591e, 6071a1, 6095a4, 6164a, 6389a3, 6768a, 6811a1	10012/3, 10012/5, 10013, 10022	Ring-shaped

Tab. 2.2.8.4 c: Chale Ghar 2, ring shaped cornelian bead.

Find Number	Feature	Shape
7139	11097	Ring-shaped

Tab. 2.2.8.5: Chale Ghar 1, keg-shaped or cylindrical cornelian beads.

Find Number	Feature	Shape
1087b, 1230, 1790e, 1819, 6067a1, 6153	10012, 10013/1, 10022	Keg-shaped

Tab. 2.2.8.6: Chale Ghar 1, rectangular, triangular, cube and irregularly shaped cornelian beads.

Find Number	Feature	Shape
6680b, 6698c5	10013, 10022	Rectangular
1592b, 1775b	10012, 10013/1	Triangular
1093, 4581h	10012, 10014	Cube-shaped, rounded corners

Tab. 2.2.8.7: Chale Ghar 1, fluted cornelian beads.

Find Number	Feature	Shape
1088, 1113, 1540	10012	Ovaloid, fluted

2.2.9 Etched Cornelian Beads

Among the cornelian beads there are thirteen etched beads. They have ornaments of white lines and dots on the red-orange stone. Due to their decoration, the beads have the most obvious identifiable characteristic, therefore chronological ranges are most likely to be possible.

2.2.9.1 Cornelian Beads with Indistinct Etching (Tab. 2.2.9.1 a)

Two spherical cornelian beads display a white discolouration, but no visible pattern is discernible (pl. 15, nos. 4345, 6090). The white etching seems like a mistake; a notable feature is a white spot on the string hole opening of bead no. 6090 (pl. 15), which gives an insight into the drilling process. This bead was obviously drilled after the etching, because the white etching has been perforated as well. One double-conical bead shows remains of a zigzag decoration (no. 4341b), apart from which it is covered with white splashes, even at the breaking edge. Another double-conical bead is completely covered with the white coloration (pl. 15, no. 1860).

Interpretation of Cornelian Beads with Indistinct Etching (Tab. 2.2.9.1 b)

Cornelian beads with such careless decoration have seldom been found in the Near East and Iran. One example was discovered in a tomb in Ras al-Khaimah, UAE.

2.2.9.2 Cornelian Beads with Decoration of Lines and Dots (Tab. 2.2.9.2 a)

A simple decoration of dots was applied to a disc or flat spherical shaped bead (pl. 16, no. 1212c): On the irregular surface of the bead, single blobs were placed. The ovaloid bead no. 1778 has an ornament of four concentric lines in a row and at least two dots as an additional decoration are visible (pl. 16).

Interpretation of Cornelian Beads with Decoration of Lines and Dots (Tab. 2.2.9.2 b)

From a Arsacid pithos grave in Tappeh Hatam, one spherical cornelian bead is known that, on its irregular surface, is etched with a decoration of dots. Another bead of cylindrical shape and etched with several white dots was discovered in a Sasanian tomb in Hassani Mahale. It probably belonged to an item of headgear (Sono and Fukai, 1968, p.25).

2.2.9.3 Cornelian Beads with Cross Decoration (Tab. 2.2.9.3 a)

One originally trapezoid shaped bead was probably broken into three fragments during the excavation process. The stone is of a regular, red colour and the bead was decorated with intersecting lines (pl. 16, no. 1941b).

Another fully preserved bead displays a cross pattern on both flat sides (pl. 16, no. 4480). One dot is placed in each quarter of the cross. This bead was seemingly drilled after the decoration was applied, and infiltrated with help of heat. The string hole was drilled through one of the white lines, and obviously no soda had flowed into the hole (technique cf. p.22). Therefore it would seem that the drilling was done after the etching.

The disc-shaped bead no. 1206d has an ornament that may be described as cross, but also as illustrating two semicircles. These lie with the flat sides opposite each other and are crossed by a horizontal line (pl. 16).

Interpretation of Cornelian Beads with Cross Decoration (Tab. 2.2.9.3 b)

One reference find corresponding to the broken rectangular beads (nos. 1941b, 1952c) may be observed in the collection of the The National Museum of Iran, Tehran (pl. 16, no. 2569), and originates from Sasanian-era Susa (Gropp, 2005). Two triangular beads and an ovaloid one with an etching of outlined triangles from Baluchistan were discussed by H. C. Beck (1933, pp.392-393, pl.68 1A) in his study on etched cornelian beads, and one cornelian cube with a white framed cross decoration was found in Taxila, Pakistan (Beck, 1933, pl.68 Y; Dikshit, 1949, pl. 9 no.1). H. C. Beck dates this specimen to the 4th century BC/3rd century AD, while M. G. Dikshit dates the same bead to the 1st century AD. At Tell Mohammed Arab, one irregular disc-shaped bead with white cross decoration was unearthed. In each of the free quarters, star or plant like figures were additionally placed.[24]

2.2.9.4 Cornelian Beads with Zigzag Decoration, Plain and in Combination with Dots (Tab. 2.2.9.4 a)

Five cornelian beads are decorated with a zigzag pattern. One spherical bead only has zigzag lines (no. 1948), while two round beads have additional secluding concentric lines above and below the zigzag ornament (pl. 16, nos. 1117, 1635). Two further spherical beads have an additional dot decoration within the zigzag lines (pl. 17, nos. 1679b, 1773).

Interpretation of Cornelian Beads with Zigzag or Lattice Decoration, Plain and in Combination with Dots (Tab. 2.2.9.4 b)

A basic design of several white lines and dots can be observed on cornelian beads from the Near East dating from the 3rd century BC to the Sasanian period. This decoration includes zigzag or wave patterns and variations with dots or a lattice design.

Similar beads were found in burials in Rudbar in the Iranian province of Gilan (The National Museum of Iran, Tehran, pl. 17, nos. 5857, 5858, 5867, 5869) and were dated to the 1st millennium BC, whilst it is unclear whether they originate in the beginning or the end of the 1st millennium. Beads with lattice designs originate from Achaemenid-era Susa (The National Museum of Iran, Tehran, no. 1190). However, Parthian finds from Djuben have a lattice or zigzag decoration as well (pl. 18, The National Museum of Iran, Tehran, nos. 3815, 3822).

Sasanian reference finds from Hassani Mahale, though, bear the closest resemblance to the finds from Veshnaveh. They are etched with zigzag lines and secluding concentric circles or with zigzag lines and dots (Sono and Fukai, 1968, pl. 43,3-6, pl.71,20-22, 25, pl.34,2). Beads from Sasanian-era Susa (Gropp, 2005) have a similar basic design made up of lines and dots: patterns of zigzag lines, lattice designs or oblique parallel lines with dots (The National Museum of Iran, Tehran, pl. 16, 18, nos. 2566, 2569, 869).[25]

Several ovaloid and double-conical beads are known that were found in Pakistan and which display an etched lattice design: Two specimens were found in Taxila and dated to the 3rd century BC and the 1st century AD (Dikshit, 1949, pl.8 no.10, pl.9, no.3). From Rairh, India, two

[24] A detailed report of the excavations at Tell Mohammed Arab is in progress. Very kindly, the excavators M. Roaf, Julius-Maximilian University of Munich, and St. J. Simpson, British Museum, allowed me to have a look into the manuscript and to quote relevant finds. For more etched beads from Israel see: Delugaz and Haines, 1960, pl.60:1; Katnelson, 2014, p.205, fig.5.1 (kind notice from E. Fischer). One also finds etched beads in the Arabian provinces of Roman-Byzantine time (Eger, 2010).

[25] Different beads stored in the National Museum of Iran can have the same museum number.

cornelian beads, also with lattice patterns, are known (Puri, 1942, pl.21,18-19). The site where these beads were found has been dated to the 3rd century BC – 2nd century AD (Puri 1998, 56). One bead from Kazakhstan resembles the Veshnaveh beads in style and is dated to the 3rd–5th century AD (Popescu, Antonini and Baipakov, 1998, p.243 no.530). H. C. Beck (1933, pl.71) assigns such beads with geometric lattice designs to the same period, the 3rd century BC – 2nd century AD.

Clearly, lattice designs were popular from the 1st millennium BC onwards and evolved into zigzag designs in later periods. The beads with wave, zigzag and dot designs that were discovered at Veshnaveh can be dated to the Sasanian period according to the references.

2.2.9.5 Cornelian Beads with Tendril Decoration (Tab. 2.2.9.5 a)

Two beads with a special decoration stand out among the etched cornelian beads from Veshnaveh: tendril patterns were applied to one spherical and one double-conical specimen; the spherical bead was treated more thoroughly. The latter has three ovals that contain a plant-like motif with a trunk and five branches (pl. 17, no. 1106). The trunk is connected to the other 'trees' with lines emerging from its end. The double-conical artefact has a rectangular diameter and is – with regard to its shape – decorated with a similar pattern as the spherical bead, but rather roughly (pl. 17, no. 1577).

Interpretation of Cornelian Beads with Tendril Decoration (Tab. 2.2.9.5 b)

Reference finds for the cornelian beads with tendril decorations have been dated to the late Sasanian/early Islamic periods. Five beads from the collection of the Hermitage Museum in St. Petersburg very clearly show that the design of probably trees surrounded by a lattice or by ovals was a familiar motif for etched cornelian beads of more recent dating (Hermitage, 2004, nos.68-69). One bead from Nishapur has a spiral ornament that does not resemble the Veshnaveh finds exactly, but mirrors the latter's plant decoration (Jenkins-Madina and Keene, 1982, pp.30-32, no.40.170.693). Two cornelian beads – probably from the Crimean Peninsula – were discussed by H. C. Beck (1933, p.395, pl.69-70). They display motifs in the shape of a plant with a trunk and five branches similar to the Veshnaveh decoration. The trunk is connected to the other 'trees' with lines emerging from its end. H. C. Beck (1933, pl.71) dates the beads with such etchings of tendrils to a period from 600 to 1000 AD.

2.2.9.6 Note on the Date and Origin of the Etched Cornelian Beads from Veshnaveh

According to J. Reade (1979) and H. C. Beck, 1933, pp.387-388, etched cornelian beads appear in Mesopotamia from the middle of the 3rd millennium BC, the early Dynastic III A, onwards and appear more frequently in the Akkadian period. Subsequently, the number of finds markedly decreases, and around 1900 BC they seem no longer to appear. During the Achaemenid period, etched cornelian beads obviously became popular once again.[26] This observation might be a first criterion – a terminus post quem – by which to situate the etched beads from Veshnaveh. With comparable finds, however, the beads that were found exclusively in Chale Ghar 1 could be dated to the Arsacid, Sasanian and the early Islamic periods. In Chale Ghar 2, no finds of this kind were made. While the beads with indistinct patterns cannot be dated, the beads with lines, dots or crosses belong to the Arsacid-Sasanian period. The date for beads with zigzag decorations, however, can be narrowed down more precisely. Their references point to the Sasanian period. The cornelian beads with tendril decorations are highly distinctive, because they are among the few finds that belong to the late Sasanian or early Islamic periods at Veshnaveh.

It is believed that the etching method was invented in the Indus valley (Tosi, 1976-1980, p.452), where natural sources of the stone were available (Tallon, 1995, pp.36-37). The Indian stone was famous for its red colour, which was probably also due to heating the stone for the improvement of the colour. Plain and etched cornelian beads were traded with regions as remote as Mesopotamia (During Caspers, 1971, p.97; Theunissen, Grave and Bailey, 2000). However, soon the knowledge of etching stones spread westwards, and etched cornelian beads were produced locally. The etched cornelian beads from Veshnaveh are mostly orange in colour and bear rough decorations. These attributes indicate local manufacture or production on Persian territory rather than an import from India.

[26] Etched beads from before and outside the Achaemenid context, however, have been recorded at Tappeh Hissar and Shah Tappeh in North-Eastern Iran (Schmidt, 1937, p.223; Arne, 1945, p.292) as well as in Jubaji, South-western Iran. (Shishegar, 2015, colour pl.4-3-14b).

Tab. 2.2.9.1 a: Chale Ghar 1, cornelian beads with indistinct etching.

Find Number	Feature	Material	Shape	Decoration	Measurements
1860	10013	Cornelian	Double-conical	White cover	D. 0.75 cm, L. 1.5 cm
4341b	10012/6	Cornelian	Double-conical	Remains of zigzag decoration and white splashes	D. 0.8 cm, L. 1.2 cm
4345	10012/6	Cornelian	Spherical to irregular	Inarticulate	D. 0.7 cm, L. 0.45 cm
6090	10022	Cornelian	Spherical	Inarticulate	D. 0.84 cm, L. 0.82 cm

Tab. 2.2.9.1 b: Cornelian bead with indistinct etching from Ras al-Khaimah.

Date	Object	Provenance	Reference
Late 1st millennium BC - early centuries AD	Ovaloid cornelian bead with careless decoration of zigzag (?) lines	Dhayah/Ras al-Khaimah, UAE	De Waele and Haerinck, 2006, pp.37-38, figs.5, 3ab.

Tab. 2.2.9.2 a: Chale Ghar 1, cornelian beads with decoration of lines and dots.

Find Number	Feature	Material	Shape	Decoration	Measurements
1212c	10013/1	Cornelian	Disc or flat spherical	Dots	D. 0.64 cm, L. 0.5 cm
1778	10013/1	Cornelian	Ovaloid	Four concentric circles	D. 0.82 cm, L. 1.5 cm

Tab. 2.2.9.2 b: Cornelian beads with decoration of lines and dots from the Near East.

Date	Object	Provenance	Reference
Unknown: 4th century BC (?)	Cornelian bead with three concentric white lines	Bhita/India	Dikshit, 1949, pl. 16, 13.
3rd century BC	Cornelian bead with dot decoration	Rairh/India	Puri, 1942, pl.23.10; Dikshit, 1949, pl.11,10, 17.
1st century AD	Keg-shaped agate bead with three parallel concentric white lines	Pakistan	Beck, 1941, pl.2.22; Dikshit, 1949, pl.9,5.
Arsacid	Spherical cornelian bead with irregular surface and white dots	Tappeh Hatam/Iran	The National Museum of Iran, Tehran, no. 3487.
Sasanian	Cylindrical cornelian bead with white dots	Hassani Mahale/Iran	Sono and Fukai, 1968, p.25, pl.43,2, pl.71,1-8.

Tab. 2.2.9.3 a: Chale Ghar 1, cornelian beads with cross decoration.

Find Number	Feature	Material	Shape	Decoration	Measurements
1206d	10013/1	Cornelian	Disc-shaped	Crosses or semi-circles	D. 0.8 cm, L. 0.4 cm
1941b, 1952c (= one bead)	10013	Cornelian	Trapezoid, fragmented	Crosses	L. 0.86 cm
4480	10013	Cornelian	Cylindrical/disc-shaped	Crosses and dots	D. 1.35 cm, L. 0.75 cm

Tab. 2.2.9.3 b: Reference finds for cornelian beads with white cross decoration from the Near East.

Date	Object	Provenance	Reference
300 BC – 200 AD	Two triangular and one ovaloid cornelian bead with white decoration of triangles	Bampur/Iran	Beck, 1933, pp.392-393. pl.68 1A.
1st century AD	Cornelian cube with white cross decoration	Taxila/Pakistan	Beck, 1933, pl.68 Y; Dikshit, 1949, pl. 9 no.1.
4th–5th century AD	Irregular disc-shaped bead with white cross decoration and additional ornaments	Tell Mohammed Arab/Iraq	Unpublished; personal communication M. Roaf.
Sasanian	Rectangular cornelian bead with white cross decoration	Susa/Iran	The National Museum of Iran, Tehran, no. 2569.

Tab. 2.2.9.4 a: Chale Ghar 1, cornelian beads with zigzag decoration, plain and in combination with dots.

Find Number	Feature	Material	Shape	Decoration	Measurements
1117	10012/2	Cornelian	Spherical	Zigzag decoration with secluding lines	D. 1.4 cm, L. 0.8 cm
1635	10012/3	Cornelian	Spherical	Zigzag decoration with secluding lines	D. 0.8 cm, L. 0.65 cm
1679b	10013/1	Cornelian	Spherical	Zigzag decoration with dots	D. 1.4 cm, L. 1.1 cm
1773	10013	Cornelian	Spherical	Zigzag decoration with dots	D. 0.95, L. 0.7 cm
1948	10013	Cornelian	Spherical	Zigzag decoration	D. 0.7 cm, L. 0.52 cm

Tab. 2.2.9.4 b: Cornelian beads with zigzag decoration, plain and in combination with dots, from the Near East and Kazakhstan.

Date	Object	Provenance	Reference
1st millennium BC	Beads with zigzag, line and dot decoration	Rudbar/Iran	The National Museum of Iran, Tehran, nos. 5857, 5858, 5867, 5869.
Achaemenid	Bead with thoroughly applied lattice and dot design	Susa/Iran	The National Museum of Iran, Tehran, no. 1190.
3rd century BC	Cornelian bead with lattice design	Taxila/Pakistan	Dikshit, 1949, pl.8 no.10.
1st century AD	Cornelian bead with lattice design	Taxila/Pakistan	Dikshit, 1949, pl.9 no.3.
3rd century BC – 2nd century AD	Two cornelian bead with lattice design	Rairh/India	Puri, 1942, p.56.
Arsacid	Two beads with lattice or zigzag pattern and dots	Djuben/Iran	The National Museum of Iran, Tehran, nos. 3815, 3822.
3rd/4th century AD	Spherical bead with white zigzag lines and dots	Ed-Dur/Oman	De Waele and Haerinck, 2006, p.37, fig.5,2e.
3rd–5th century AD	Spherical bead with rough lattice design filled with dots	Konyr-Tobe/Kazakhstan	Popescu, Antonini and Baipakov, 1998, p.243 no.530.
Sasanian	Nine beads with zigzag and secluding concentric lines or zigzag lines and dots	Hassani Mahale/Iran	Sono and Fukai, 1968, pl.43,3-6, pl.71,20-22, 25, pl.34,2.
Sasanian	Three cornelian beads with zigzags, lattice design or oblique parallel lines with dots	Susa/Iran	The National Museum of Iran, Tehran, nos. 2566, 2569, 869.
Samad period 300 BC – 1000 AD	Cornelian bead with zigzag and dot decoration	Rawdah/Muqatta/Oman	Yule, 2002, p.396, pl.539 1.6.

Tab. 2.2.9.5 a: Chale Ghar 1, cornelian beads with tendril decoration.

Find Number	Feature	Material	Shape	Decoration	Measurements
1106	10012?	Cornelian	Spherical	Tendril pattern	D. ca. 0.8 cm, L. ca. 0.5 cm
1577	10012	Cornelian	Double-conical	Tendril pattern	D. unknown, L. 1.45 cm

Tab. 2.2.9.5 b: Cornelian beads with tendril decoration from the northern the Near East and adjacent regions.

Date	Object	Provenance	Reference
6th–7th century AD	Three disc-shaped and two spherical etched cornelian beads with several plant motifs with each four to five branches in frames	Northern Caucasus and unknown	Hermitage, 2004, nos. 68–69.
Samad period 300 BC – 1000 AD	Spherical cornelian bead with pattern of a white rank, scroll motif	Samad al Shan/Oman	Yule and Weisgerber, 1988, p.29, fig.9; Yule, 2001, p.358; De Waele and Haerinck, 2006, pp.37-38, fig.5,4b.
3rd–5th century AD	Three spherical cornelian beads with plant like decoration	Tell Mohammed Arab/Iraq	Roaf, 1984, p.144, pl.XIc.
7th–11th century AD	Two beads with plant motifs with each five branches	Crimea (?)	Beck, 1933, p.395, pl.69-70.
9th–12th century AD	Cornelian bead with spiral plant decoration	Nishapur/Iran	Jenkins-Madina and Keene, 1982, p.30-32, no.40.170.693.

2.2.10 Beads of Various Stones

P. R. S. Moorey states (199, p.83), that 'this term (*garnet*) embraces a whole family of minerals, all silicates, varying from red to purple in colour.' (Moorey, 1999, 83). Therefore a number of mineral beads from Veshnaveh that have an appearance of red, blood red or brownish red colour, are categorised under the generic term 'garnet' here.

Thirty-four beads were unearthed in Chale Ghar 1, while in Chale Ghar 2 only one garnet bead was found. Most of them have an irregular shape, and even the spherical and ovaloid beads were roughly worked out. Further shapes include one irregular rectangular bead and one hexagonal garnet bead.

Nine lapis lazuli beads were found in Chale Ghar 1. The material is of a rather poor quality, and the beads have a greyish colour with only a slight blue tinge. Four ovaloid, one ring-shaped, one disc-shaped and two cornerless cube shaped beads and one spacing bead are presented.

Gagat, sometimes called jet, is a black stone that is rich in bitumen, and one that can be polished to display a shiny surface. While in Chale Ghar 2 no gagat was found, in Chale Ghar 1 thirteen beads of several shapes were uncovered, as there are spherical, ovaloid, cylindrical, disc-shaped, rectangular and flat rhombic-shaped beads.

35 beads, mainly of a rather irregular shape, are included in a separate subsection dealing with various brown, red and pink stones. Their mineral was not specified, and so these beads were categorised only based on their colour

Various white or colourless beads (23 specimens) are summarised in one subsection, too; they are of limestone, chalcedony and rock crystal and they were processed to make disc, double-conical, rectangular, spherical, ring, cylindrical, ovaloid and hexagonal shapes.

2.2.10.1 Garnet Beads (Tabs. 2.2.10.1 a–f)

Seven spherical, six ovaloid, one rectangular, one hexagonal and 20 irregular garnet beads were found in the Chale Ghar mines. Of these 35 beads, only one fragmented ovaloid garnet bead originates from Chale Ghar 2, the rest from Chale Ghar 1. The shapes mostly resemble those of the cornelian beads, and the beads were manufactured in a similar, irregular or rough manner as the cornelian ones (pl. 18, nos. 1947, 1790c). However, the latter are on average slightly larger in size.

Interpretation of Garnet Beads (Tab. 2.2.10.1 g)
The drilling of the string holes was mainly carried out from two sides, as can be seen on more or less translucent specimens, such as no. 1883c9 (pl. 18). Here, it is visible that the holes that were drilled from two sides do not meet exactly in the middle and a slight edge was formed as a result. This method of drilling would have been intended to keep the stone from cracking during the drilling process. Funnel shaped string holes, as in the case of nos. 1766b and 1949b, may, however, indicate drilling from just one side.

Reference finds of garnet beads were mostly made together with necklaces (Musche, 1988, p.127, no.2.2.24; Gaultier and Metzger, 2005, p.47, fig.4.13). However, individual beads were found in sepulchral contexts – at least in the early Islamic period – as examples from Kush or Samad show. Due to the simple and rough shapes of the garnet beads from Chale Ghar 1 as well as the general appearance of these beads over a long time period, it is not possible to date the garnet beads exactly. However, stone beads are obviously seldom used in prehistory and seem to be dated younger in general. All in all, they resemble the cornelian beads in shape, roughness and general appearance over the times.

2.2.10.2 Lapis Lazuli Beads (Tabs. 2.2.10.2 a–e)

The lapis lazuli stone from Veshnaveh is greyish-blue in colour and was fashioned into rather simple and rough beads. Only one cornerless cube-shaped bead and one spacing bead with three string holes stand out among this category.

The nine beads, all of which were found in Chale Ghar 1, are all completely preserved and are less than 1 cm in diameter and length, except for the cornerless cube-shaped and the spacing beads with respectively diameters of 1.1 cm and 1.92 cm (pl. 18, nos. 4517d, 4584c).

Interpretation of Lapis Lazuli Beads (Tabs. 2.2.10.2 f–h)
Although the shapes are simple and the quality of the lapis lazuli beads is low, this group of finds is of a particular significance among the artefacts from Chale Ghar 1. Lapis lazuli was probably not available in Persia and had to be brought from afar. The stone was of great value due to its foreign origin and its colour, and was popular in the whole Near East (Röllig, 1980-1983, p.488). Lapis lazuli beads have been found in Iran dating from at least the 4th millennium BC to the Islamic period, as the table below shows. Simple shapes such as ovaloid, ring- or disc-shaped beads were threaded with other beads to form necklaces. Simple shapes, as found at Veshnaveh, appear frequently, and could be contemporaneous despite the cornerless cube-shaped beads.

The latter may not be dated before the Arsacid period, much like the blue cornerless cube-shaped glass beads. One reference to the cornerless cube-shaped lapis lazuli beads was found in Kush, but unfortunately not at a reliable find spot (pl. 19, Kush x 201).

The spacing bead that was found in Chale Ghar 1 has one counterpart from Sasanian-era Qasr-i Abu Nasr, and is also rectangular in shape, with three string holes.

2.2.10.3 Gagat Beads (Tabs. 2.2.10.3 a–e)

All 13 gagat beads from Veshnaveh were carefully manufactured and were found in Chale Ghar 1. No. 1285 contains a small red glass bead in the string hole. It is unclear whether this bead was inserted into the hole deliberately or whether the glass bead accidentally slipped into the string hole. Other so much small beads were not found in Chale Ghar 1 or 2. Nos. 4333e and 4516c (pl. 19) are unusual among the gagat beads from Chale Ghar 1, being larger in size and very well made. No. 4516c obviously was drilled from two sides. This method of drilling had to be used especially on gagat beads, because this material is very prone to damage and requires careful handling. On the other hand, gagat is quite easily worked and shaped.

Interpretation of Gagat Beads (Tab. 2.2.10.3 f)
Gagat beads have been found in graves of several periods and regions, including Lurestan of the 3rd century BC and Sasanian-era Qasr-i Abu Nasr, as well as on the Northern Black Sea littoral and in the Kuban region, dating from the 2nd century BC to the 2nd century AD. In the Roman world, gagat was well known and widely used (Henkel, 1913, p.349). In this context, some finds from Augst are worth mentioning here.

No exact reference finds to the Veshnaveh beads are available, so their dating must remain unclear, although the available evidence points to the Arsacid and Sasanian periods.

2.2.10.4 Turquoise and Azurite Beads (Tab. 2.2.10.4)

Two turquoise beads and one made of azurite were found in Chale Ghar 1. They are of an irregular shape that resembles a rectangle (pl. 19, no. 1883c11).

2.2.10.5 Various Brown, Red and Pink Stones (Tab. 2.2.10.5)

One light brown (Michel Color Guide, 2000) stone bead from Chale Ghar 1 stands out among the other stone beads due to its large size and the thoroughness of its making (pl. pha19, no. 1072). Two beads, one rectangular, the

other quite fragmented, were also found in Chale Ghar 1 (nos. 1883c12, 1883c14). They are probably made of hematite. One ovaloid bead of grey stone is covered by traces of a reddish iron oxide, maybe because it was located close to a corroded iron object (no. 1965f).

2.2.10.6 Beads of White Stone: Limestone and Marble, Chalcedony, Rock Crystal (Tab. 2.2.10.6 a–d)

Beads of three different types of stones are presented in one group under the rubric of 'white stones': limestone and marble, chalcedony, and rock crystal.

As a category, the white stone beads come in simple shapes: spherical, ovaloid, disc-shaped, cylindrical or rectangular. They are all to some extent coarsely made, and two beads even have an unpolished surface (pl. 19, nos. 4599b, 4594). One rock crystal bead, however, is made carefully in a hexagonal shape and stands out among this group.

Some beads clearly show that they were drilled from two sides (nos. 1498, 1840, 4516b, 4599), and it is likely that most stone beads were drilled in this manner. Bead no. 1611a has a funnel shaped string hole that, by contrast, may indicate its having been drilled from just one side.

A further remark should be made concerning bead no. 1480 (pl. 19): It was found together with a short green s-drilled yarn.

Interpretation of White Stone Beads (Tab. 2.2.10.6 e)

Beads made of white stones have frequently been found in Iran and the Near East, as the examples in the table show. Like the beads from Veshnaveh, they were made in simple shapes and sometimes they were worked quite carelessly. Rock crystal was an especially popular stone (pl. 20, Kush x 209, x 424) and was combined with other stones, such as cornelian and lapis lazuli, or with glass beads, in necklaces.

Tab. 2.2.10.1 a: Chale Ghar 1, spherical garnet beads.

Find Number	Feature	Shape	Preservation	Measurements
1766b	10013/1	Spherical	Complete	D. 0.6 cm, L. 0.48 cm
1947	10013	Spherical	Complete	D. 0.5 cm, L. 0.44 cm
6063	10022	Spherical	Complete	D. 0.41 cm, L. 0.7 cm
6117	10022	Spherical	Complete	D. 0.6 cm, L. 0.49 cm
6151a8	10022	Spherical	Complete	D. 0.42 cm, L. 0.28 cm
6226a3	10022	Spherical	Complete	D. 0.55 cm, L. 0.42 cm
6404	10022	Spherical	Complete	D. 0.4 cm, L. 0.25 cm

Tab. 2.2.10.1 b: Chale Ghar 1, ovaloid garnet beads.

Find Number	Feature	Shape	Preservation	Measurements
1426	10018	Ovaloid to rhombic	Complete	D. 0.4 cm. L. 0.8 cm, W. 0.6 cm
1883c10	10013	Ovaloid	Complete	D. 0.42 cm, L. 0.6 cm
4337e	10012/5-6	Ovaloid	Complete	D. 0.55 cm, L. 0.7 cm
4674c	10013	Ovaloid	Complete	D. 0.52 cm, L. 0.65 cm
4954c7	10022	Ovaloid	Complete	D. 0.55 cm, L. 0.4 cm

Tab. 2.2.10.1 c: Chale Ghar 2, ovaloid garnet bead.

Find Number	Feature	Shape	Preservation	Measurements
7156c7	11097	Ovaloid	Fragmented	L. 0.76 cm, W. 0.49 cm

Tab. 2.2.10.1 d: Chale Ghar 1, rectangular garnet bead.

Find Number	Feature	Shape	Preservation	Measurements
1883c9	10013	Rectangular	Complete	D. 0.42 cm, L. 0.6 cm

Tab. 2.2.10.1 e: Chale Ghar 1, hexagonal garnet bead.

Find Number	Feature	Shape	Preservation	Measurements
1790c	10013/1	Hexagonal	Complete	D. 0.4 cm, L. 0.3 cm

Tab. 2.2.10.1 f: Chale Ghar 1, irregular garnet beads.

Find Number	Feature	Shape	Preservation	Measurements
1164	10013/1	Irregular	Complete	D. 0.73 cm, L. 0.49 cm
1747	10013	Irregular	Complete	D. 0.55 cm, L. 0.3 cm
1800f	10013/1	Irregular	Complete	D. 0.4 cm, L. 0.5 cm
1872l	10013	Irregular	Complete	D. 0.54 cm, L. 0.38 cm
1949b	10013	Irregular	Complete	D. 0.54 cm, L. 0.36 cm
1951a	10013	Irregular	Complete	D. 0.55 cm, L. 0.4 cm
4274d	10012/5	Irregular	Complete	D. 0.5 cm, L. 0.2 cm
4578b	10014	Irregular	Complete	D. 0.6 cm, L. 0.38 cm
4810a	10013	Irregular	Complete	D. 0.44 cm, L. 0.59 cm
6060a	10022	Irregular	Fragmented	D. 0.6 cm, L. 0.49 cm
6213	10022	Irregular	Fragmented	D. 0.5 cm, L. 0.35 cm
6220	10022	Irregular	Fragmented	D. 0.49 cm, L. 0.35 cm
6238a4	10013	Irregular	Complete	D. ca. 0.6 cm, L. unknown
6238a6	10013	Irregular	Complete	D. ca. 0.5 cm, L. unknown
6238a7	10013	Irregular	Complete	D. ca. 0.45 cm, L. unknown
6350	10022	Irregular	Fragmented	D. 0.6 cm, L. 0.31 cm
6358	10022	Irregular	Fragmented	D. 0.49 cm, L. 0.4 cm

Tab. 2.2.10.1 f: Chale Ghar 1, irregular garnet beads.

Find Number	Feature	Shape	Preservation	Measurements
6451	10022	Irregular	Complete	D. 0.5 cm, L. 0.35 cm
6885a2	10004	Irregular	Complete	D. 0.46 cm, L. 0.26 cm
6939a1	10004	Irregular	Complete	D. ca 0.5 cm, L. unknown

Tab. 2.2.10.1 g: Garnet beads from the Near East.

Date	Object	Provenance	Reference
2nd–1st century BC	Necklace with garnet beads	Shakhoura/Bahrain	Lombard, 1999, p.199 no.326.
Arsacid	Necklace of 20 double-conical garnet beads in compound with other jewellery	Northern Iran	Musche, 1988, p.17 no.2.2.24
1st century BC – 3rd century AD	19 (irregular) oblate, 17 barrel-shaped, 1 'circular', 2 irregular, seven oblate and circular beads	Dura Europos/Syria	Toll, 1946, p.32, tomb 6 nos.25-26, pl.XXXVI; p.41, tomb 11 no.36, pl.XL; p.61, tomb 28 nos.27-29, pl.XLVIII, p.66, tomb 33 nos.24-25, pl.L, p.75, tomb 40 nos.25-31, pl.LII, p.76, tomb 40 nos.29-31, pl.LII, p.82, tomb 41 no.16, pl.LV, p.89, tomb 49 nos.35-36, pl. LVII, p.139.
Late Samad period 600 – 900 AD	3 irregularly shaped garnet beads	Samad al Shan/Oman	Yule, 2001, p. 168, p. 354, pl.439,10.8.
7th – 8th century AD	1 spherical garnet bead	Kush/Ras al-Khaimah/UAE	Unpublished; by courtesy of St. J. Simpson

Tab. 2.2.10.2 a: Chale Ghar 1, ovaloid lapis lazuli beads.

Find Number	Feature	Shape	Preservation	Measurements
4333d	10012/5-6	Ovaloid lapis lazuli bead	Complete	D. 0.66 cm, L. 0.95 cm
4494c12	10019	Ovaloid lapis lazuli bead	Complete	D. 0.55 cm, L. 0.7 cm
4517c1	100012/6	Ovaloid lapis lazuli bead	Complete	D. 0.72 cm, L. 0.85 cm
4517c2	100012/6	Ovaloid lapis lazuli bead	Complete	D. 0.72 cm, L. 0.82 cm

Tab. 2.2.10.2 b: Chale Ghar 1, ring shaped lapis lazuli bead.

Find Number	Feature	Shape	Preservation	Measurements
4467a	10012/5	Ring shaped lapis lazuli bead	Complete	D. 0.66 cm, L. 0.35 cm

Tab. 2.2.10.2 c: Chale Ghar 1, disc-shaped lapis lazuli bead.

Find Number	Feature	Shape	Preservation	Measurements
1799h	10013/1	Disc-shaped irregular lapis lazuli bead	Complete	D. 0.7 cm, L. 0.4 cm

Tab. 2.2.10.2 d: Chale Ghar 1, cornerless cube-shaped lapis lazuli beads.

Find Number	Feature	Shape	Preservation	Measurements
1500	10019	Cornerless cube-shaped lapis lazuli (?) bead	Complete	D. 1.1 cm, L. 1.35 cm
4517d	10012/6	Cornerless cube-shaped lapis lazuli bead	Complete	D. 1.1 cm, L. 0.38 cm

Tab. 2.2.10.2 e: Chale Ghar 1, rectangular spacing bead of lapis lazuli.

Find Number	Feature	Shape	Preservation	Measurements
4584c	10014	Rectangular spacing bead	Complete	D. 1.92 cm, W. 0.6 cm, Th. 0.32 cm

Tab. 2.2.10.2 f: Jewellery of lapis lazuli from Iran.

Date	Object	Provenance	Reference
4th millennium BC	Necklace with ovaloid lapis lazuli and other beads	Susa/Iran	de Morgan, 1905, pl.II.
2nd half of the 4th millennium BC	Necklace of cornelian and lapis lazuli beads	Tape Sialk/ran	Musée du Louvre AO 30061. Excavation R. Ghirshman 1933, 1934, 197.
3rd millennium BC	Necklace of disc and keg-shaped lapis beads and other	Shahr-i Sokhta/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.595 no.77.
3rd millennium BC	Necklace with cylindrical, keg-shaped and tubular lapis lazuli beads of different quality	Tape Hissar/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.737 no. 408, pp.726-727, nos.392-394.
3rd millennium BC	Tube-shaped and rhombic beads of greyish lapis lazuli	Tape Hissar/Iran	Musche, 1992, p.133 nos.3.2-3.3.
1st half of the 3rd millennium BC	Necklace of cornelian and lapis lazuli beads	Tape Ali Abad (?)/Iran	Musée du Louvre Sb 21890: Excavations of J. E. Gautier and G. Lampre.
Unknown	22 lapis lazuli beads of ovaloid, cylindrical or disc shape	Tureng Tappeh/Iran	Musée du Louvre documetation AO 21360-21365. Graves 37,39, 43, 44.
1st millennium BC	Necklace of cylindrical lapis lazuli beads and cornelian beads	Tape Sialk/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.731 no.401.
Achaemenid	Longish ovaloid lapis lazuli bead	Pasargardae/Iran	Rehm, 1992, p.103, p.387 fig.D.3.b; Stronach, 1978, fig.102,11.
Achaemenid	Earring with lapis lazuli pendant	Pasargadai/Iran	Musche, 1992, p.273 no.6.3.3.
Achaemenid	Neck ring with lapis lazuli inlays	Susa/Iran	Musche, 1992, p.278 no.2.3.
Achaemenid	Necklace with among other one barrel shaped lapis lazuli bead	Susa/Iran	De Miroschedji, 1987, p.73 no.6.
Sasanian/Early Islamic	Ovaloid lapis lazuli bead	Siraf/Iran	Kind advice of S. Priestman, British Museum. Whitehouse, 1972, p.87.
650–851 AD	Lapis lazuli beads	Pahlauj (Mazanderan)/Iran	Abedini, 2008.

Tab. 2.2.10.2 g: Cornerless cube-shaped lapis lazuli bead from the UAE.

Date	Object	Provenance	Reference
Unknown	Small cornerless cube-shaped lapis lazuli bead.	Kush/Ras al-Khaimah/UAE	Find no. x 201. Unpublished; by courtesy of St J. Simpson.

Tab. 2.2.10.2 h: Spacing bead of lapis lazuli from Iran.

Date	Object	Provenance	Reference
100 – 700 AD (Sasanian)	Spacing bead of lapis lazuli: flat rectangular shape with three holes	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, p.187, fig.70.

Tab. 2.2.10.3 a: Chale Ghar 1, spherical gagat bead.

Find Number	Feature	Shape	Preservation	Measurements
4333e	10012/5-6	Spherical	Fragmented	D. 1.1 cm, L. 1.06 cm

Tab. 2.2.10.3 b: Chale Ghar 1, ovaloid gagat beads.

Find Number	Feature	Shape	Preservation	Measurements
1285	10012/2	Ovaloid	Complete	D. 0.94 cm, L. 0.8 cm
1835a	10013	Ovaloid	Complete	D. 0.7 cm, L. 0.7 cm

Tab. 2.2.10.3 c: Chale Ghar 1, cylindrical gagat beads.

Find Number	Feature	Shape	Preservation	Measurements
1497	10019	Cylindrical	Complete	D. 0.5 cm, L. 0.28 cm
1581	10012	Cylindrical to barrel shaped	Complete	D. unknown, L. 0.8 cm
1585a	10012	Cylindrical	Complete	D. 0.56 cm, L. 0.35 cm
Unknown	Unknown	Cylindrical	Complete	D. 0.59 cm, L 0.78 cm

Tab. 2.2.10.3 d: Chale Ghar 1, disc-shaped gagat bead.

Find Number	Feature	Shape	Preservation	Measurements
1811e	10012	Disc-shaped	Complete	D. 0.55 cm, L. 0.25 cm
1836f	10013	Disc-shaped	Complete	D. 0.5 cm, L. 0.2 cm
4324a	10012/5	Disc-shaped	Complete	D. 0.68 cm, L. 0.24 cm
4407e	10012/5	Disc-shaped	Fragmented	D. 0.48 cm, L. 0.2 cm

Tab. 2.2.10.3 e: Chale Ghar 1, rectangular and rhombic shaped gagat bead.

Find Number	Feature	Shape	Preservation	Measurements
1766c	10013/1	Rectangular	Complete	D. 0.4 cm, L. 0.48 cm
4516c	10012/6	Rhombic shaped with cut ends	Fragmented	D. 0.9 cm, L. 1.95 cm, W. ca. 0.4 cm

Tab. 2.2.10.3 f: Gagat beads from the Near East, the northern Black Sea littoral and Europe.

Date	Object	Provenance	Reference
3rd century BC	Necklace of gagat and other beads	Pusht-i Kuh (Lurestan)/Iran	Van den Berghe, 1072, p.6.
2nd century BC	Ovaloid gagat bead	Northern Black Sea littoral	Alekseeva, 1978, pl15, pl.22,51.
2nd century BC	Keg-shaped gagat bead	Northern Black Sea littoral	Alekseeva, 1978, 12, pl.20,29.
1st century AD	Keg-shaped gagat bead	Northern Black Sea littoral	Alekseeva, 1978, p.12, pl.22,49.
1st century AD	Cornerless cube-shaped gagat bead	Dura Europos/Syria	Toll, 1946, p.64, pl.XLIX, tomb 32 no.3.
1st–3rd century AD	Two cornerless cube gagat beads	Northern Black Sea littoral	Alekseeva, 1978, p.17. pl.22 nos.32 and 57.
1st half of the 1st century AD	Ovaloid or facetted gagat bead	Michajlovskaja, Kreia Kurganinsk/Northern Caucasus	Simonenko, Marčenko and Limberis, 2009, p.339, pl.20,10.
2nd half of the 1st century	Gagat beads (number and shape not stated)	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2009, p.369, p.388, pl.164,7.
Beginning of the 2nd century AD	3 small cylindrical gagat beads	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2009, p.372, p.388, pl.180,4.
100–700 AD	Cylindrical gagat bead	Qasr-i Abu Nasr/Southern Iran	Whitcomb, 1985, p.185, pl.69,gg.
Roman	Three decorated tube-shaped gagat beads	Augst/Switzerland	Riha, 1990, p.161, nos.1351-1353, pl.39 nos.1351-1353.
Roman	Two fragments of cornerless cube-shaped gagat beads	Augst/Switzerland	Riha, 1990, p.161, nos.1358-1359, pl.39 nos.1358-1359.

Tab. 2.2.10.4: Chale Ghar 1, turquoise and azurite beads.

Find Number	Feature	Material	Shape	Preservation	Measurements
1883c11	10013	Turquoise	Irregular	Complete	D. 0.9 cm, L. 1.1 cm
4320b	10012/4	Azurite	Rectangular	Fragmented	D. 0.65 cm, L. 0.7 cm
4587d	10013	Turquoise	Fragmented	Fragmented	D. 0.44 cm, L. 0.73 cm

Tab. 2.2.10.5: Chale Ghar 1, beads of various brown, red and pink stones.

Find Number	Feature	Material	Shape	Preservation	Measurements
1072	10012	Agate	Spherical	Complete	D. 2.4 cm, L. 1.7 cm
1883c12	10013	Hematite	Rectangular	Fragmented	D. 0.5 cm, L. 0.5 cm

Tab. 2.2.10.5: Chale Ghar 1, beads of various brown, red and pink stones.

Find Number	Feature	Material	Shape	Preservation	Measurements
1883c14	10013	Hematite	Fragmented	Fragmented	L. 0.6 cm
1965f	10013	Grey stone	Ovaloid	Complete	D. 1.09 cm, L. 0.3 cm, W. 0.7 cm

Tab. 2.2.10.6 a: Chale Ghar 1, limestone and marble beads.

Find Number	Feature	Material	Shape	Preservation	Measurements
1480	10019	Limestone	Disc-shaped	Complete	D. 1.8 cm, L. 0.4 cm
1611a	10012/3	Marble	Double-conical	Complete	D. 0.5 cm, L. 1.3 cm
1834b	10013/1	Limestone	Rectangular, large string hole	Complete	D. 0.7 cm. L. 0.5 cm
1872i	10013	Limestone	Disc-shaped	Complete	D. 0.37 cm, L. 0.2 cm
1883c17	10013	Limestone. Very light material	Spherical	Complete, very corroded	D. 0.63 cm, L. 0.5 cm
1883c18	10013	Limestone	Spherical	Complete	D. 0.5 cm, L. 0.36 cm
1949g	10013	Limestone	Ring shaped	Complete	D. 0.54 cm, L. 0.27 cm
1957b	10013	Limestone	Rectangular	Complete	D. 0.76 cm, L. 0.47 cm
4192	10013	Marble	Ring shaped	Complete	D. 0.8 cm, L. 0.38 cm
4274a	10012/5	Limestone or marble	Fragmented	Fragmented	D. unknown, L. 0.75 cm
4479	10012/6	Marble	Rectangular	Complete	D. 1.05 cm, L. 0.74 cm
4584b	10014	Limestone	Cylindrical	Fragmented	D. 1.2 cm, L. 1.2 cm
4584d	10014	Marble	Disc-shaped	Complete	D. 0.62 cm, L. 0.7 cm
6529a	10013	Limestone	Fragmented	Fragmented	L. 0.45 cm, L. 0.44 cm

Tab. 2.2.10.6 b: Chale Ghar 2, chalcedony beads.

Find Number	Feature	Material	Shape	Preservation	Measurements
1498	10019	Chalcedony	Spherical	Complete	D. 1.2 cm, L. 95 cm
1840	10013	Chalcedony	Spherical	Complete	D. 1.1 cm, L. 1 cm
4516b	10012/6	Chalcedony	Ovaloid	Complete	D. 1.4 cm, L. 1.85 cm
4599b	10013	Chalcedony	Irregular, un-worked surface	Complete	D. 1.35 cm, L. 0.77 cm

Tab. 2.2.10.6 c: Chale Ghar 2, chalcedony bead.

Find Number	Feature	Material	Shape	Preservation	Measurements
7214a2	11099	Chalcedony	Rectangular	Complete	D. 0.61 cm, L. 0.95 cm

Tab. 2.2.10.6 d: Chale Ghar 1, rock crystal beads.

Find Number	Feature	Material	Shape	Preservation	Measurements
1779e	10013/1	Rock crystal	Hexagonal	Complete	D. .8 cm, L. 0.6 cm
1810	10013/1	Rock crystal	Ovaloid	Fragmented (split in two halves)	D. 1.4 cm, L. 1.7 cm
4594	10013	Rock crystal	Slight double-conical with irregular hexagonal section; surface unworked	Complete	D. 1.02 cm, L. 1.23 cm

Tab. 2.2.10.6 e: Rock crystal and chalcedony beads from the Near East and the northern Black Sea littoral.

Date	Object	Provenance	Reference
3rd millennium BC	Necklace with disc-shaped rock crystal, (cornelian and lapis beads) beads	Tape Hissar/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.737 no.408.
Unknown	Two spherical beads of rock crystal	Boğazköy, Büyükkale/Turkey	Boehmer, 1972, p.223, pl.XCII,2309, 2312.
Iron Age II or III	Cylindrical rock crystal bead	Khatunban/Iran	Haerinck, Overlaet and Jaffar-Mohammadi, 2004, p.140, pl.19,Kh. B 5.
Probably 3rd–early 2nd century BC	Necklace with rock crystal beads (alongside glass paste, bitumen and yellowish stone beads)	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.64, GMIS 184; Haerinck, 1983, p.14.
1st century BC–1st century AD. AV: 25-50 and 75 AD.	Eight rock crystal beads: irregular ovaloid shapes	Ed-Dur/UAE	Haerinck, 2001, p.40 N273, pl.39,23, p.33 N23, p.37 N 196, pl. 48,27, pl.56,33, p.53 AV111 (158-160), pl.138, pl.s158-159 (3×), pl.160.
1st century BC–1st century AD	Necklace with (among other) rock crystal beads, irregular ovaloid	Shakhura Nekropolis/Bahrain	Lombard, 1999, p.201 no.335.
1st–3rd century AD	Spherical chalcedony bead	Hassani Mahala/Iran	Sono and Fukai, 1968, pl.LXIV,19.
1st – 2nd century AD	Seven irregular quartz beads	Dura Europos/Syria	Toll, 1946, p.66, tomb 33 nos.17-23, pl.L, 139
1st–5th century AD	13 Rock crystal beads	Black Sea Littoral	Alekseeva, 1982, pp.7-9, pl.15, 21, 26, pl.35,8, 10-15, 34-36.
2nd century AD	Necklace with rock crystal beads of different sizes	Coll. F.L. von Gans	Greifenhagen, 1975, p.25, pl.18,1.
Beginning of the 5th century AD?	Necklace with (among other) rock crystal beads	Coll. F.L. von Gans	Greifenhagen, 1975, p.25, pl.17,1.
^{14}C 734 ± 94 AD	Spherical chalcedony bead	Samad al Shan/Oman	Yule, 2001, p.294, pl.250,5.
8th/9th century AD	Spherical rock crystal bead	Kush/Ras al-Khaimah/UAE	Kush No. x 209. Unpublished; by courtesy of St J. Simpson.
5th–13th century AD	Spherical rock crystal bead	Kush/Ras al-Khaimah/UAE	Kush no. x 424. Unpublished; by courtesy of St J. Simpson.

2.2.11 Amber Beads

The 62 amber beads and fragments that were found exclusively in Chale Ghar 1 are in a very good condition (see also Francis, 2002, p.13). They have a honey or orange colour, and vary in size, shape and quality. A large number remain translucent, others are opaque either because that was their original state or through weathering. Some beads were manufactured very carefully (pl. 21, no. 1103b; pl. 20, 1400a; no. 1851; pl. 21, no. 4841a; 6662 and 6699c), while others are of an average quality or of an indistinct or irregular shape, or are fragmented. Only two spherical amber beads were found, whereas 26 beads are ovaloid in shape: they are flat-ovaloid or quite round in section. Furthermore, five cylindrical beads and two with a drop-shaped cross section are present in the collection.

Two groups are of especial significance: the cornerless-cube-shaped amber beads and the beads with a triangular cross section.

2.2.11.1 Spherical Amber Beads (Tab. 2.2.11.1)

Beads nos. 1454 and 1835b differ from the other amber beads from Veshnaveh in shape and size. They are the only spherical amber beads to have been found in Chale Ghar 1. No. 1835b is reddish in colour, while the other beads are mainly orange or honey-coloured.

2.2.11.2 Ovaloid Amber Beads (Tab. 2.2.11.2)

Twenty-six ovaloid amber beads are classified according to their ovaloid shape or cross section (pl. 20, nos. 1188, 1790d, 4760a). However, while one bead might also be classified as disc-shaped on account of its thinness (pl. 20, no. 1734b), it is listed among the ovaloid beads because of its oval appearance.

2.2.11.3 Cylindrical Amber Beads (Tab. 2.2.11.3)

Among six cylindrical amber beads, two beads stand out due to the care with which they appear to have been manufactured (pl. 20, nos. 1400a, 6198). They have straight sides and a symmetrical appearance.

2.2.11.4 Cornerless Cube-Shaped Amber Bead (Tab. 2.2.11.4 a)

Two cornerless cube-shaped amber beads were uncovered in Chale Ghar 1 (pl. 21, 4841a).

Interpretation of the corneless cube shaped amber beads (Tab. 2.2.11.4 b)

The cornerless cube shape appears mostly in blue glass beads of the Roman period,[27] but stone beads were also manufactured in this particular shape, like three chalcedony beads from Ed-Dur, UAE (Haerinck, 2001, p.47, AV 111, p.70, p.89 BC6; De Waele, 2008, p.5 AV 111 (166), AV 111 (167), BC6 (5)) or a number of cornelian beads from the Roman and Arsacid periods (Greifenhagen, 1975, p.21, p.33, pl.11,3-4, p.26 [?], pl.18,3-4, pl.29,4, pl.30,4; Novák, Oettel and Witzel, 2000, p.63, fig.140 K2; Mączyńska, 1997, p.107 fig. 1,2, pp.21-22, fig.2,15, p.108 fig.2, 15; Arsen'eva, Bezuglov and Toločko, 2001, pl.21,293, 299; pl.46,565-569, pl.47,588-590). These are dated to 25–50 and 75 AD and the 1st century BC to the 1st century AD. Due to the glass and stone comparison objects, and based on two fragmented cornerless cube-shaped amber beads from the Roman era, the two cornerless cube-shaped amber beads from Veshnaveh may be dated to this period, which corresponds with the Arsacid period.

2.2.11.5 Triangular Amber Beads (Tab. 2.2.11.5 a)

Eight amber beads have triangular square sections (pl. 21, no. 1883c13).

Interpretation of triangular amber beads (Tab. 2.2.11.5 b)

Beads with triangular cross sections seem to be exceptional finds. One amber bead from Moravia with a triangular cross section was found in a context dated to the La Tène period. Triangular beads found at Tanais date to 2nd half of the 2nd century – 1st half of the 3rd century AD and those found at Tell Mohammed Arab date from the 4th or 5th century AD. Perhaps this shape was rather popular in the Near East. There are earlier examples of triangle beads as from Dinkha Tappeh and one from Moravia, but more similar comparison objects from Nowruz Mahale, Tell Mohammed Arab and Qasr-i Abu Nasr, among them one glass bead, indicate the Late Arsacid and Sasanian period for beads with a triangular cross section. From Islamic Ghubayra, Iran, very similar beads of different materials are known that were made with a trianglular section (Bivar, 2000, p.12, p.234, p.250, fig.56, 71.053a-e). These beads date from the 14th century AD and indicate a long tradition of this shape.

2.2.11.6 Droplet-Shaped Amber Bead (Tab. 2.2.11.6)

Two beads stand out among the ensemble because of their droplet-shaped cross section (pl. 21, no. 1103b).

[27] See chapter about cornerless cube-shaped glass beads (subsection 2.2.1.10).

2.2.11.7 Irregularly Shaped and Fragmented Amber Beads (Tab. 2.2.11.7 a–b)

Two irregularly shaped and 15 fragments could not be classified to a shape.

2.2.11.8 Note on the Amber Beads of Veshnaveh (Tab. 2.2.11.8)

Like stone beads, the amber beads were probably drilled from two sides to avoid breakage. No. 6660 even seems to be drilled additionally, parallel to the first string hole, to make it larger. Therefore the string hole has an oval shape (D. 0.22 × 0.3 cm). Bead no. 1835b, on the other hand, has a very small string hole (D. 0.06 cm) and a slightly different colour compared to the other amber beads from Veshnaveh.

Amber beads have not been found in large numbers in the Near East. The table below shows several examples of spherical, ovaloid or other shapes. Most of the beads mentioned are indistinct in appearance and do not resemble the beads from Veshnaveh exactly. Still, they may represent a tendency towards rather small amber beads and only few spherical beads in the Near East.

Some of the amber beads from Veshnaveh have a rather flat ovaloid shape (nos. 1115b, 1188, 4668, 4760a (pl. 20), 6520). This shape is also known from stone beads, like the cornelian beads that were found in the graves of Samad al Shan, Oman (Yule, 2002, p.270, pl.175,10.4.252-253, pl.99,2.4).

Tab. 2.2.11.1: Chale Ghar 1, spherical amber beads.

Find Number	Feature	Shape	Preservation	Measurements
1454	10012	Spherical	Complete	D. 0.7 cm, L. 0.4 cm
1835b	10013	Spherical	Complete	D. 0.7 cm, L. 0.5 cm

Tab. 2.2.11.2: Chale Ghar 1, ovaloid amber beads.

Find Number	Feature	Shape	Preservation	Measurements
1115b	10012/2	Ovaloid	Complete	D. 0.7 cm, L. 0.63 cm, W. 0.4 cm
1188	10013/1	Ovaloid	Complete	D. 1.6 cm, L. 0.72 cm, W. 0.42 cm
1201	10013/1	Ovaloid	Fragmented	L. 1 cm
1206e	10013/1	Ovaloid	Complete	D. 1.1 cm. L. 1.3 cm
1219a	10013/1	Ovaloid	Complete	D. 0.33 cm, L. 0.7 cm, W. 0.6 cm
1473	10019	Ovaloid	Complete	L. 0.7 cm, W. 0.38 cm
1734b	10013	Ovaloid	Fragmented	D. 1.03, L. 0.86, Th. 0.4 cm
1790d	10013/1	Ovaloid	Fragmented	D. 0.32 cm, L. 0.6 cm
1791f	10013/1	Ovaloid	Fragmented	D. 0.62 cm, L. 0.38 cm
1964	10013	Ovaloid	Complete	D. 0.5 cm, L. 0.8 cm

Tab. 2.2.11.2: Chale Ghar 1, ovaloid amber beads.

Find Number	Feature	Shape	Preservation	Measurements
4062b	10013	Ovaloid	Fragmented	L. 1.2 cm, W. 0.68 cm
4476a	10013	Ovaloid	Fragmented	L. ca. 1.35 cm
4547a	10014	Ovaloid, rhombic section	Complete	D. 0.7 cm, L. 0.87 cm
4595a	10013	Ovaloid	Complete	D. 0.82 cm, L. 0.75 cm, W. 0.6 cm
4668	10013	Ovaloid	Fragmented	D. 1.29 cm, L. 0.93 cm
4760a	10021	Ovaloid	Complete	D. 0.84 cm, L. 0.82 cm
4760c	10021	Ovaloid	Fragmented	L. 0.66 cm
4841b	10013	Ovaloid	Complete	D. ca. 0.8 cm, L. 0.6 cm, W. 0.45 cm
6222a1	10022	Ovaloid	Complete	L. 0.72 cm, W. 0.74 cm
6520	10013	Ovaloid	Complete	D. 0.8 cm, L. 0.9 cm, W. 0.4 cm
6535	10013	Ovaloid	Fragmented	D. 0.6 cm, L. 0.9 cm
6543	10013	Ovaloid	Fragmented	D. 0.4 cm, L. 0.75 cm
6544	10013	Ovaloid	Complete	D. 0.6 cm, L. 0.7 cm, W. 0.4 cm
6660	10013	Ovaloid	Complete	D. 1.12 cm, L. 1.25 cm, W. 0.77 cm
6662, 6669c	10013	Ovaloid	Fragmented	D. ca. 0.7 cm, L. 0.78 cm
6770	10013	Ovaloid	Fragmented	D. 0.7 cm, L 1.3 cm

Tab. 2.2.11.3: Chale Ghar 1, cylindrical amber beads.

Find Number	Feature	Shape	Preservation	Measurements
1400a	10013	Cylindrical	Fragmented	D. 0.61 cm, L. 0.56 cm
1851	10013	Cylindrical	Fragmented	D. 1.35 cm, L. 0.7 cm
4571a	10013	Cylindrical	Fragmented	D. 0.5 cm, L. 0.5 cm
6198	10013	Cylindrical	Complete	D. 0.9 cm, L. 0.45 cm
6680b	10013	Cylindrical	Complete	D. 0.66 cm, L. 0.8 cm

Tab. 2.2.11.4 a: Chale Ghar 1, cornerless cube-shaped amber beads.

Find Number	Feature	Shape	Preservation	Measurements
4045	10014	Cornerless cube (?), irregular	Complete	D. 0.6 cm, L. 0.66 cm
4841a	10013	Cornerless cube	Complete	D. 0.41 cm, L. 0.5 cm

Tab. 2.2.11.4 b: Cornerless cube-shaped amber beads from the Roman Empire.

Date	Object	Provenance	Reference
Roman	Two cornerless cube-shaped amber bead	Roman Empire	Spaer, 2001, p.74, nos.48-49.

Tab. 2.2.11.5 a: Chale Ghar 1, triangular (cross section) amber bead.

Find Number	Feature	Shape	Preservation	Measurements
1766a	10013/1	Ovaloid with triangular section	Complete	D. 0.6 cm, L. 0.85 cm
1775b	10013/1	Cylindrical with slightly triangular section	Complete	D. 0.46 cm, L. 0.54 cm
1883c13	10013	Ovaloid with triangular section	Complete	D. 0.32 cm, L. 0.55 cm
1940a	10015	Ovaloid with triangular section	Complete	D. 0.52 cm, L. 0.85 cm
4759a	10021	Ovaloid with triangular section	Complete	D. 0.62 cm, L. 1.03 cm
4760b	10021	Ovaloid with triangular section	Complete	D. 0.66 cm, L. 0.59 cm
6189	10013	Ovaloid with slightly triangular section	Complete	D. 1.15 cm, L. 0.45 cm
6811a2	10013	Ovaloid with triangular section	Complete	D. 0.52 cm, L. 0.55 cm

Tab. 2.2.11.5 b: Triangular amber, cornelian and glass beads from Iran and Iraq and the Czech Republic.

Date	Object	Provenance	Reference
La Tène period	Oblong amber bead with triangular section	Ohrozim, Moravia/Czech Republic	Čižmář, 1997, p.36, fig.1 no.2.
1000–800 BC	Oblong cornelian bead with triangular section	Dinkha Tappeh/Northern Iran	Muscarella, 1974, p.65, fig. 36 o.67.
Late Arsacid	Seven rectangular or triangular amber beads	Nowruz Mahale/Iran	Egami, Fukai and Masuda, 1966, pl.19, 6, XLVIII,3-9; Musche, 1988, p.156 no.5, pl.LI,5.
2nd half of the 2nd century – 1st half of the 3rd century AD	Two amber bead with slightly triangular section	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, p.40, pl.47,583, 585.
4th to 5th century AD	Several amber beads with triangular section	Tell Mohammed Arab/Iraq	Graves 49T:24, 50S:23, 51T:05 and 09. Unpublished; personal communication M. Roaf.
100–700 AD	Flat triangle bead of 'amber glass' (glassware with yellow-brown shading)	Qasr-i Abu Nasr/Southern Iran	Whitcomb, 1985, p.185, pl.69.

Tab. 2.2.11.6: Chale Ghar 1, droplet-shaped (cross section) amber beads.

Find Number	Feature	Shape	Preservation	Measurements
1103b	10012	Ovaloid with droplet-shaped section	Complete	D. 0.87 cm, L. 0.65 cm
1400c	10013	Conical with droplet-shaped section	Complete	D. 0.8 cm, L. 0.54 cm, W. 0.45 cm

Tab. 2.2.11.7 a: Chale Ghar 1, irregular amber beads.

Find Number	Feature	Shape	Preservation	Measurements
1400b	10013	Irregular, trapezoid	Complete	D. 0.75 cm, L. 0.6 cm
4580b	10014	Irregular, triangle?	Complete	D. 1.11 cm, L. 1.15 cm

Tab. 2.2.11.7 b: Chale Ghar 1, amber (bead) fragments.

Find Numbers	Feature
1018c1, 1183a, 1649a, 1803f, 1831m, 4040a, 4333a, 4468d, 4494c2, 4494c14, 6574a, 6662, 6664, 6688c1, 6699a	10012, 10012/2, 10014, 10013/1, 10014, 10012/5-6, 10013, 10019, 10013, 10015

Tab. 2.2.11.8: Amber beads of various shapes from the Near East and the Kuban region.

Date	Object	Provenance	Reference
14th century BC	Two amber beads (no indication of shape)	Shipwreck from Uluburun/Turkey	Gülçür, 1995, p.458.
Hissar III C	Several amber beads	Tape Hissar/Iran	Schmidt, 1937, p.223.
1000–800 BC	Three ovaloid amber beads	Dinkha Tappeh/Northern Iran	Muscarella, 1974, p.65 fig.36,b, p.67, p.71 fig.45a-b.
Iron Age	Amber bead (no indication of shape)	Surkh Dum-i Luri (Lurestan)/Iran	Schmidt, Loon and Curvers, 1989, p.387 no. 735.
Achaemenid	Spherical amber bead	Kamid el-Loz/Lebanon	Poppa, 1978, p.122, pl.23,76:56, 68.
Achaemenid	Spherical amber bead	Persepolis/Iran	Rehm, 1992, p.102, p.387 fig.D.2. Schmidt, 1957a, pl. 43, 41.
Achaemenid	Planoconvex amber (indigenous) bead	Kamid el-Loz/Lebanon	Poppa, 1978, p.122, pl.23,76:68.
Not assigned to a layer	Disc- or ring-shaped amber bead	Boğazköy, Büyükkale/ Turkey	Boehmer, 1972, pl.XCVIII,2460.
2nd–1st century BC	Necklace with amber and other beads	Seleucia/Iraq	Musche, 1988, p.125, pl.XXVI-II,3-9; Yeivin, 1933, pl.XIX,4.
Late Arsacid	Two droplet-shaped amber beads	Nowruz Mahale/Iran	Egami, Fukai and Masuda, 1966, pl.19,6, XLVIII,3-9; Musche, 1988, p.156 no.5, pl.LI.5.
1st half of the 2nd century AD	Two ovaloid amber beads	Adygeen/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.376, p.389, pl.205,5.
End of the 2nd century AD	Three large ovaloid amber beads, irregular with double-conical and oval section	Adygeen/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.376, p.389, pl.205,17.
2nd half of the 2nd century – 1st half of the 3rd century AD	Four ovaloid amber beads	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, p.40, pl.47,580-582, 584.

2.2.12 Shell Beads and Beads of Various Organic Materials

Sixty-six beads were made of white shell or coral, and were shaped to become spherical, ovaloid, cylindrical, disc-shaped and rectangular artefacts, with one triangular (cross section) bead being an exception; a number of beads are irregular-shaped or fragmented. It is unclear whether the beads were made of white coral or shell; only a few beads have a smooth surface, mostly from Chale Ghar 2, and that tends to mean shell, others have a textured surface that may point to coral (pl. 21, nos. 6870b, 6909d). Most of them were found in the entrance area of Chale Ghar 1 and very sporadically in the rear chamber and a considerable number – proportionally – in Chale Ghar 2. Two mother of pearl or pearl beads were unearthed in each of the two mines, one of which has an unfinished string hole. Besides the wrought shell beads, 13 cowrie shells and one conus were found at Veshnaveh, and they obviously were provided with string holes.

A small number of beads – just nine – could not be designated as belonging to one material group, so they are brought together in one chapter. These beads are probably made of bone or clay.

2.2.12.1 Spherical Shell Beads (Tab. 2.2.12.1 a–b)

Six spherical shell or coral beads were unearthed, all in Chale Ghar 1. They are of a rather rough spherical shape with a slightly textured surface (cf. pl. 21, no. 6888a). Five irregular spherical beads resembling the ones from Chale Ghar 1 were found in Chale Ghar 2.

2.2.12.2 Cylindrical/Tube-Shaped and Ovaloid Shell/Coral Beads (Tab. 2.2.12.2 a–b)

Twenty-nine beads of slightly differing shapes that were all excavated in Chale Ghar 1 are grouped into a single table. They are cylindrical to tubular in shape (pl. 21, 6870b, 6909d) and three are of an irregular ovaloid shape (pl. 21, 6878a3). All beads have textured surfaces.

Three cylindrical beads were found in Chale Ghar 2, one of which is of a light reddish colour with a slightly textured surface (pl. 21, no. 7134b), another two of white colour with smooth surface (pl. 21, no. 7135c4).

2.2.12.3 Disc-Shaped Shell/Coral Beads (Tab. 2.2.12.3 a–b)

Each two disc-shaped beads were uncovered in Chale Ghar 1 and Chale Ghar 2. They are distinguished by their short length. Aside from that, they are distinguished by their smooth surface (pl. 22, no. 6993), while the beads discussed above all have textured surfaces.

2.2.12.4 Rectangular Shell/Coral Beads (Tab. 2.2.12.4 a–b)

Eight beads described as rectangular, and which might also be described as irregularly cylindrical, display a rectangular cross section with round edges (pl. 22, no. 6846). They have only slightly textured surfaces. One bead may be described as eye-shaped (pl. 22, no. 6871a). The two beads from Chale Ghar 2 have very smooth surfaces.

2.2.12.5 Triangular Shell/Coral Bead (Tab. 2.2.12.5)

One exceptional shell/coral bead was found in Chale Ghr 2. It has a triangular cross section similar to the amber beads that were excavated in Chale Ghar 1. Its surface is very smooth (pl. 22, no. 7226).

2.2.12.6 Irregular and Fragmented Shell/Coral Beads (Tab. 2.2.12.6 a)

Six irregularly shaped shell/coral beads were found in Chale Ghar 1. They have slightly textured to highly textured surfaces.

Interpretation of Shell/Coral Beads (Tab. 2.2.12.6 b)
Of the 66 shell or coral beads found, most have a textured surface, which might indicate that they are made of coral. On the other hand, their white colour may seem to disprove this suggestion. Although white coral exists in nature, most of the coral traded in antiquity was of the *corallium rubrum* variety (de Waele, 2007, p.304). It is worth noting that the beads that were unearthed in Chale Ghar 2 mostly have smooth surfaces. Probably, these were made of a different material, or they were subject to different conditions: The beads from Chale Ghar 1 may have been exposed to other environmental factors then those from Chale Ghar 2.

The shell/coral beads that were found at Veshnaveh are rather small, and similar to their reference finds in that respect. Either the material did not allow for the manufacture of larger beads, or small shell or coral beads were considered preferable. References to the shell/coral beads from Veshnaveh were mostly described as shell, they come from Iran, Iraq, Syria and Oman (pl. 22, Kush x 94, Siraf 252) and have been dated to the 2nd millennium BC as well as to the Islamic period. Shell beads similar to those from Veshnaveh have also been found in Africa. Probable coral beads were excavated in the Black Sea region and in Kazakhstan. Considering

these references, obviously this kind of bead enjoyed a considerable geographic and chronological distribution.

2.2.12.7 Cowry Shells (Tab. 2.2.12.7 a–b)

Four cowries were found in the entrance area of Chale Ghar 1 (pl. 23, no. 6865) and nine in Chale Ghar 2. On all, the back portions have been cut off, or string holes have been added for threading.

Interpretation of Cowry Shells (Tab. 2.2.12.7 c)
Cowries were found at many sites and from several periods. In many cases, they were found in graves, for instance in a child's grave in Samad al Shan, Oman (Yule, 2001, p.314, pl.315,1.2), where 46 shells were unearthed. Additionally E. Glover claims (quoted in Yule, 2001, p.482) that women's graves are more likely to contain cowry shells.

The shells from Veshnaveh most probably belonged to gastropods of the *monetaria moneta* species.[28] This species is of Indo-Pacific origin and has been found from the Galapagos Islands to the Indian Ocean, including the Persian Gulf. For the purpose of threading, holes were carved into the shells, or their back portion was removed.

2.2.12.8 Conus Shell (Tab. 2.2.12.8)

A single specimen of a conus shell was found in an upper layer of Chale Ghar 1 (pl. 23, no. 4403a). It has a centrally located string hole.

2.2.12.9 Mother of Pearl (Nacre) Beads (Tab. 2.2.12.9 a–b)

Only two mother of pearl beads were found, one in Chale Ghar 1 and one in Chale Ghar 2 (pl. 22, nos. 6882d, 7166c4). The lenticular one from Chale Ghar 1 has no string hole, although such a hole is hinted at by a shallow indentation. Clearly, the drilling was begun, but not finished.

Interpretation of Mother of Pearl Beads (Tab. 2.2.12.9 c)
Based on their appearance, there is obviously a difference of material between the two beads from Chale Ghar 1 and 2. Bead no. 6882d displays cracks along the unfinished string hole, and the material seems to be porous (pl. 22). These attributes attest to this bead being made of mother of pearl. This material consists mainly of calcium carbonate, an organic compound, and is built up in layers. Therefore mother of pearl is much less stable and smooth than real pearl. Probably that is why the string hole was not finished: The bead threatened to burst during the drilling process. Bead no. 7166c4 has a straight, narrow string hole and seems to have a smooth surface (pl. 22). It may be a real pearl bead.

Comparable finds are scarce, and they are mainly classified as pearl beads. Mother of pearl and pearl are preserved only under the most favourable conditions (Musche, 1992, pp.43-44). This may be the reason for there being so few pearl and mother of pearl finds.

The references date to the pre-Christian era as well as to the late Sasanian or the early Islamic period (pl. 22, Siraf 174; pl. 23, Kush x 275). This wide date range precludes a chronological classification of the pearl or mother of pearl beads from Veshnaveh. We know, however, that pearl or mother of pearl beads were popular in certain periods: In the Achaemenid era, pearls were valued more highly than gold or precious stones, as the historian Ammianus Marcellinus records (23.6.84; Musche, 1992, p.261), and during the Roman period, pearls became highly esteemed by the Romans, who paid large sums for them (De Waele, 2007, p.305).

2.2.12.10 Bone Bead (Tab. 2.2.12.10 a)

Only one bone bead was found, and it was uncovered in Chale Ghar 2. It follows the natural shape of a bone in having a cylindrical shape.

Interpretation of the Bone Bead (Tab. 2.2.12.10 b)
Bone beads were not considered very desirable in the past, although pendants, rings and bracelets were manufactured from bone in the earliest village settlements. Either bone beads were not popular in antiquity, or the few finds might reflect the focus of excavations, where more precious jewellery was given attention (Moorey, 1999, p.114). Hardly any bone beads have been mentioned in excavation reports that concern the Veshnaveh finds, except for e.g. bone beads of different shapes from excavations in Ghalekuti in Iran, the Black Sea Littoral, Meiron in Israel and Al Bustan, UAE.

2.2.12.11 Bead of Unknown Material (Tab. 2.2.12.11)

One bead has a rectangular shape with slightly cut edges, resulting in a cornerless cube shape (pl. 23, no. 1612a). The material of the bead has a structure of small holes and channels and is obviously some kind of natural material. It is noticeable that the string hole becomes narrower towards the middle (D. 0.31 cm, at the ends D. 0.34 cm), which might indicate drilling from two sides.

[28] I would like to thank Dr. S. Schneider, Bayrische Staatssammlung für Paläontologie und Geologie, Ludwig-Maximilians-Universität Munich, for his thoughts on cowries nos. 6723h, 6745 and 6787c.

Tab. 2.2.12.1 a: Chale Ghar 1, spherical shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
6740	10050	Spherical	Complete	D. 0.77 cm, L. 0.6 cm
6862	10008	Spherical	Complete	D. 0.65 cm, L. 0-.51 cm
6878b	10004	Irregular	Complete	D. 0.41 cm, L. 0.38 cm
6878b2	10004	Irregular	Complete	D. 0.43 cm, L. 0.24 cm
6888a	10004	Spherical	Complete	D. 0.37 cm, L. 0.3 cm
6926b	10004	Spherical	Complete	D. 0.38 cm, L. 0.32 cm

Tab. 2.2.12.1 b: Chale Ghar 2, shell/coral beads of irregular spherical shape.

Find Number	Feature	Shape	Preservation	Measurements
7002e	11057	Spherical	Complete	D. 1 cm, L. 0.8 cm
7002g	11057	Spherical	Complete	D. 1.1 cm, L. 0.73 cm
7137	11097	Spherical	Fragmented	D. 0.5 cm, L. 0.3 cm
7156c3	11097	Spherical	Complete	D. 0.48 cm, L. 0.32 cm
7156c4	11097	Spherical	Complete	D. 0.93 cm, L. 0.7 cm
7678	10311	Unknown, spherical?	Complete	D. 0.7 cm. L. 0.5 cm

Tab. 2.2.12.2 a: Chale Ghar 1, ovaloid, conical and cylindrical to tube shaped shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
1407	10200	Cylindrical	Complete	D. 1.1 cm, L. 0.67 cm
6612	10050	Cylindrical	Complete	D. 0.54 cm, L. 0.58 cm
6743a8	10050	Cylindrical	Fragmented	D. 0.33 cm, L. 0.27 cm
6743a9	10050	Cylindrical	Fragmented	D. 0.46 cm, L. 0.74 cm
6839	10000	Cylindrical	Fragmented	D. 0.29, L. 0.64 cm
6842	10000	Cylindrical	Fragmented	D. 0.25 cm, L. 0.9 cm
6864	10004	Cylindrical	Complete	D. 0.3 cm, L. 0.43 cm

Tab. 2.2.12.2 a: Chale Ghar 1, ovaloid, conical and cylindrical to tube shaped shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
6870b	10008	Cylindrical	Fragmented	D. 0.35 cm, L. 0.5 cm
6870c	10008	Cylindrical	Complete	D. 0.3 cm, L. 0,21 cm
6871c	10008	Cylindrical	Fragmented	D. 0.3 cm, L. 0.49 cm
6873a2	10008	Cylindrical	Complete	D. 0.33 cm, L. 0.46 cm
6874	10008	Cylindrical	Complete	D. 0.31 cm, L. 0.5 cm
6876a	10008	Cylindrical	Fragmented	D. 0.3 cm, L. 0.7 cm
6876b	10008	Flat cylindrical	Complete	D. 0.51 cm, L. 0.2 - 0.3 cm
6876c	10008	Cylindrical	Complete	D. 0.4 cm, L. 0.21 cm
6878a1	10004	Cylindrical	Fragmented	D. 0.42 cm, L. 0.45 cm
6878a2	10004	Cylindrical	Complete	D. 0.45 cm, L. 0.42 cm
6878a3	10004	Ovaloid	Complete	D. 0.34 cm, L. 0.5 cm
6885a5	10004	Cylindrical	Fragmented	D. 0.16 cm, L. 0.4 cm
6887d	10050	Ovaloid	Fragmented	D. 1.3 cm, L. 1.4 cm
6891a	10004	Cylindrical	Complete	D. 0.42 cm, L. 0.29 cm
6891c	10004	Ovaloid	Complete	D. 0.43 cm, L. 0.31 cm
6893a	10004	Cylindrical	Complete	D. 0.31 cm, L. 0.51 cm
6893b	10004	Cylindrical	Fragmented	D. 0.2 cm, L. 0.4 cm
6893c	10004	Cylindrical	Complete	D. 0.5 cm, L. 0.45 cm
6894a	10004	Conical	Complete	D. 0.25 cm, L. 0.41 cm
6894b	10004	Cylindrical	Complete	D. 0.23 cm, L. 0.46 cm
6909a	10004	Cylindrical	Complete	D. 0.59 cm, L. 0.49 cm
6909d	10004	Cylindrical	Fragmented	D. 0.42 cm, L. 0.94 cm

Tab. 2.2.12.2 b: Chale Ghar 2, cylindrical shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
7134b	11097	Cylindrical	Complete	D. 0.28 cm, L. 0.6 cm
7135c4	11097	Cylindrical	Complete	D. 0.31 cm, L. 0.27 cm
7181c3	11099	Cylindrical to barrel-shaped	Fragmented	D. 0.64 cm, L. 0.87 cm

Tab. 2.2.12.3 a: Chale Ghar 1, disc-shaped shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
6634c	10050	Disc-shaped	Complete	D. 0.55 cm, L. 0.23 cm
6993	10050	Disc-shaped	Complete	D. 1.1 cm, L. 0.5 cm

Tab. 2.2.12.3 b: Chale Ghar 2, disc-shaped shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
7002c	11057	Disc-shaped	Complete	D. 1 cm, L. 0.4 cm
7210	11097	Disc-shaped	Complete	D. 0.81 cm, L. 0.3 cm

Tab. 2.2.12.4 a: Chale Ghar 1, rectangular shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
6736	10050	Rectangular	Complete	D. 0.8 cm, L. 0.6 cm
6743a2	10050	Rectangular	Complete	D. 0.4 cm, L. 0.36 cm
6786	10050	Irregular	Complete	D. 0.51 cm, L. 0.3 cm
6846	10000	Rectangular	Complete	D. 0.75 cm, L. 0.5 cm
6871a	10008	Rectangular, eye-shaped	Complete	D. 0.5 cm, L. 0.35 cm
6905b	10004	Rectangular	Complete	D. 0.36 cm, L. 0.2 cm
6909c	10004	Rectangular	Complete	D. 0.57 cm, L. 0.5 cm
6917a1	10004	Rectangular	Complete	D. 0.36 cm, L. 0.24 cm
6921a	10004	Rectangular	Complete	D. ca. 0.6 cm, L. unknown

Tab. 2.2.12.4 b: Chale Ghar 2, rectangular shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
7136	11097	Rectangular	Complete	D. 0.41 cm, L. 0.3 cm
7181c4	11099	Rectangular	Fragmented	D. 0.43 cm, L. 0.35 cm

Tab. 2.2.12.5: Chale Ghar 2, shell/Coral bead of triangle shape.

Find Number	Feature	Shape	Preservation	Measurements
7226	11097	Triangular	Complete	D. 0.8 cm, L. 1.15 cm

Tab. 2.2.12.6 a: Chale Ghar 1, irregular and fragmented shell/coral beads.

Find Number	Feature	Shape	Preservation	Measurements
4187d	10012	Fragmented	Fragmented	D. unknown, L. 0.85 cm
6274a4	10022	Irregular	Fragmented	Unknown
6560b1	10050	Fragmented	Fragmented	D. 0.46 cm, L. 0.72 cm
6743a5	10050	Irregular	Complete	D. 0.62 cm, L. 0.5 cm
6743a6	10050	Irregular	Complete	D. 0.46 cm, L. 0.41 cm
6891b	10004	Irregular	Complete	D. 0.5 cm, L. 0.42 cm

Tab. 2.2.12.6 b: Shell and coral beads from the Near East and adjacent regions.

Date	Object	Provenance	Reference
1350 – 300 BC	6 disc-shaped shell beads	Al Maysar/Oman	Yule, 2001, p.152, p.226, pl.13,9.1, pl.14,30.10.
6th – middle of the 5th century BC	2 very flat disc-shaped beads	Surkh Dum-i Luri/Iran	Overlaet, 2000, p.36, pl.230,ah-ai.
Last quarter of the 6th – middle of the 5th century BC	31 disc-shaped shell beads	Tappeh Guran/Iran	Thrane, 2001, p.117, pp.112-114, pl.67 nos.43-49, pl.68 nos. 60-61, 63-74, 81, 83-88, 91-93, 106-111, 114-115.
3rd – 2nd century BC	1 cylindrical, slightly crooked coral (?) bead	Tanais/Russia	Alekseeva, 1982, pl.43,48
300 BC – 200 AD	33 disc-shaped shell beads with biconcave and biconvex rim	Samad al Shan/Oman	Yule, 2001, p.163, 351, pl.426,3.2, 3.4.
300 BC – 1000 AD	193 biconcave, cylindrical, ovaloid and disc-shaped shell beads	Samad al Shan/Oman	Yule, 2001, p.235, pl.40-41,1.1-1.3, p. 253, pl.99,2.18, p.291, pl.241,16.4, 16.7, 16.8.
Roman	Cylindrical coral (?) bead	Black Sea Littoral	Alekseeva, 1982, pl.43,29.

Tab. 2.2.12.6 b: Shell and coral beads from the Near East and adjacent regions.

Date	Object	Provenance	Reference
1st century BC – 1st century BC	21 cylindrical to ring-shaped shell beads	Ed-Dur/UAE	Haerinck, 2001, pl.45,18-22, 28-34, 37-45.
1st – 2nd century AD	One barrel-shaped, one cylindrical shell bead	Dura Europos/Syria	Toll, 1946, p.60 no.60, p.75 no.78 pl.XLVIII, pl.LII,40-I.86, tomb 46 no.23, pl.LVI.
1st century BC – 3rd century BC	1 barrel-shaped shell bead	Dura Europos/Syria	Rostovzeff, et al., 1946, p.86 no.23, pl.LVI.
4th century AD	Triangle (section) shaped coral (?) bead	Black Sea Littoral	Alekseeva, 1982, pl.43,27.
3rd – 2nd century AD	Necklace of coral beads	Konyr-Tobe/Kazakhstan	Popescu, Antonini and Baipakov, 1988, p.242 no.526.
4th – 5th century AD	88 shell beads	Tell Mohammed Arab/Iraq	Kind advice from M. Roaf
1st – 2nd century AD and 7th – 8th century AD	43 irregular to square shell beads. Some have an almost eye-shaped section.	Kush/UAE	Courtesy of the British Museum
Pre-Islamic	1 cylindrical shell bead	Siraf/Iran	Courtesy of the British Museum
Islamic	2 disc-shaped shell beads	Kilwa/East African Coast	Chittick, 1974, pl.I, selected beads, top.

Tab. 2.2.12.7 a: Chale Ghar 1, cowries with string hole.

Find Number	Feature	Type	Preservation	Measurements
6723h	10050	Cowry with string hole	Complete	L. 1.55 cm
6745	10050	Cowry with string hole	Complete	L. 1.5 cm
6787c	10050	Cowry with string hole	Complete	L. 1.7 cm
6865	10008	Cowry with string hole	Complete	L. 1.4 cm

Tab. 2.2.12.7 b: Chale Ghar 2, cowries with string hole.

Find Number	Feature	Type	Preservation	Measurements
7122	11097	Cowry with string hole	Complete	L. 1.71 cm
7124	11097	Cowry with string hole	Complete	L. 2.05 cm
7125	11097	Cowry with string hole	Complete	L. 1.51 cm
7156c8	11097	Cowry with string hole	Complete	L. 1.79 cm
7158	11099	Cowry with string hole	Complete	L. 1.81 cm
7211	11097	Cowry with string hole	Complete	L. 1.72 cm
7212	11099	Cowry with string hole	Complete	L. 1.53 cm
7227	11097	Cowry with string hole	Complete	L. 1.88 cm
7310	11103	Cowry with string hole	Complete	L. 1.4 cm

Tab. 2.2.12.7 c: Finds of Cowry shells, with string holes, from the Near East and adjacent regions.

Date	Object	Provenance	Reference
Late 2nd/early 1st millennium BC	19 cowry shells with cut-off back portion	Ghalekuti I/Iran	Egami, Fukai and Masuda, 1965, pl.LXXV, 83.
Iron Age	111 cowry shells	Surkh Dum-i Luri/Iran	Schmidt, Loon and Curvers, 1989, pl.230.
Iron Age	7 cowry shells, cut-off back portion	Tell Michal/Israel	Herzog, Rapp Jr. and Negbi, 1989, pl.79,2.
1000–800 BC	1 cowry shell with string hole	Dinkha Tappeh/Iran	Muscarella, 1974, p.65, fig.36,h.67.
Achaemenid/Seleucid	Collier with different beads and one cowry shell	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.82,GMIS 615,b.
Terminus post quem 450/440 BC – probably 370/60 BC	1 cowry shell, upper part cut off; a bead inside	Kamid El-Loz/Lebanon	Poppa, 1978, p.86, pl.11,13:20.
3rd–early 2nd century BC	3 cowry shells with string hole	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.79,GMIS 603, pl.108,4, Haerinck, 1983, p.14.
1st century BC–1st century AD	6 cowry shells, cut-off back portion	Ed-Dur/UAE	Haerinck, 2001, p.37 N178, p.38 N223, pl.45,70, 71.42 AV 26, pl.79,5.47 AV 106, pl.106,220.50 AV 21 (4 beads), pls146-147,21.
Arsacid	1 cowry shell	Palmyra/Syria	Musche, 1988, p.157, pl.LI,20; Michalowski, 1960, 201, fig.224; Fellmann, 1975, pl.14, 31.
3rd–5th century AD	3 cowry shells with string hole	Konyr-Tobe/Kazakhstan	Popescu, Antonini and Baipakov, 1998, p.242 no.528.
100–700 AD	2 cowry shells with string hole	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, p.187, fig.70,t, v.
300 BC–1000 AD	49 cowry shells with string hole (cypraea sp., olivia sp., (?) conus sp., morula sp.)	Samad al Shan/Oman	Yule, 2001, p.314, pl.315,1.2, p.354, pl.441,2.
200–600 AD	2 cowry with string hole. Cypraea annulus or moneta	Samad al Shan/Oman	Yule, 2001, p.241, pl.60,1.6.
Islamic	4 Cypraea moneta	Ghubayra/Iran	Glover and Taylor, 2000, p.263 nos.264, 266-267, 269.
10th century AD	1 cowry shell; imported	Kyzylkala/Ustyurt Plateau	Samashev, et al., 2007, p.292.
Unknown	1 cowry shell with opening for string hole	Black Sea Littoral	Alekseeva, 1982, p.30, pl.43,19.

Tab. 2.2.12.8: Chale Ghar 1, conus shell with string hole.

Find Number	Feature	Type	Preservation	Measurements
4403a	10012/5	Conus sp.	Complete	D. 0.93 cm, L. 0.48 cm

Tab. 2.2.12.9 a: Chale Ghar 1, mother of pearl bead with an unfinished string hole.

Find Number	Feature	Shape	Preservation	Measurements
6882d	10004	Lenticular; string hole indicated, but not finished	Complete	D. 0.30 cm, L. 0.15 cm

Tab. 2.2.12.9 b: Chale Ghar 2, mother of pearl bead with string hole.

Find Number	Feature	Shape	Preservation	Measurements
7166c4	11099	Ovaloid	Complete	D. 0.41 cm, L. 0.25 cm

Tab. 2.2.12.9 c: Pearl and mother of pearl beads from Iran and the UAE.

Date	Object	Provenance	Reference
5th – 4th century BC	Necklace with pearls and other beads	Susa/Iran	Public exhibition of the Musée du Louvre Sb 9374. Excavation of R. Mecquenem
3rd – 2nd century BC	Several pearl beads	Masjid-e Suleiman/Iran	Haerinck, 1983, p.14, pl.75,G-MIS 690.
1st century BC – 1st century AD	1 irregular spherical pearl bead	Ed-Dur/UAE	Haerinck, 2001, p.70 BC 6(2), pl.185,2.
4th – 5th century AD	1 spherical pearl bead	Tell Mohammed Arab/Iraq	Kind advice from M. Roaf, Grave 51 T: 09, no. 230.
Late Sasanian/Early Islamic	1 mother of pearl bead	Siraf/Iran	Courtesy of the British Museum. Whitehouse 1972, 84.
Kush period IV and VIII	2 spherical pearl or mother of pearl beads	Kush/UAE	Courtesy of the British Museum. Kush nos. x 141, x 275.

Tab. 2.2.12.10 a: Chale Ghar 2, bone bead.

Find Number	Feature	Material	Shape and Preservation	Measurements
7181c5	11099	Bone	Cylindrical, complete	D. 0.4 cm, L. 0.6 cm

Tab. 2.2.12.10 b: Bone beads from Iran, the Near East and the Black Sea littoral.

Date	Object	Provenance	Reference
Achaemenid, terminus post quem 4th century BC	3 bone beads of triangular, spherical and double-conical shape. Necklace of cylindrical bone beads of different length	Ghalekuti/Iran	Sono and Fukai, 1968, pl.LXXXV,20-22, necklace 23-25.
4th century BC – 2nd century AD	Barrel-shaped bone bead	Black Sea Littoral	Alekseeva,1982, pl.46,81.
180 – 324 AD	Ring-shaped bone bead	Meiron/Israel	Meyers, Strange and Meyers, 1981, pp.232-233 no. r723670, pl.9.21,9.
300 BC – 1000 AD	Barrel-shaped bone bead	Al Bustan/UAE	Yule, 2001, p.372, pl.486,10.2.

Tab. 2.2.12.11: Chale Ghar 1, cornerless cube-shaped bead of unknown material.

Find Number	Feature	Material	Shape and Preservation	Measurements
1612a	10012	Natural material of blackish yellowish orange 13-4-8 colour, coral?	Cornerless cube-shaped, fragmented	D. 0.65 cm, L. 1.3 cm

2.3 Pendants

2.3.1 Glass Pendants

One group was categorised as pendants due to their off-centre string holes (Sasse and Theune, 1995, p.78, fig.3). In the case of the eleven glass pendants that were found at Veshnaveh, the holes are at the narrow end of the objects with one exception at the broad part (pl. 23, no. 1848). Among the glass objects, four blue, one yellow and three multi-coloured pendants of conical shape were unearthed in Chale Ghar 1; as well as one drop-shaped brown pendant and two blue lunula pendants. The latter have eyelets instead of string holes.

On the basis of comparable finds the lunulae, the multi-coloured pendants and the brownish bag-shaped glass pendant could be given chronological ranges. Colour may have played a significant role in the case of these simple shaped pendants. The colour blue is of especial importance, as will be considered below (subsection 5.3.5).

2.3.1.1 Blue and Yellow Conical Glass Pendants (Tab. 2.3.1.1 a–b)

Three conical blue glass pendants were found in Chale Ghar 1 that belong to one category, 1872p, 4189b and 6151a2 (pl. 23). However, no. 1872p is very fragmented. It is therefore unclear whether it is a pendant or a bead. Its appearance, however, resembles a similar blue conical pendant. The pendants are of a conical shape with a rectangular cross cut; the string hole is located at the narrow end of the cone.

The material and condition of the three fragments seem to be very similar and nos. 1872p and 6151a2 (pl. 23) even have exactly the same colour, blackish blue 31-0-8, although they were unearthed in different parts of Chale Ghar 1– in the main and in the rear chamber, respectively.

One pendant of a turquoise-like colour has its string hole in the broader part of the pendant, indicating that it would hang with the tip downward (pl. 23, no. 1848). This pendant has a decoration of wavy lines that meander around the artefact. Unfortunately, this decoration is much corroded and its colour not discernable anymore.

One yellow pendant is of an irregular conical shape with the string hole in the tapered end. Stripes and the direction of air bubbles indicate that this pendant was manufactured from drawn glass (pl. 23, no. 1883c26).

Interpretation of Blue and Yellow Conical Glass Pendants (Tab. 2.3.1.1 c–d)

Conical pendants of monochrome, especially blue glass are known mainly from the Hellenistic period in the Eastern Mediterranean region and the Near East. These simple pendants appear as late as the Sasanian period, as finds from Tell Mohammed Arab show. The colour of these pendants suggest that they have been invested with apotropaic powers similar to those of the monochrome glass beads. The colour blue was supposed to ward off the evil eye (cf. subsection 5.3.5). Such pendants might have been worn on a string around the neck or perhaps around the wrist, as in the case of the blue pendant from Ed-Dur that was found in a female grave, where it had been placed near the neck and close to the right hand (Haerinck, 2001, pp.25-26).

The turquoise glass pendant from Chale Ghar 1 (pl. 23, no. 1848) resembles the bird pendants that were found in Dura Europos. Yellow pendants have not been found frequently. One comparandum from the Northern Black Sea Littoral of yellow colour also carries a decoration.

2.3.1.2 Brown Bag-Shaped Glass Pendant (Tab. 2.3.1.2 a)

One unique brown glass pendant was found in the rear chamber of Chale Ghar 1 (pl. 23, no. 6044). It is made of translucent glass and has a large string hole in a slightly narrowing part. Its appearance resembles amber.

Interpretation of Brown Bag Shaped Glass Pendant (Tab. 2.3.1.2 b)

The droplet-shaped pendant is characterised by its fairly round body and brownish highly translucent glass. A possible dating is suggested by two similar pendants from the Eastern Mediterranean region of the 1st century BC – 1st century AD period, one from the Kuban region and one from Tanais, both of the 1st century BC. The brownish to yellowish colours of the pendants suggest that amber was imitated. Bag-shaped amber pendants are known from the Roman period, which corresponds with the Arsacid era like one example from Germi (pl. 23; cf. paragraph 2.2.11.2).

2.3.1.3 Blue Lunula-Shaped Glass Pendants (Tab. 2.3.1.3 a)

Two pendants in the shape of an upside down lunula were found in Chale Ghar 1. They have eyelets instead of string holes.

Pendant no. 1965g (pl. 24) from the main chamber of Chale Ghar 1 is decorated in a manner resembling the eye decoration of the beads with pressed in eyes (cf. subsection 2.2.6.1). The eyes consist of irregularly shaped white rings with a blue centre that is filled by the basic glass of the bead. No. 6084 (pl. 24), found in the rear chamber, originally had a decoration of curved lines. The glass of this decor is so much corroded that its exact colour is no longer discernible.

Interpretation of Lunula-Shaped Glass Pendants (Tab. 2.3.1.3 b)

Lunula-shaped pendants, worn upside down, are known from earliest times in Persia and Mesopotamia. Such pendants, made of stone or precious metals, have been found at Susa, Tappeh Hissar and Tell al-Deylam. Crescent-shaped glass pendants seem to appear at Dura Europos in 1st century BC and have also been found at Sasanian Qasr-i Abu Nasr and early Islamic Nishapur. Obviously, crescent-shaped glass pendants came into use in the last centuries BC and were produced until well into the Islamic period in the Near East. For the blue pendants from Veshnaveh, the Arsacid and Sasanian periods are likely datings.

The crescent moon was a symbol of the goddess Sīn in the ancient East (Seidl, 1957-1971, p.485) and was then a tool to ward off the evil eye, as it still is today (Kötting, 1954, cols.474-475). The colour blue and the eye motif may have been believed to enhance this protective property.

2.3.1.4 Multicoloured Oval Glass Pendants (Tab. 2.3.1.4 a)

Three ovaloid pendants are made of parallel wavy layers of differently coloured glasses (pl. 24, nos. 4496a, 6837a): translucent brown, opaque and translucent white and slightly translucent blue glass. The string hole is positioned off-centre of the brown glass. The pendants are made of similar colours with slightly different arrangements. The hue of the glasses also is different. Perhaps the pendants were either not made in the same workshop or of the same (coloured) glass.

Interpretation of Multicoloured Glass Pendants (Tab. 2.3.1.4 b)

The multicoloured conical pendant is a common type but, according to M. Spaer (2001, p.164), the archaeological sources are few. Based on finds from Delos, she suggests the Aegean region as their most likely provenience, but also that such pendants were probably manufactured in different regions, including Persia. In that case, the finds from Veshnaveh would confirm Spaer's hypothesis. These pendants clearly belong to a well-known type that was produced often, in a specific range of colours. They were perhaps intended as imitations of stone, maybe agate, beads.

M. Spaer (2001, p.164) describes the manufacture of these pendants as involving a 'multistage technique that required considerable skill. Presumably, the pendants are sections cut from pre-manufactured canes that were subsequently reheated, tooled to shape (possibly with the aid of some simple molding implements), and rod-pierced.'

The three pendants found in Chale Ghar 1, as well as three pendants from Gilan, display zones of brown or ochre, white, and blue glasses, while the objects of comparison from the Aegean region and the Black Sea littoral have a different combination of colours, being fashioned from yellow, green and blue glasses. All pendants, however, are distinguished by the consistent separation of the coloured glasses by white glass. Certain colours seem to have been preferred in certain regions, possibly brown and blue in Northern Persia. Probably these pendants were supposed to mimic apotropaic agate stone beads.

Comparisons, alongside the findings of M. Spaer, allow the multicoloured pendants to be dated to the Arsacid period.

Tab. 2.3.1.1 a: Chale Ghar 1, blue glass pendants.

Find Number	Feature	Material	Shape and condition	Measurements
1872p	10013	Translucent blackish blue 31-0-8 glass	Fragment of conical pendant; corroded	L. (preserved) 0.23 cm
1848	10013	Opaque glass, dark green blue 31-39-7	Conical pendant with rectangular diameter; decoration of wavy lines partly corroded	D. 0.46 cm, L. 1.1 cm, W. 0.7 cm
4189b	10012	Translucent grey ultramarine 29-2-6 glass	Fragment of rectangular cone pendant; corroded	D. 0.43 cm, L. 0.55 cm
6151a2	10022	Translucent blackish blue 31-0-8 glass	Fragmented conical pendant; corroded	D. 0.5 cm, L. 1.2 cm

Tab. 2.3.1.1 b: Chale Ghar 1, yellow glass pendant.

Find Number	Feature	Material	Shape and condition	Measurements	Technical specifics
1883c26	10013	Opaque yellow glass	Ovaloid to conical pendant	D. 0.48 cm, L. 0.95 cm	Drawn glass

Tab. 2.3.1.1 c: Blue conical glass pendants from the Near East, the eastern Mediterranean region and the Black Sea littoral.

Date	Object	Provenience	Reference
Persian or later	Two conical pendants of translucent dark violet-blue glass	Eastern Mediterranean region (?)	Spaer, 2001, p.164 nos.293-295, pl.24,293-295.
Persian or later	Three conical pendants of purple/black, dark blueish-green and yellowish colourless glass	Eastern Mediterranean region (?)	Spaer, 2001, p.164 nos.299-300, pl.24,299-300.
Hellenistic to Roman	Pendant of pale blue glass (?), conical	Samaria/Palestine	Crowfoot, Crowfoot and Kenyon, 1957, p.393 fig.92,45, p.396.
1st century BC – 1st century AD	Conical pendant of blue glass	Ed-Dur/UAE	Haerinck, 2001, pp.25-26, N281; De Waele, 2008, p.42, N281.
1st – 3rd century AD	39 small shell-shaped pendants of blue opaque glass ('paste')	Karanòg/Egypt	Woolley, 1910, no.7826A.G278.
1st – 3rd century AD	Two monochrome conical glass pendants	Hassani Mahale (Dailaman)/Iran	Sono and Fukai, 1968, pl.LX-IV,15-16.
1st – 2nd century AD	Bird-shaped pendant made of glass	Dura Europos/Syria	Rostovzeff, et al., 1946, p.76 nos.81-84, pl.II, tomb 49-I.
4th – 5th century AD	Conical pendant of glass, elliptical with hole in the narrow end	Tell Mohammed Arab/Iraq	Kind notification by M. Roaf.
Unknown	Conical pendant of opaque blue and translucent blue glass	Northern Black Sea littoral	Alekseeva, 1978, p.44, pl.27,75.

Tab. 2.3.1.1 d: Yellow conical pendant from the Black Sea littoral.

Date	Object	Provenience	Reference
1st century BC – 1st century AD	Conical glass pendant; yellow with white stripes	Northern Black Sea littoral	Alekseeva, 1978, p.44, pl.27,70.

Tab. 2.3.1.2 a: Chale Ghar 1, brown glass pendant from Chale Ghar 1.

Find Number	Feature	Material	Shape and condition	Measurements
6044	10022	Translucent light chrome yellow 6-0-3 glass	Bag-shaped fragment of pendant; corroded	D. 0.65 cm, L. 1 cm

Tab. 2.3.1.2 b: Translucent droplet-shaped pendants from Russia and the eastern Mediterranean region.

Date	Object	Provenience	Reference
1st century BC	Bag shaped glass pendant of amber coloured glass	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.61,757.
3rd century BC – 3rd century AD	Light brownish translucent glass pendant, bag shaped	Germi/Iran	The National Museum of Iran, Tehran, no. 3500.
1st half of the 1st century BC	Bag-shaped glass pendant	Voroncovskaja/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.343, pl.52,4.
1st century BC – 1st century AD	Two bag or jar-shaped pendants of yellowish colourless and translucent light green glass	Eastern Mediterranean region	Spaer, 2001, p.163 nos.290-291, pl.24,290-292.

Tab. 2.3.1.3 a: Chale Ghar 1, blue lunula-shaped pendants.

Find Number	Feature	Material	Shape and condition	Measurements
1965g	10013	Opaque blue glass with white eye decoration	Lunula shaped pendant	L. 1.3 cm, W. 1.3 cm
6084	10022	Opaque dark blue 31-0-7 glass; trail decoration	Lunula shaped pendant; corroded decoration	D. 0.99 cm, L. 1 cm

Tab. 2.3.1.3 b: Lunula-shaped glass pendants from Iran, the Near East and the Black Sea littoral.

Date	Object	Provenience	Reference
3300–3100 BC	Necklace of beads and lunula-shaped limestone pendants	Susa/Iran	Musée de Louvre Sb 4890. Excavation of J. de Morgan.
2095–1939 BC. Old Elamite period	Copper lunula pendant	Tappeh Hissar/Iran	Musche, 1992, p.133, pl.XL-VI,3.3; Schmidt, 1937, p.224 fig.133b, p.225 fig.134.
Terminus ante quem 1600 BC, early Kassite period	Golden lunula pendant with granule decoration	Dilbat (Tell al-Deylam)/Iraq	Maxwell-Hyslop, 1971, p.89, pls.61-64, no.47 l.
1st century BC	Lunula-shaped pendant of green glass	Dura Europos/Syria	Musche 1988, p.172; Rostovzeff, 1946, pl.XLIII.
25–50 and 75 AD	Fragmented lunula-shaped pendant made of glass (?)	Ed-Dur/UAE	Haerinck, 2001, p.50 AV20, pls.146-147,3.
130/150 AD–1st half of the 3rd century AD	Reliefs, lunula-shaped pendants, worn by women	Palmyra/Syria	Musche, 1988, pp.119-120, pl.XXIII,1.5-1.7; Ingholt, 1928, pl.XVI,3, pl.XV,2.
3rd century and 2nd half of the 3rd–the 4th century AD	Two bronze or lead pendants in the shape of a lunula	Northern Black Sea littoral	Alekseeva, 1982, pp.25-26, pl.42,1-2.
100–700 AD. Sasanian	Two lunula shaped pendants one of yellow glass; other one, colour unknown	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, p.187, fig.70,c-d.
9th–10th century AD	Lunula pendant made of gold sheet	Nishapur/Iran	Jenkins and Keene, 1982, p.23 no.5.

Tab. 2.3.1.4 a: Chale Ghar 1, multicoloured oval pendants.

Find Number	Feature	Material	Shape and condition	Measurements
4496a	10014	Parallel wavy layers of translucent orange brown (11-13-6) and opaque dark cobalt blue (31-33-7) and white (1-0-6) glasses	Pendant of long oval shape, complete	D. 0.4 cm, L. 0.1 cm
4586e	10013	Parallel wavy layers of translucent dark brown ochre (9-11-7), green white (1-39-6), opaque white (1-0-6) and translucent (?) blackish blue green (39-31-8) glasses	Pendant of long oval shape, complete	D. 0.38 cm, L. 1.15 cm
6837a	10000	Parallel wavy layers of translucent brown, opaque white 1-0-6, translucent white, opaque white 1-0-6 and translucent (?) blue glasses	Pendant of long oval shape, complete	D. 0.35 cm, L. 0.84 cm

Tab. 2.3.1.4 b: Multicoloured pendants from Iran, the Black Sea littoral and the Aegean region.

Date	Object	Provenience	Reference
Late Hellenistic/Early Roman period	13 conical pendants made of layers of differently coloured glasses (colourless, brown, yellow, blue) separated by white bands	Aegean region?	Spaer, 2001, p.164 no.296.
1st–2nd century AD	Conical pendant of layers of translucent brown coloured, yellow and dark green glass	Crimea, Taman peninsula/Russia	Alekseeva, 1978, p.44, pl.27,73.
1st half of the 1st century BC	Two double conical glass pendants	Voroncovskaja, Kuban region/Russia	Simonenko, Marčenko and Limberis, 2008, p.343, pl.52,4
2nd century AD	Conical pendant of layers of opaque light green, white and translucent dark blue glass	Crimea, Taman peninsula/Russia	Alekseeva, 1978, p.44, pl.27,72.
1st–3rd century AD	Three conical pendants of layers of brown, white and blue glasses	Gilan/Iran	Fukai, 1977, pl.48, bottom left.
Unknown	Pointed conical pendant of layers of blue, green and white glass	Northern Black Sea littoral	Alekseeva, 1978, p.44, pl.27,71.

2.3.2 Metal Pendants

The metal pendants excavated at Veshnaveh consist of two kinds of metals: gold and bronze. There are golden pendants of pomegranate shape, which have been appraised by their technical conditions as well as by their appearance. Other golden pendants are of a lens shape or fragmented. The latter are summarised under the heading 'miscellaneous pendants'. One golden pendant with an inlay of turquoise stone sticks out from the assemblage, but unfortunately cannot be dated now.

Quite interesting are the bronze bell pendants, which could be ranged in due to their shape and decoration. Two further bronze pendants with decoration will be presented here, although they could not be classified due to the corrosion of one and a lack of exact comparisons for the other.

2.3.2.1 Golden Pomegranate Pendants (Tab. 2.3.2.1 a)

Three golden pomegranate pendants and two fragments, which seem to have belonged to a single piece, were found in mine 1. A spherical body, a cylindrical extension, attached granules or petals mimic the shape of the fruit (pl. 24, nos. 1250, 1768a, 4666a). The golden corpus of each pendant is composed of two halves, made out of gold foil; thus they are not solid, but hollow.

Interpretation of Golden Pomegranate Pendants (Tab. 2.3.2.1 b)

Pomegranate pendants or earrings feature prominently in the Near East from early times onwards, as Iranian examples from Tappeh Marlik, Susa and Amlash demonstrate.[29] During the periods concerning these archaeological sites, such pomegranates seem to have been decorated elaborately or used in large quantities. In later times, i. e. in the Arsacid and Sasanian periods, these pendants appear to have become more simple. Their decorations become more restrained: sometimes, a single granule appears to represent the calyx of the pomegranate, and earrings mostly consist of single fruits.

The parallels suggest that pomegranate pendants formed part of earrings rather than of necklaces. Support for this assumption can be drawn from figurative illustrations as they are found e.g. on Palmyrenian tomb reliefs (Musche, 1988, pp.60-51, figs.1-2) or on a Late Assyrian bronze coffin (Rehm, 1992, p.445 fig.46; Curtis, 1983, pl.XXVIIIf). Here, earrings with pomegranate pendants are depicted on one individual's earlobe. Their possible use in necklaces, however, should not be discounted, as a relief depicting the Assyrian king Ashurnasirpal shows, but it seems to be less frequent (Maxwell-Hyslop, 1971, fig.118). However, one necklace from the northern Black Sea region is made with several pomegranate-pendants (Mordvinceva and Treister, 2007, p.41 A230.1).

Due their rather plain appearance and the comparisons listed in tab. 2.3.2.1 b, the pomegranates from Veshnaveh belong to the Arsacid-Sasanian period.

2.3.2.2 Golden Pendant with Turquoise Inlay (Tab. 2.3.2.2 a)

One pendant consisting of a golden setting with an inlay of greenish-blue turquoise was unearthed in the entrance area of Chale Ghar 1. The pendant is shaped like a teardrop (pl. 24, no. 6919). Its golden setting is flattened at the rear and encases the stone like a cloak tapering off into a rectangular wire, which is bent to form an eyelet. The stone lies loose in the setting, the latter having become slightly deformed and the metal fragmented.

Interpretation of the Golden Pendant with Turquoise Inlay (Tab. 2.3.2.2 b)

Because of a lack of distinct parallels, it is not possible to date this object conclusively. It seems clearly enough to be of Iranian origin on account of the local turquoise sources, which have existed at Baghoo and Nishapur since antiquity (Schindler, 1884; Iran National Museum 2001, Map of Various Mines in Iran). However, one piece corresponding to the one in question here was found in tomb 4004 at Lachish. According to Maxwell-Hyslop (1971, pl.101,138) it is of the Late Bronze Age Period III, 1225 – 1175 BC; it is made of a droplet-shaped, light-coloured stone in a metal setting, with this middle part being further decorated with collateral extensions of metal and stone. This artefact belongs to a period before activities had even started at Veshnaveh, but it shows a resemblance to our turquoise and gold piece. One parallel, however, is not enough to indicate that such droplet-shaped pendants with stone inlays would have been well known in the Near East.

2.3.2.3 Miscellaneous Gold Pendants (Tab. 2.3.2.3 a)

Several very differently shaped objects are introduced in the following:

- One hollow lenticular pendant has a fairly small hole for a string off-centre (pl. 25, no. 4663).
- Another is made of gold wire and bent to a loop with two threaded rings (pl. 25, no. 1993b). References concerning these two objects are scarce.

[29] Marlik (late 2nd – early 1st millennium BC): Negahban, 1964, pp.37-38, p.49 fig.78. Susa (8th–7th century BC): Maxwell-Hyslop, 1971, fig.211. Amlash (?) (9th–7th century BC): Maxwell-Hyslop, 1971, p.198 fig.153.

- A third pendant is badly deteriorated, but still leaves some room for interpretation. It is a small fragment of gold sheet, decorated with vertical grooves (pl. 25, no. 1212g). The oval eyelet, made of round wire, was soldered onto the sheet at both ends. Only the remainders of the gold sheet surrounding the eyelet are preserved today.

Interpretation of Miscellaneous Golden Pendants (Tab. 2.3.2.3 b)

An initial idea concerning pendant no. 1212g (pl. 25), that may have belonged to an earring, might be to compare it with the so-called 'bag-shaped' gold pendants, as were found at Troy and Eskiyapar (Danilowa, 1996, p.117 no.125, p.136, nos.155, pp.200-202; Musche, 1992, pp.117-120). However, in that case, the eyelet would have been attached to the sheet like a handle at either side of the bag's 'opening', so that it would form a kind of basket. In contrast the piece from Veshnaveh was made of one repoussé decorated gold sheet, fitted with an eyelet that was soldered onto the sheet.

The lenticular bead seems to resemble personal ornaments for attachment to clothes, like those probably originating in Greek Bactria (see tab. 2.3.2.3.b).

2.3.2.4 Decorated Bronze Pendants (Tab. 2.3.2.4 a)

Two bronze pendants with decoration were excavated at Veshnaveh (pl. 25, nos. 1872e, 6840). The ovaloid one is quite corroded, but displays reddish rhombic patterns. The other one consists of a rectangular 'body' with a simple decoration of grooves and a spherical 'head' which simultaneously forms the string hole.

Interpretation of Bronze Pendants (Tab. 2.3.2.4 b)

There are no comparison objects for either the ovaloid or the rectangular bronze pendant from Veshnaveh. However, the latter (pl. 25, no. 6840) may represent an abstract figure with a body and a head, like a small bronze pendant from Aï Khanoum; or it may be a simple geometrical shape, like a pendant from Tell Sheikh Hamad (see tab. 2.3.2.4 b). The decoration of the incised dots recalls the ornament of five rectangular copper beads from Ed-Dur. Perhaps this, together with the comparison object from Tell Sheikh Hamad, points to a dating to the Arsacid period for the rectangular pendant.

2.3.2.5 Bronze Bell Pendants (Tab. 2.3.2.5 a)

Two conical bronze bells were unearthed in Chale Ghar 1, one with its clapper preserved (pl. 25, no. 1739). One of them is visibly decorated with horizontal grooves or lamellae, the other is too corroded for its decoration to be discernible with any accuracy.

Interpretation of Bronze Bell Pendants (Tab. 2.3.2.5 b)

Conical bells made of bronze are known from several periods and regions, e.g. bells probably from the Caucasus (Muscarella, 1988, p.443 nos. 589-592) or others from Aï Khanoum (Guillaume, Rougeulle and Samoun, 1987, p.54 nos.0977-0978, pl.18,0977-0978, pl.XIII,10-11), Ghalekuti, Kaluraz and Bégram (see tab. 2.3.2.5 b). As M. Schatkin writes (1978, p.148): 'Conical bells from Transcaucasia, usually of rather small size, penetrated into Iran, as shown by finds from Khurvin.' (Van den Berghe, 1964, pl.37,242, 253, 255).

As for the bells from Veshnaveh, not only the conical shape with straight walls is characteristic, but, above all, the decoration of horizontal, circumferential grooves. Parallels from Iranian sites such as Pasargadae, Bastam[30], Nowruzmahale, Masdjid-e Suleiman or the Mesopotamian Nuzi display these grooves as well.

Two conical bells were found in graves at Dura Europos next to the pelvic bones of children (Rostovtzeff, et al., 1946, p.66 nos.4-5).[31] Also at Dura Europos, bronze bells were excavated in adult graves (Rostovtzeff, et al., 1946, p.52 tomb 24).

Obviously this shape, in combination with a decoration of grooves, was common from the Achaemenid at least until the Arsacid Period (i. e. 6th century BC to 3rd century AD; see also Calmeyer, 1957-1971, p.430 and Stronach, 1965, p.40 no.34, pl.13,a-b). Until the 6th century AD, slightly diverging shapes are known (Greifenhagen, 1975, pl.79,6).

[30] Late Classical Period cemetery in the eastern building, see Kleis, 1970, pp.40-41.

[31] Perhaps such objects were associated with children or childhood and were worn alongside a belt? More evidence and a thorough analysis of graves and grave goods would be necessary to support such a theory.

Tab. 2.3.2.1 a: Chale Ghar 1, pomegranate pendants.

Find Number	Feature	Material	Shape	Measurements
1250	10012/2	Gold	Double conical pendant with four triangular petals at one end and a cylindrical fragmented extension at the other	D. 0.5 cm, L. 0.6 cm
1583	10012	Gold	Spherical fragmented pendant with one granule	L. 0.9 cm, W. 0.8 cm, Thickness of gold sheet: 0.02 cm, Diam. of granule: 0.1 cm
1768a	10013/1	Gold	Spherical pendant with four granules (arranged pyramidally) at one end, and a cylindrical extension with attached eyelet at the other	D. 0.6 cm, L. 1.1 cm
4666a	10013	Gold	Spherical pendant of gold sheet, made of two halves. Cylindrical extension at one side, slight extension with two interlooped eyelets made of gold wire	D. 0.43 cm, L. 0.72 cm
6372	10022	Gold	Eyelet with extension, fragment of pomegranate?	L. 0.4 cm, W. 0.2 cm

Tab. 2.3.2.1 b: Pomegranate pendants from the Near East, Iran and the northern Black Sea Region.

Date	Object	Provenience	Reference
2nd century BC – 2nd century AD	Necklace with hollow pomagranate-pendants	Northern Black Sea region	Mordvinceva and Treister, 2007, p.41 no.A230.1.
Arsacid	Golden grain-shaped bead/ pendant with one granule at the end	Unknown	Musche, 1988, p.159 no.12, pl.LIII,12; Pforzheim, 1974, fig.47,58.
Sasanian	Earring with one golden spherical bead, with one granule at the end	Siraf/Iran	Musche, 1988, p.296 no.3.2.1, pl.CIII,3.2.1; Whitehouse, 1972, pl.XII,c.
Sasanian	Earring with several golden spherical beads, with one granule at the end	Armazis-Chevi/Georgia	Musche, 1988, p.297 no.3.4.4, pl.CIII,3.4.4.

Tab. 2.3.2.2 a: Chale Ghar 1, gold-turquoise pendant.

Find Number	Feature	Material	Shape	Measurements
6919	10004	Gold and turquoise	Teardrop-shaped pendant with turquoise inlay, setting continuous with a wire eyelet	L. 0.88 cm, W. 0.43 cm

Tab. 2.3.2.2 b: Setting with inlay from Israel.

Date	Object	Provenience	Reference
1225 – 1175 BC	Metal setting with stone inlay, drop shaped	Lachish, Tell ed-Duweir/Israel	Maxwell-Hyslop, 1971, p.138, pl.101.

Tab. 2.3.2.3 a: Chale Ghar 1, miscellaneous gold pendants.

Find Number	Feature	Material	Shape	Measurements
4663	10013	Gold	Lenticular pendant of gold sheet with small string hole off-centre; dented	L. 1.25 cm, W. 1.85 cm
1993b	10013	Gold	Pendant made of gold wire; two small rings are inter-looped with an eyelet, which is broken at one end	L. 0.95 cm, D. of rings 0.34 cm
1212g	10013/1	Gold	Fragment of grooved gold sheet with a wire eyelet	L. 0.9 cm, W. 0.55 cm

Tab. 2.3.2.3 b: Pendants and personal ornaments from Bactria and Turkey.

Date	Object	Provenience	Reference
1st century BC to 1st century AD	4 gold plaques, lenticular with two holes for attachment	Unknown. Greek Bactria, Afghan-Pakistani region?	Pfrommer, 1993, p.215 no.122.
Early Bronze Age III A	5 pendants made of gold sheet and decorated with gold wire and bent to the shape of a basket	Troy/Turkey	Musche, 1992, pp.117-118; Schliemann, 1881, pp.553-554, p.546 fig.842-843, p.554 fig.881-882; Alkim, 1968, pl.51 middle and left.

Tab. 2.3.2.4 a: Chale Ghar 1, decorated bronze pendants.

Find Number	Feature	Material	Shape	Measurements
1872e	10013	Bronze	Ovaloid with jointed eye and small reddish, rhombic patterns	D. 0.35 cm, L. 0.4 cm
6840	10000	Bronze	Pendant with rectangular 'body' and spherical 'head'. 'Body' decorated with holes or grooves in a row: three at the broad and two at the narrow end	D. 0.49 × 0.31 cm, L. 1.2 cm

Tab. 2.3.2.4 b: Bronze pendants from the Near East.

Date	Object	Provenience	Reference
4th century – middle of 2nd century BC	Bronze pendant in the rough shape of a figure	Aï Khanoum/Afghanistan	Guillaume, Rougeulle and Samoun, 1987, p.58, pl.18,51 (1098).
200–50 BC	Rectangular bronze pendant with decoration of incised lines	Tell Sheikh Hamad/Syria	Novák, Oettel and Witzel, 2000, p.58 fig.119,K-1.
1st century BC/1st century AD	5 rectangular copper beads decorated with incised dotted circles	Ed-Dur/UAE	Haerinck, 2001, p.23 no.N142, p.24 no.N244, pl.24 no.9; De Waele, 2008, p.85 nos.54 AG 1, 55 ED42-ED43, 56 N244.

Tab. 2.3.2.5 a: Chale Ghar 1, bronze bells.

Find Number	Feature	Material	Shape	Measurements
1734a	10013	Bronze	Bell-shaped pendant, heavily corroded, eyelet broken	D. 1.8 cm, L. 1,8 cm
1739	10013	Bronze	Bell-shaped pendant with clapper, decorated with 4 horizontal grooves on the outside, cylindrical extension with string hole; corroded	D. 1.3 cm, L. 1.8 cm

Tab. 2.3.2.5 b: Bells from Iran and Afghanistan.

Date	Object	Provenience	Reference
1st millennium BC	4 conical bronze bells with slight vertical fluting	Kaluraz, Gilan/Iran	The National Museum of Iran, Tehran, no. 5643. Excavation Hakemi.
Achaemenid	Conical golden bells with grooves or lamellae	Pasargadai/Iran	Musche, 1992, p.276, pl.CVI,1.8; Stronach, 1978, p.159, pl.153,a-b (bells), pp.206-207 fig.88,21-23 (bells); 1965, pl.XIII,a-b.
Late Classical Period	3 conical bronze bells with horizontal grooves or lamellae	Bastam/Iran	Kroll, 1979, p.179 no.18, p.180 nos.1-2.
Kushan period (2nd half of the 2nd century BC to third century AD)	Conical bronze bell	Bégram/Afghanistan	Ghirshman, 1946, p.76, pl.XXI,2.

Tab. 2.3.2.5 b: Bells from Iran and Afghanistan.

Date	Object	Provenience	Reference
1st–2nd century AD	Conical bronze bell with horizontal grooves and with massive eyelet	Nowruzmahale/Iran	Egami, Fukai and Masuda, 1966, pl.XLIX,34, pl.XIX,7; Musche, 1988, p.173, pl.LIX,23.3.
Around 1st–2nd century AD	Two conical bronze bells	Dura Europos/Syria	Rostovtzeff, et al., 1946, p.66 nos.4-5, pl.L tomb 33-XI.
3rd–2nd century BC (Ghirshman) and 2nd century AD (Louvre)	11 conical metal (bronze?) bells with solid eyelet of different shapes and sizes	Masdjid-e Suleiman/ Iran	Ghirshman, 1976, pl.CIII, pl.28,GMIS 72, pl.41,GMIS 223, 210, 222, pl. 60,GMIS 273-274, 292, 343; Haerinck, 1983, p.14. Musée du Louvre Sb 8844.
Arsacid	Three conical bronze bells with incised circle decoration	Djuben/Gilan/Iran	The National Museum of Iran, Tehran, all no. 3836. (Excavation Hakemi).
1st–3rd century AD	Conical copper bell with horizontal grooves	Nuzi/Iraq	Musche, 1988, p.173, pl.LIX,23.6; Starr, 1937/1939, pl.141,B.
Arsacid-Sasanian Period	Conical copper bell	Ghalekuti/Iran	Sono and Fukai, 1964, p.51, pl.LXX-VII,9.
6th century AD	6 conical bronze bells with partly groove decoration	Presumably southern Russia	Greifenhagen, 1975, pp.115-116, pl.79,6.

2.3.3 Stone Pendants

While stone beads appeared in large numbers in Chale Ghar 1 and 2, stone pendants are restricted to only four specimens: one fragmented cornelian, one fragmented agate, one chalcedony and one gagat pendant, all with more or less trapezoid shapes.

2.3.3.1 Description of Pendants of Different Stones (Tab. 2.3.3.1 a)

Generally speaking, pendants are distinguished by their off-centre string hole, and this holds true for the stone pendants from Veshnaveh. Four pendants of different materials were unearthed in Chale Ghar 2. They are made of white chalcedony, red cornelian, brownish agate and black gagat (pl. 26, nos. 1087a, 4266b, 4347a, 6195). Their shapes are not identical, but quite similar: the pendants all have a more or less trapezoid shape; the holes are drilled through the smaller part of the pendant. The gagat pendant is equipped with an eyelet that gives it an almost triangular shape.

Interpretation of Pendants of Different Stones (Tab. 2.3.3.1 b)

The agate pendant is one of the very few agate objects to have been found at Veshnaveh, while mostly cornelian was predominant among the stone artefacts discovered there.

Only a few references to the stone pendants from Chale Ghar 1 are presented here. They originate from Dinkha Tappeh and Qasr-i Abu Nasr and are of oval, droplet or trapezoid shapes. These shapes are too unspecific and the comparisons too few to allow a conclusive dating of the Veshnaveh types.

Tab. 2.3.3.1 a: Chale Ghar 1, stone pendants.

Find Number	Feature	Material	Shape and preservation	Measurements
1087a	10012	Chalcedony	Trapezoid, complete	D. 0.84 cm, L. 1.38 cm
4266b	10012/5	Cornelian	Trapezoid, fragmented	D. 0.56 cm, L. 1.03 cm, W. 0.77 cm, Th. 0.45 cm
4347a	10012/5	Agate	Trapezoid, fragmented	D. 0.7 cm, L. 0.9 cm
6195	10013	Gagat	Trapezoid to triangle, complete	D. 0.7 cm, L. 0.9 cm

Tab. 2.3.3.1 b: Stone pendants from Iran.

Date	Object	Provenience	Reference
1250 – 1000 BC	Oval cornelian pendant	Dinkha Tappeh/Iran	Muscarella, 1974, p.42 fig.7,o.43.
Sasanian	Trapezoid or droplet-shaped agate pendant	Qasr-i Abu Nasr/Iran	Whitcomb, 1986, p.187 fig.70,q.
Sasanian	Droplet-shaped 'crystal' pendant	Qasr-i Abu Nasr/Iran	Whitcomb, 1985, fig.70,z.

2.3.4 Amber Pendants

Three amber pendants completely differ in their shapes: one is ovaloid, another triangular, and the final one is a so-called bag-shaped pendant that deserves special attention. Its shape clearly indicates its chronological and geographical origins, and it is obviously not Iranian.

2.3.4.1 Description of the Amber Pendants (Tab. 2.3.4.1 a)

Three amber pendants were found in the main chamber of Chale Ghar 1. One is of a longish, ovaloid shape (pl. 26, no. 6173), another is triangular with the string hole through the broader part (pl. 26, no. 6193). Below the hole, at a distance of approximately 0.2 cm, a horizontal groove decorates the pendant. A third pendant is bag-shaped (pl. 26, no. 1107). It has a vertical string hole and a groove around a narrow portion, around which a string would have been tied, indicates that the artefact was used as a pendant: The string was apparently wound around the neck and threaded through the string hole. At the top of the pendant, a cruciform incision decorates the area around the string hole opening.

Interpretation of Amber Pendants (Tab. 2.3.4.1 b)
The horizontal groove on the triangular pendant (pl. 26, no. 6193) raises some questions. It was probably filled with another substance for the purpose of decoration, or it may have served as a groove for a string that was wound around the bead as well as through the string hole.[32]

While there exist no reference objects for the ovaloid and the triangular amber pendants, the bag-shaped amber pendant is of great interest. Bag or flask-shaped amber pendants have been discovered mostly in Eastern Europe, as examples from Poland, the Czech Republic and Ukraine show. However, their string holes are drilled horizontally through the upper, narrow part, while the pendant from Veshnaveh is drilled vertically.[33]

Obviously, this type of pendant existed in the Roman period and, as Th. Stöllner writes, especially in the 3rd century AD (Bagherpour Kashani, Rustaei and Stöllner, 2011), while E. M. Alekseeva states (1978, p.21) that in the Baltic region, the southern Caucasus and the Black Sea region, 'mushroom-shaped' amber pendants are typical of the 4th century AD. Bag shaped pendants of stone or amber coloured glass also appeared in Tanais, Russia, in the 1st century BC, and from the end of the 1st until the first half of the 5th century BC.

It seems likely that the bag-shaped amber bead was imported from Eastern Europe, probably via the Black Sea region (Bagherpour Kashani, Rustaei and Stöllner, 2011). A bag-shaped amber pendant that was found on the Crimean Peninsula is one indication that might close the circle.

It is remarkable that the cross decoration cut into the top of the pendant from Veshnaveh was obviously not found in Eastern Europe, but in the Near East: One bag-shaped limestone bead from Al Tar, Iraq, is decorated with an incised cross mark on the tail, as well as a longish conical frit bead from Tell Šēḫ Ḥamad, Syria, that is decorated with a cross at both ends. They resemble the style of the bag-shaped amber bead from Veshnaveh to some degree.

The cross decoration and the vertically drilled string hole are distinctive features that might indicate that the bead was reworked in the Near East. However, until further evidence can be brought forward, this must remain a conjecture.

[32] There are also other possibilities: Maybe the amber was drilled as a bead first, whereupon it burst, and the fragment was then reworked to form a pendant and the groove polished?

[33] Th. Stöllner discusses the bag-shaped amber pendant from Veshnaveh in greater detail, and writes about the distribution of bag-shaped amber pendants in Eastern Europe and Iran in a separate article (Stöllner, 2011, fig. 4).

Tab. 2.3.4.1 a: Chale Ghar 1, amber pendants.

Find Number	Feature	Material	Shape and preservation	Measurements
1107	10012	Amber	Bag-shaped pendant	D. 1.4 cm, L. 1.28 cm
6173	10013	Amber	Longish ovaloid pendant	D. 0.5 cm, L. 1.7 cm
6193	10013	Amber	Triangular pendant	D. 0.3 cm, L. 0.9 cm, W. 0.6 cm

Tab. 2.3.4.1 b: Bag-shaped amber pendants from the Near East and adjacent regions.

Date	Object	Provenience	Reference
170 BC (non-calibrated ^{14}C date)	Bag-shaped bead of orange calcium with a 'cross mark' incised on the tail portion	Al Tar/Iraq	Fujii, 1976, p.235, p.237 no.9, p.256, p.301, pl.LXXIX,a.
1st century BC	Bag shaped amber pendant of translucent amber coloured glass	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.61,757.
1st century AD	Bag shaped amber pendant	Ust'-Al'ma/Ukraine	Puzdrovskij and Zajcev, 2004, p.233 fig.3,a.m.
1–150 AD	Conical frit pendant with cross decoration on both ends	Tell Šēḫ Ḥamad/Syria	Novák, Oettel and Witzel, 2000, p.61 fig.135,F5.
End of the 4th–1st half of the 5th century AD	Bag shaped pendant of white stone	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, pl.26,392.
Roman	4 bag-shaped amber pendants	Cecele/Poland	Jaskanis, 1996, pl.IV,13A:1-4.
Roman	Bag-shaped amber pendant	Kostelec na Hané/Czech Republic	Čižmář, 1997, p.38, fig.2,2.
Roman	4 bag-shaped or bulla shaped amber pendants	Ephesus/Turkey	Strong, 1966, p.44, no.a-b, d,f, pl.II,a-b, d, f.
Roman	Bag-shaped amber pendant	Kosanovo/Ukraine	Mączyńska, 1997, p.104, p.107 fig.1,29.
Roman	Bag-shaped amber pendant	Ružičanka/Ukraine	Mączyńska, 1997, p.111 fig.5,6.

2.4 Inlays and Gem

Seven objects made of glass were found in Chale Ghar 1. They are rectangular, round and ovaloid, and have no string holes. One specimen of blue glass is decorated with the negative pattern of a figural motif. The size of the finds indicates that they were used as inlays for jewellery, may be finger rings or pendants. Three ovaloid garnet or ruby inlays and one round chalcedony inlay are very small, too, and they most probably had once been inlays for metal finger rings.

2.4.1 Glass inlays

2.4.1.1 Description of the Glass Inlays and the Gem

Ovaloid and Round Glass Inlays (Tab. 2.4.1.1 a)

Three inlays are of translucent colourless or white glass of ovaloid (pl. 26, no. 1883c33; pl. 27, no. 4750e) and flat rectangular shapes (pl. 27, no. 1295a2). Two are green in colour and of ovaloid (no. 1274c) and flat rectangular (pl. 27, no. 1265a5) appearance, respectively.

One round specimen of a pristine translucent blue glass is very well preserved (pl. 27, no. 1105).

An exception with regard to its colour is one droplet-shaped purple inlay (pl. 27, no. 4954c1), because barely any purple glasses were found in Chale Ghar 1 and 2.

Glass Gem (Tab. 2.4.1.1 b)

One decorated translucent blue glass gem was found in the main chamber of Chale Ghar 1. It is of an ellipsoid shape – convex at the back and the front side – with an engraved or moulded decoration. A standing figure is facing left, while the body is depicted frontally; both legs are clearly visible and are slightly inclined. The figure is holding an oval shield at its right and a crook or a spear in its bent left arm; it is probably wearing a hat or a helmet, maybe with a plume. Some faint traces may indicate that the figure is wearing a garment with structures similar to a pteryges (a leather skirt) (pl. 27, no. 1505).[34]

2.4.1.2 Interpretation of Glass Inlays and the Gem

Interpretation of the Ovaloid and Round Glass Inlays

The blue inlay no. 1105 (pl. 27) may have belonged to a ring similar to a round blue inlay (no. 4672a) that was found alongside a ring in Chale Ghar 1. Both are of the same size, with a diameter of 0.5 cm, but no. 4672a is much better preserved (cf. subsection 2.5.2.17).

As discussed in the chapter on the metal rings, glass gems or intaglii were invented in the Hellenistic period and were produced in ever increasing numbers since that time (cf. subsection 2.5.2.16; Zahlhaas, 1985, pp.12-13). Intaglii are decorated with negatively worked-in patterns. While the inlays presented here have no decoration, they nevertheless may represent substitutes for more expensive stone inlays of rings or earrings. The Hellenistic period may be proposed as terminus post quem for them.

Interpretation of the Gem (Tab. 2.4.1.1 c)

To judge from its measurements, gem no. 1505 from Veshnaveh most probably was used as an inlay for a finger ring (pl. 27). Its decoration either was engraved when the glass was in a cold state or it was moulded when the glass was hot (Spaer, 2001, p.217). Although there is only a slight abrasion of the glass, it was not possible to deduce which method was used to create the figure. M. Spaer (2001, p.358), however, states that such ring 'stones' were always moulded.

The comparisons listed in the table below show images of Graeco-Roman deities that resemble the figure from Veshnaveh in various respects. The posture is echoed by Roman gods as Mercury, who is depicted on a gem from Augst, Switzerland (Riha, 1990, p.124 no.14, pl.1,14) or by a genius depicted on a cornelian gem (Henig and Mac Gregor, 2004, p.34 no.1.43), by the Heracles on a glass gem (Spaer, 2001, p.223 no.522), by Bacchus and a satyr on cornelian gems (Zahlhaas, 1985, p.40 nos.41-42). These figures are facing to their left, their body is depicted frontally, the hips moved slightly to the left side by inclining the left leg.

Attributes such as a spear and a shield, as well as the probable helmet, are found on illustrations of Athena or Ares/Mars on gems, coins and lamps. Both gods wear a shield and a spear and often have an attic helmet with plume.

Owing to its coarse manufacture and corrosion, it is not possible to specify the figure on the glass gem from Veshnaveh. However, it may be assumed that the gem depicts a naked warrior (the visible legs and the indifferent shape of the body argue against it being a female figure), who perhaps was clothed with at least pteryges, and who was equipped with a round or oval shield and a spear. The warrior probably wears a helmet with a plume. This illustration recalls Greco-Roman Ares/Mars iconography, but it must remain open whether it represents a god or an anonymous warrior.

Coins and bullae with similar illustrations of Greek or Roman gods were found at archaeological sites in Iraq, Israel, Palestine, Turkey, Tunisia, Lebanon, Syria, the northern Black Sea region and the UAE (see tab. 2.4.1.1 b). They demonstrate that the iconography of Roman and Greek gods was well known in the Near East. This bears the question whether the specimen from Veshnaveh was an import from the Eastern Roman provinces to the Persian highlands. Based on the comparison objects, and because of the figure's posture, the gem from Veshnaveh may be dated to into a time frame of the Hellenistic to Roman period.[35]

[34] An impression of the intaglio/gem results in a mirror image. Descriptions of this intaglio/gem and the comparisons are given from the perspective of figure. The person depicted would hold objects in his left or right arm and move to his right side.

[35] M. Spaer writes that the number of glass intaglii/gems grew very considerably from the 3rd century onward (Spaer, 2001, p.216). This might at least provide a terminus ante quem for the blue gem from Veshnaveh.

Tab. 2.4.1.1 a: Chale Ghar 1, glass Inlays.

Find Number	Feature	Material	Shape and preservation	Measurements
1105	10012	Translucent dark ultramarine 29-7-0 glass	Round, concave, flat bottom; complete, well preserved	D. 0.5 cm, L. 0.4 cm
1274c	10012/2	Slight translucent dark blueish green 39-31-7 glass	Ovaloid convex; complete, corroded	D. 0.2 cm, L. 0.71 cm, W. 0.5 cm
1265a5	10012/2	Opaque grey green 39-2-6 glass	Very flat rectangular; complete, corroded	L. 0.6 cm, W. 0.36, Th. 0.07 cm
1295a2	10012/2	Translucent colourless glass	Very flat rectangular; complete	L. 0.75 cm, W. approx. 0.5 cm
1883c33	10013	Translucent colourless glass. Small green inclusion	Ovaloid, concave, flat bottom	D. 0.3 cm, L. 1.13 cm, W. 0.8 cm
4750e	10019	Translucent green white 1-39-6 glass	Ovaloid to round, concave, flat bottom; complete	L. 0.63 cm, W. 0.61 cm, Th. 0.3 cm
4954c1	10022	Translucent brown purple 25-11-6 glass	Droplet-shaped, concave, flat bottom; complete, well preserved	L. 0.72 cm, W. 0.34 cm, Th. 0.21 cm

Tab. 2.4.1.1 b: Chale Ghar 1, glass gem.

Find Number	Feature	Material	Shape and preservation	Measurements
1505	10019	Translucent dark lilac ultramarine 29-23-7 glass	Ovaloid or ellipsoid complete	L. 1.3 cm, W. 1.1 cm, Th. 0.55 cm

Tab. 2.4.1.1 c: Gems and bullae with figural motifs from the Near East, Europe and the northern Black Sea region.

Date	Object	Provenience	Reference
Hellenistic	14 bullae with figural motif wearing a helmet and carrying a shield and a spear (Athena Promachos). Depicted side-on	Seleucia on the River Tigris/Iraq	Invernizzi, 2004, p.19, nos. At80–At94.
Hellenistic	Coin with a representation of Ares; wearing a helmet and holding a spear and a shield	Aelia Capitolina (Jerusalem)/Israel	LIMC 1984a, p.495 no.22; LIMC 1984b, pl.373, no.22.
Hellenistic	Coin with representation of Ares; wearing a helmet and holding a spear and a shield	Néapolis/Palestine	LIMC 1984a, p.495 no.23; LIMC 1984b, pl.373,23.
Hellenistic	Coin with representation of Ares; wearing a helmet and holding a spear and a shield	Edessa/Turkey	LIMC 1984a, p.495 no.24; LIMC 1984b, pl.373,24.
2nd century BC – 2nd century AD	Gem with standing warrior with spear, shield and a kind of helmet	Northern Black Sea region	Mordvinceva and Treister, 2007, p.83 no.A308.4.
1st century BC – 1st century AD	Agate gem of 'western' origin; shows a standing figure in long classical dress	Ed-Dur/UAE	Haerinck, 2003, p.203 fig.2,6; De Waele, 2007, fig. 1,30; 2008, p.6 no.BO 63.
1st century AD	Gem of cornelian. Engraved with the standing figure of the helmeted Athena holding a spear, in profile to her left; an altar in front of her	Unknown	Henig and MacGregor, p.44 no.2.28.
1st century AD	Two lamps, Mars depicted naked with helmet, holding spear and shield	Pozzuoli/Italy and Carthage/Tunisia	LIMC 1984a, p.532 nos.264–264a; LIMC 1984b, pl.400,264.
1st century AD	Engraved gem of translucent green glass with Heracles depicted in frontal position, facing to his left	Unknown	Spaer, 2002, p.223 no.522.

Tab. 2.4.1.1 c: Gems and bullae with figural motifs from the Near East, Europe and the northern Black Sea region.

Date	Object	Provenience	Reference
2nd half of the 1st century AD	Cornelian gem/gem of ring depicting naked Bacchus; his body frontal, facing to his left.; hips moving to his left by inclining his right leg	Lebanon	Zahlhaas, 1985, p.40 no.41.
2nd century AD	Gem of red cornelian. Engraved with a Genius, facing to his left side, holding a patera in his left hand and a cornucopia in his right	Unknown	Henig and MacGregor, 2004, p.34 no.1.43.
2nd century AD	Gem of brown jasper with figure of Athena, facing to her left, holding a shield and a spear in her right hand, a small Nike in her left	Unknown	Henig and MacGregor, 2004, p.43 no.2.23.
2nd century AD	Gem of red cornelian. Engraved with the figure of Aequitas, facing and moving to her right side, holding a sceptre in her right hand and scales in her left	Unknown	Henig and MacGregor, 2004, p.59 no.4.1.
2nd century AD	Cornelian gem with incised goddess Roma with amazone chiton	Trier/Germany	Krug, 1995, p.62 no.49, pl.51,49.
2nd–3rd century AD	Gem of nicolo with Hermes depiction; figure leaning on a column in three-quarter profile on his right side	Unknown	Henig and MacGregor, 2004, p.37 no.1.72.
Late 2nd–3rd century AD	Cornelian gem/intaglio of ring. Shows a satyr or Silenus holding a rod in his bended right hand and a grape vine in his left hand, body frontal, facing to his left	Ras el Ayn (Aleppo)/Syria	Zahlhaas, 1985, p.40 no.42.
3rd century AD	Gem of cornelian with Ares depiction, helmeted figure, body forward and head turned to his left side, he leans on a spear held in his left hand	Italy?	Henig and MacGregor, 2004, p.32 no.1.16.
Mid-4th–mid-5th century AD	Glass pendant, light yellowish brown; goddess seated on throne, turning slightly to her right side; right hand on shield, left hand holding spear	Unknown	Spaer, 2001, p.179 no.355.
Roman	Oval gem of cornelian. Mercury frontally depicted with profiled head; holding an indistinct item in his right hand and an elongated bag (?) in his left	Augst/Switzerland	Riha, 1990, p.124 no.14, pl.1,14.

2.4.2 Stone Inlays

2.4.2.1 Description of the Stone Inlays (Tab. 2.4.2.1)

Four stone inlays were found in Chale Ghar 1. Three are probably made of garnet and have an oval shape with a flat bottom. Because of their small size, they may have been inlays for rings. No. 1228 fits perfectly into ring no. 4445 (pl. 37). It is unclear whether these two items indeed belong together.

Tab. 2.4.2.1: Chale Ghar 1, stone inlays.

Find Number	Feature	Material	Shape and preservation	Measurements
1111	10012	Chalcedony	Half spherical	D. 1.7 cm, L. 0.85 cm
1228	10013	Garnet/Ruby (?)	Half ovaloid	D. 0.53 cm, L. 1.2 cm, W. 0.8 cm
1872b	10013	Garnet	Half ovaloid	D. approx. 0.5 cm, L. approx. 0.6 cm
4662b	10013	Garnet	Half ovaloid	D. 0.6 cm, L. 0.5 cm

2.5 Finger Rings

2.5.1 Glass Finger Ring

2.5.1.1 Description of the Glass Finger Ring (Tab. 2.5.1.1 a)

One ring unearthed in Chale Ghar 1 was completely made of glass (pl. 27, no. 1903b). Its hoop was manufactured of twisted yellow and translucent colourless glass and a blue-white eye of opaque glass was applied as bezel on the top of it. To produce this ring, clearly a bi-coloured glass rod was manufactured first, then reheated and its ends joined together. On top of this conjunction the white-blue bezel was applied. This manufacturing process is strongly suggested by the thinning of the hoop and the discontinuity or inconsistency in the yellow stripes just below the bezel.[36]

Interpretation of the Glass Finger Ring (Tab. 2.5.1.1 b)

Similar observations concerning technique and appearance can be made on parallels from Gilan (Northern Iran) and on rings from the Nasser D. Khalili Collection (see tab. 2.5.1.1 b). They seem to have been produced according to the same technique as the specimen from Veshnaveh. These finger rings are made of translucent yellow glass pierced with stripes of yellow and whitish opaque glass; however, their bezel consists of a single red eye.

Other comparisons are known from graves in the Kuban region or from collections, for instance a seamed ring with a round bezel in the Israel Museum (Spaer, 2001, p.210 no.491) or a glass ring with an eye decoration in the Alice and Louis Koch collection. It is noticeable that very similar rings are known from Orvieto, Italy, too (Marshall, 197, p.231 no.1578). They are made of a plain hoop with round cross cut of transparent glass with a yellow band twisted spirally around it (*reticella*) and with an oval bezel of a circular piece of blue glass with a yellow border attached to it. From Roman Augst, Switzerland, a broken or open glass ring of yellowish colour with a circumferential white (?) stripe is known. In a tomb in Khorramrud, Iran, a glass ring was found, made of yellowish-brown glass with white spirals and a glass bezel (see tab. 2.5.1.1 b).

As F. Henkel wrote in the early 20th century (1913, p.214), glass rings seem to have been worn in the Roman world from the 3rd century AD onwards, but the comparison objects indicate possible dates for the ring from Veshnaveh ranging from the 1st to the 4th centuries AD or the late Arsacid period.

Tab. 2.5.1.1 a: Chale Ghar 1, glass finger ring.

Find Number	Feature	Material	Preservation	Measurements
1903b	10013	Glass	Complete	D. 2.15 cm, inner D. approx. 1.5 cm

Tab. 2.5.1.1 b: Glass finger rings with yellow or striped hoop and round bezel from Iran, the Near East and Europe.

Date	Object	Provenience	Reference
Hellenistic	Glass ring, violet-brown with yellow, twisted stripe	Boğazköy/Turkey	Boehmer, 1972, p.178 no.1855, pl.98,1855.
Middle of the first century AD	Glass ring, striped, twisted hoop	Adygeen/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.377, p.389, pl.197,4.
1st half of the 2nd century AD	Glass ring, striped, twisted hoop	Adygeen/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.376, p.389, pl.205,4.
1st–3rd centuries AD	Glass ring, translucent yellow hoop with yellow twisted stripe; red bezel	Gilan/Iran	Fukai, 1977, p.61 fig.70, pls.53-55.

[36] A technique of producing glass bracelets is described by Manfred Korfmann (1966, pp.52–54): Hot monochrome glass is taken out of the furnace by turning a conical-ended rod, and the turning and swelling of the rod produce a larger inner diameter of the ring. Then, with the help of a tool, the former ring bead is formed into a seamless bracelet. This method, however, does not seem very plausible due to the fact that glass could not be spun to an even ring easily (Wagner, 1998, p.167). Additionally, until the late Roman period, glass seems not to have been removed from a furnace or a crucible directly for manufacturing objects. Instead, pre-manufactured glass was used in the form of chunks (Stern and Schlick-Nolte, 1194, p.28). It is more probable that the seamless rings were produced by winding a hot thin glass trail around a large conical rod, as it was done with wound beads (personal record of R. Lierke). However, in the case of the glass ring from Veshnaveh, the method was different from that described above: A glass rod made of twisted yellow and colourless glass was bent to a ring and the two ends joined together. F. Henkel (1913, p.283) also discusses the manufacture of glass finger rings. At sufficiently high temperatures, it was possible to shape, bend and join the material together. Casting does not come into consideration for the manufacture of glass rings.

Tab. 2.5.1.1 b: Glass finger rings with yellow or striped hoop and round bezel from Iran, the Near East and Europe.

Date	Object	Provenience	Reference
1st–7th centuries AD	Glass ring, colourless and translucent white glass, red bezel	Syria or Iran	Wenzel, 1993, pp.18-19 no.12.
Roman	Glass ring, purple-brown with yellow, twisted stripe	Roman Empire	Spaer, 2001, p.201 no.491.
2nd–3rd century AD	Glass ring, translucent light brown hoop, greyish-green bezel	Unknown	Chadour, 1994, p.96 no.327.
Roman	Glass ring, translucent hoop with yellowish twisted stripe; yellow-blue bezel	Orvieto/Italy	Marshall, 1907, p.231 no.1578, pl.34,1578.
Roman	Glass ring, yellowish hoop with twisted white (?) stripe	Augst/Switzerland	Riha, 1990, p.137, pl.14,283.
Late Arsacid Period	Glass ring, translucent glass with twisted stripes	Khorramrud/Iran	Egami, Fukai and Masuda, 1966, p.14, pl.XXX,1.

2.5.2 Metal Finger Rings

Considering the status of research on Iranian finger rings, which is scarce, it is remarkable that at Veshnaveh 143 finger rings have been excavated in situ. Seldom do finger rings appear in such a great number at one site. The one glass finger ring stands out from the assemblage, while 142 are mostly made of bronze, and a few of silver and iron. Some of them are decorated with animal or abstract illustrations.[37] Most have got ribbon hoops, flat inside, curved outside (Boardman, 1979, p.214). They have a broadened part or a stepped bezel of oval, rectangular, triangular or rhombic shape.[38] Others are made of a wire hoop with a round-to-oval cross section with a thickening part of fitted or stepped bezels of oval, rectangular, conical or rhombic shape.[39] The hoop probably has been soldered directly under the bezel, but some hoops show breaks that might have resulted from week soldered material (e.g. pl. 35, no. 1807; pl. 30, no. 4531; pl. 29, no. 4597).[40]

The iconographical ornaments of the finger rings from Veshnaveh seem much more significant than their shape. Therefore the rings are classified according to their decoration, described as variety here. Most of the decorated finger rings have ornaments of incised birds. Unique are one griffin and one deer motif. Some birds were cut with care while others are incised very roughly. Other ornaments include plant motifs, circles, crosses and possible Pahlavi inscriptions; or sometimes the shape of the ring itself is of interest.

[37] For a technical glossary see Allan, 1982, p.11.

[38] Veshnaveh nos. 1227 (pl. 32), 1517 (pl. 28), 1793 (pl. 93), 1807 (pl. 35), 1814 (pl. 28), 1820 (pl. 34), 1824 (pl. 31), 1826 (pl. 37), 1828 (pl. 30), 1829 (pl. 32), 4007, 4263a, 4311d (pl. 33), 4338, 4340, 4478 (pl. 38), 4511, 4513 (pl. 31), 4515 (pl. 31), 4516a (pl. 29), 4519, 4523 (pl. 32), 4531 (pl. 30), 4564f, 4585a, 4597 (pl. 29).

[39] Veshnaveh Nos. 1091 (pl. 34), 1478, 1504, 1572, 1638a (pl. 33), 1834f, 1834k, 4240a (pl. 33), 4341a (pl. 38), 4442a (pl. 33), 4446, 4453, 4457b, 4477, 4481, 4498 (pl. 32), 4512, 4517a, 4521 (pl. 30), 4591a, 6562.

[40] Measurements indicate the outer Diameter ('D.') of the rings.

The following 'types' are described:

- Variety 1: Animal-decorated bronze and silver rings: birds (var. 1.1.1–1.1.6), one griffin (var. 1.2), one stag (var. 1.3).
- Variety 2: Bronze rings with inscriptions.
- Variety 3: Bronze rings with plant decorations. (var. 3.1–3.2).
- Variety 4: Bronze rings with abstract decorations, cross (var. 4.1) and circles (var. 4.2).
- Variety 5: Bronze rings in certain shapes (var. 5.1), a ring of a decorated bronze sheet (var. 5.2) or with such shaped decorations as spiral rings (var. 5.3).
- Variety 6: Bronze rings with inlays (var. 6.1–6.3).
- Variety 7: Bronze rings with open ends.
- Variety 8: Plain bronze rings (var. 8.1–8.3).
- Variety 9: Iron rings corroded.
- Variety 10: Iron ring with inlay.

2.5.2.1 Variety 1.1.1: Bronze and Silver Rings with Motif of Standing Birds, Assurgent Tail Feathers and Crest (Tab. 2.5.2.1 a)

Due to the similarity of their design and style, these six rings may be discussed under a single heading. Two of them are made with an offset oval bezel (pl. 28, no. 1814; no. 4564f), while one has an oval bezel that is not offset (pl. 28, no. 1517). Another displays an offset rectangular bezel (pl. 29, no. 4597). The latter is decorated with short incised parallel lines around the rim. All four were manufactured with a broad ribbon hoop. They feature very similar designs, of a bird seen in profile, striding forth, looking to the right or to the left side. The animal is depicted vertically (no. 4564f; pl. 29, no. 4597) or horizontally (pl. 28, nos. 1517, 1814) within the oval

bezel. The wing or the body of the animal is dashed to give the appearance of (flight) feathers. The tail, which the birds extend vertically, is illustrated by one or two curved lines. On at least two rings, on the head of the birds, a lunula and crown-shaped crest is visible (no. 4564f; pl. 28, no. 1517).

A further ring, consisting of a wire hoop with a rectangular bezel, may also depict a bird with vertical tail, but it is too corroded to confirm this observation (no. 1572). The silver ring no. 1097 shows a rather fragmented bird, whose head and assurgent tail feathers are still visible.

Interpretation of Bronze and Silver Rings of variety 1.1.1 (Tab. 2.5.2.1 b)

Considering their posture and attributes – the long tail and the crest point – it would appear that the birds depicted on the rings are cranes. This may seem peculiar, as cranes tend to inhabit flat regions such as the tundra or the savannah.[41] Veshnaveh, however, is situated in a mountainous region.

Very similar illustrations of birds with assurgent tail feathers and/or crests are depicted on Sasanian seals, metal ware and fabrics.

Comparable finds of similar rings may be found in the National Museum of Iran (pl. 39, no. 2998) and in the Alice and Louis Koch Collection. They display round and rectangular bezels surrounded by a line decoration, and featuring a central motif of a bird and a mare (Chadour, 1994, p.142 no.478). They resemble ring no. 4597 from Veshnaveh (pl. 29), especially with regard to the rim decoration and the rectangular bezel.

Rings with ornaments of birds with long tail feathers and long bent necks were excavated in Masdjid-e Suleiman. On the rings from Veshnaveh, a common Sasanian bird illustration clearly was used.

2.5.2.2 Variety 1.1.2: Rings with Motif of Birds, Extended, with Horizontally Protruding Tail (Tab. 2.5.2.2 a)

Rings with this decoration are made of a broad ribbon hoop. There is no offset bezel, but a broader section with a carelessly incised decoration. One ring from Veshnaveh clearly shows a bird, looking to the right, with long, horizontally protruding tail feathers suggested by two or three incised lines, and a wing (pl. 29, no. 4516a). Oblique parallel lines simulate flight feathers. The shapes of the rings and their decoration of strokes giving a sense of motion correspond to each other very closely indeed. Other rings of the same shape display only remnants of horizontal lines. It is highly probable that these rings originally showed similar birds, too (pl. 29, no. 1793; no. 4519).

Interpretation of Rings of variety 1.1.2 (Tab. 2.5.2.2 b)

On Sasanian seals, simple birds, looking sideways, are depicted with outstretched tail feathers and oblique parallel lines on the body or wing. A ring in the National Museum of Iran, dated to the late Sasanian period, is very similar to these rings from Veshnaveh. It is of exactly the same shape as the rings presented here and has a rough line decoration, but no recognisable bird shape (pl. 39, no. 2977). Other bird illustrations with protruding tails can be seen on late Sasanian silverware.

2.5.2.3 Variety 1.1.3: Rings with Motif of Standing Birds with Horizontal Short Tail Feathers and Additional Decoration (Tab. 2.5.2.3 a)

Unlike the other rings from Veshnaveh, the two under discussion here are decorated with a coarsely rendered bird, in stride, with short, vertical tail feathers. A ring has a ribbon hoop, and an oval, offset bezel. On the bezel a bird and three droplet-shaped ornaments are visible below the animal's body (pl. 30, no. 1846). Above the bird, there are markings which may be remains of an indistinct decoration or may merely be attributable to dents or scratches. The other ring is made of a wire hoop and a rectangular bezel. The bird, standing sideways, appears to be stretching its tail feathers vertically. Above its back, there are incisions which may be interpreted as letters (pl. 30, no. 4521).

Interpretation of Rings of variety 1.1.3 (Tab. 2.5.2.3 b)

To judge by the position and design of the birds, the aforementioned Sasanian seals seem to correspond to the rings under discussion here. Simply rendered birds in stride are known from Roman gems. A bronze ring in the National Museum of Iran (pl. 39, no. 2951) has a round bezel with a carelessly rendered decoration of a bird surrounded by indistinct filling motifs. A Roman ring features a bird depicted alongside letters.

The comparisons given here are too vague for further statements concerning this type of ring, but they may serve to indicate a direction.

2.5.2.4 Variety 1.1.4: Rings with Motif of Simple Standing Birds, Schematically Rendered (Tab. 2.5.2.4 a)

Two rings are made of a ribbon hoop with an offset and a doubly offset oval bezel (pl. 30, nos. 1828, 4531). The bezel depicts a single bird in profile, in stride; simple, schematic incisions represent the feet. The body or flight feathers are represented by rough parallel lines. One bird is executed more coarsely still (pl. 30, no. 1828) than the other, and has a larger body.

[41] Many thanks to Dr. A. Holzschuh from the Agroecological Institute of the Georg-August-Universität Göttingen, Germany (now at Julius-Maximilian Universität Würzburg) for her suggestions.

Interpretation of Rings of variety 1.1.4 (Tab. 2.5.2.4 b)
Birds, roughly incised on a round bezel ornamented with oblique lines, are found on bronze rings from Siah Darreh and Amolu in the Iranian province of Gilan (pl. 39, nos. 2998, 3020). Such birds, depicted standing and in profile, with plumage indicated by parallel lines are also found on Sasanian seals. This simple decoration obviously was a common iconography, as it has been discovered in different places and regions.

2.5.2.5 Variety 1.1.5: Rings with Motif of Very Coarsely Executed (Moving) Birds on Triangular or Rhombic Bezel (Tab. 2.5.2.5 a)

Three rings are similar in shape and decoration (no. 4511; pl. 31, no. 4513; no. 4585a). They are made of ribbon- and wire-shaped hoops, and display triangular (pl. 31, no. 4513; no. 4585a) and rhomboid bezels (no. 4511). On each of them, a bird with coarse and thin lines has been incised. It seems as though the bird was moving to the right-hand side of the bezel.

Interpretation of Rings of variety 1.1.5 (Tab. 2.5.2.5 b)
From the fortress in Qasr-i Abu Nasr, one copper finger ring is preserved. It has a triangular bezel and a bird decoration.

2.5.2.6 Variety 1.1.6: Rings with Motif of Flying Birds (Tab. 2.5.2.6 a)

So far, all bird rings from Veshnaveh have been decorated with capillary incisions. Two rings with ribbon hoops, however, one with an oval (pl. 31, no. 1824), one with a rectangular bezel (pl. 31, no. 4515), appear instead to be ornamented by the metal having not just been engraved, but removed. This might have happened with the help of moulds or with tools. By means of several concave indents, a flying bird with outstretched wings is illustrated on the bezels. On ring no. 1824 the bird is flying straight upwards, whilst on the other, no. 4515, it appears to be turning to the left.

Interpretation of Rings of variety 1.1.6 (Tab. 2.5.2.6 b)
Flying birds or birds shown head-on with outstretched wings (specifically eagles) are known from Sasanian metalwork, such as a silver vase in the Hermitage Museum at St. Petersburg, as well as from Roman gems and Sasanian seals. Due to the rough workmanship of the birds on the rings, these are not quite comparable. However, the particular bearing of the birds suggests a certain type of flying bird illustration that may be interpreted differently from the standing and sitting birds of the Sasanian period.

2.5.2.7 Variety 1.2: Ring with Motif of a Griffin (Tab. 2.5.2.7 a)

One finger ring with ribbon hoop and rectangular bezel shows the decoration of a seated griffin with upright tail, wings and a horn (pl. 32, no. 4523).

Interpretation the Ring of variety 1.2 (Tab. 2.5.2.7 b)
Griffins are known from Achaemenid tiles from the palace in Susa and a bronze plaque from Masdjid-e Suleiman, but a quite exact reference concerning the posture and appearance of the animal has been found on fibulae and silver plates of the late Sasanian to the Early Islamic period (Bussagli, 1956, p.50; Brisch, 1980, p.36). Again, on this ring from Veshnaveh a common late Sasanian iconography was found.

2.5.2.8 Variety 1.3: Ring with Motif of Stag (Tab. 2.5.2.8 a)

One ring decorated with the image of a stag was unearthed in Chale Ghar 1 (pl. 32, no. 1227). This ring stands out not only because of this motif, but also because of its shape. The fairly thick hoop with a round cross section broadens to a flat oval bezel without step. The stag is depicted standing, with all four legs. Its head, on the right side of the bezel, is turned three-quarters. The antlers are shown completely, as is one ear. The animal is rendered with broad grooves and concave areas. Filling motifs, maybe plants, are to be seen in front of the stag's throat and mouth; a sideways lunula is depicted above his back. This ring is clearly a signet ring.

The shape of this ring resembles bronze ring no. 4007, the decoration of which is no longer discernible (see subsection 2.5.2.20).

Interpretation of the Ring of variety 1.3 (Tab. 2.5.2.8 b)
Antler motifs are familiar from Sasanian seals, where plant, star or crescent motifs are added in front of the stag's throat or mouth, as well as an inverted lunula or star above its back. This corresponds exactly to the illustration on the ring from Veshnaveh. A bronze ring with a stag motif from Qasr-i Abu Nasr dates from the Sasanian period. The ring differs in shape, but the bezel shows a roughly incised, standing stag. The shape of the ring from Chale Ghar 1 is almost similar to Roman rings that have been dated to the 3rd and 4th centuries AD (Henkel, 1913, pp.144-146). This shape is echoed by a stag decorated ring from Iran kept in the collection 'von Grawert' (Stutzinger, 2001, p.73 no.51). From Hassani Mahale, we know of a Sasanian ring with animal illustration and crescent motif, which supports a late dating of this ring and motif.

2.5.2.9 Variety 2: Rings with Inscriptions (Tab. 2.5.2.9 a)

Three rings appear to be decorated with what may be a Pahlavi inscription. Two of them consist of a ribbon hoop with an offset oval-to-rhombic bezel (pl. 32, nos. 1829, 4498); a third has a wire hoop and an oval bezel (pl. 33, no. 4240a). They have an ornament of lines, which seem to reflect letters.

Interpretation of Rings of variety 2 (Tab. 2.5.2.9 b)
Several experts have tried to read the inscriptions on the rings from Veshnaveh, but unfortunately it has not been possible to decipher the words.[42] It is probable that the incisions are supposed to imitate a script, as in the case of two rings in the National Museum of Iran, Tehran (pl. 39, no. 2983a). They display rough incisions that appear to indicate a pseudo-inscription.

Comparable copper or bronze rings with genuine inscriptions are known from Uruk of the Seleucid and Arsacid period. 53 bronze rings from the Rhine area in Germany are equivalent in shape to their Iranian counterparts.

Rings with inscriptions seem not to be uncommon, as further examples show: One Roman gold ring has an amulet-type inscription in two rows and a bronze ring from Masdjid-e Suleiman also shows letters.

Since we cannot identify what exact models the finger rings with pseudo-inscriptions from Veshnaveh may have been based on, a dating cannot be given with absolute certainty, but the comparisons would point to the Arsacid and Sasanian periods.

2.5.2.10 Variety 3.1 and 3.2: Rings with Plant Motifs (Tab. 2.5.2.10 a–b)

Three rings with ribbon hoops and triangular offset, oval and a rhombic bezels are decorated by a simple spica motif (pl. 33, nos. 4311d, 4442a; no. 4453). This motif consists of a central, horizontal line, flanked by short oblique incisions. Ring 4442a displays a special accessory: One end of the hoop is made of plated wires and seems to continue the plant decoration. The end is broken off the bezel.

Ring no. 1638a (pl. 33) has a thickened bezel with a very rough plant decoration of just three or four slight short incisions radiating from the centre. Three fragmented rings resemble the shape of ring no. 1638a with a thickened centre, but no decoration is observable, owing either to corrosion or to there having been none in the first place (nos. 1274, 1427, 1504).[43]

Interpretation of Rings of variety 3 (Tab. 2.5.2.10 c)
Rings with spica motifs seem to be common in different periods, as Iranian examples from Masdjid-e Suleiman, Qazwin as well as from Masada (Israel) and Roman gold rings show. They vary in design, but the basic pattern with the line flanked by oblique incisions is similar. The illustrations on the Roman rings have been described as depicting palm fronds or laurels (Chadour, 1994, p.55, nos.178-179).

In the Iranian National Museum, two rings show plant decorations. One was fashioned with a rhombic bezel and decorated with a spike motif (pl. 39, no. 3011). It was found by R. Ghirshman on the Island of Khark in the Persian Gulf. Another ring from Siah Darreh, in the Iranian province of Gilan, resembles ring no. 1638a from Veshnaveh (pl. 33) in having just three simple incisions to symbolise a plant motif (pl. 40, no. 3009). The shape with its thickened centre is also known from a Byzantinian bronze ring found in Cyprus, it has a raised, thickened section that originally contained an inlay. This shape was common from the Hellenistic period onwards (Chavane, 1975, p.145).

The plant motifs continue at least until the Islamic era, as finds from Ghubayra/Kerman in Iran prove.

2.5.2.11 Variety 4.1: Rings with Cross Motif (Tab. 2.5.2.11 a)

Two bronze rings belong to the group of rings with cruciform ornaments. They are made of a ribbon hoop and clearly show a cross decoration on the bezel. These rings are exceptional and display significant attributes different from the others: The decorated rhombus of ring no. 1820 (pl. 34) is applied onto the hoop and is smaller than the hoop. Among the rings from Chale Ghar 1, the bezels are usually broader than the hoops, and this ring represents an exception in this respect. Its decoration is an incised cross; the ends of the cross terminate in crossbars (i. e. a cross potent). Ring no. 1091 has a very pronounced bezel, an upside-down cone with traces of facets or flutings on the sides and the cross decoration on the slight convex picture field (pl. 34, no. 1091). The central cross decoration has filling motifs: lines in each quarter of the bezel.

Interpretation of Rings of variety 4.1 (Tab. 2.5.2.11 b)
Ring no. 1820 from Chale Ghar 1 is made of a broad hoop with a smaller bezel decorated with a cross (pl. 34). This pattern derives from Roman bronze finger rings such as those found in the Rhine Valley or in Syria, dating from the 3rd and 4th centuries AD, which feature round bezels that are smaller than their broad hoops and are decorated with a cross symbol. At Uruk, one ring from the Seleukian/Arsacid period, with a round bezel, surrounded by a circle, inside a cross, has been discovered.

Ring no. 1091 with the conical bezel is one of the special finds from Veshnaveh, because it proves the late use of the mines, probably up to the early Islamic

[42] I would like to thank S. Curtis, Curator of Islamic and Iranian coins at the British Museum, Dr. S. Ziegler, Friedrich-Schiller University of Jena, Germany, and Mrs. Askari as well as Mrs. Baseri from the department of seals and coins of the National Museum of Tehran for their effort to read the inscription.

[43] No. 1274 is not mentioned in the database of the excavation, but there is a photograph. It is unclear whether this lack of information is due to an error in numbering.

era (pl. 34). An analogous bronze ring with a conical bezel exists in the Nasser D. Khalili Collection. In this regard, it is very interesting that the editor of this collection mentioned comparable items from Mostagedda in Middle Egypt and from an excavation at Rayy, Iran. Other Iranian example of this form were found in Islamic Nishapur or, in a Sasanian context, in Lebanon (see tab. 2.5.2.11 b). The latter ring bears a decoration of a head. In general, rings with strongly offset conical bezels are known from the Byzantine period, notably two silver rings with a cross decoration and a lattice design.

2.5.2.12 Variety 4.2: Ring with Circle or Eye Motif (Tab. 2.5.2.12 a)

One bronze ring is made of a ribbon hoop, which is broken at one section, and an oval, offset bezel. The latter displays a motif of two eyes or circles with dots (pl. 35, no. 1807). The circles were possibly made with a drill (Wright, 1982, pp.95-104).

Interpretation of Rings of variety 4.2 (Tab. 2.5.2.12 b)
Rings equivalent to the Veshnaveh types have been excavated at Northern Iranian sites. Two of them are made of a broad ribbon hoop and an oval bezel; they are decorated with three circles with a dot, corresponding to the 'eyes' on the ring from Veshnaveh (pl. 40, nos. 2952, 3003). A third bears an even stronger resemblance to the Veshnaveh piece. It is very similar in shape, with two eyes, but in oblique orientation (pl. 40, no. 3140). The rings date from the Sasanian and the late Sasanian periods respectively.

2.5.2.13 Variety 5.1: The 'Tie Finger Ring' (Tab. 2.5.2.13 a)

A broad band or ribbon-shaped bronze ring, which broadens at the ends and was perhaps silver-plated, is joined at both ends to a thinner and smaller rectangle (pl. 35, no. 6064a). This forms the decoration of the ring and gives the appearance of a modern tie.

Interpretation of the Ring of variety 5.1 (Tab. 2.5.2.13 b)
A ring almost identical to the specimen from Chale Ghar 1 was found in Siah Darreh, Iran, and dated to the late Sasanian period (pl. 40, no. 3002).

2.5.2.14 Variety 5.2: The Metal Sheet Finger Ring (Tab. 2.5.2.14 a)

A fragment of a ring is made of a band-shaped bronze sheet that perhaps was connected to a round picture field. The hoop is ornamented in repoussé technique with punches in two rows (pl. 35, no. 4574c). Because of its appearance, this fragment seems to be part of a ring rather than only an ornamented sheet of metal that was used for another purpose.

Interpretation of the Bronze Ring of variety 5.2 (Tab. 2.5.2.14 b)
In graves in the Kuban region, bronze rings were unearthed that may resemble the fragment from Veshnaveh. One is made of a bronze sheet with a zigzag dot decoration (in repoussé technique?) and has a spiral bezel. It dates from the end of the first century AD. The other one dates from the 1st half of the 2nd century AD. More evidence would be needed to confirm any such tentative dating.

2.5.2.15 Variety 5.3: The Spiral Ring (Tab. 2.5.2.15 a)

One bronze ring was simply manufactured of a bronze wire (pl. 36, no. 4339a). Both ends overlap and are turned to form spirals.

Interpretation of the Ring of variety 5.3 (Tab. 2.5.2.15 b)
Spiral rings, made of different metals, were widespread in several regions from the prehistoric until recent times. Rings consisting of a wire hoop and one or several spirals as a bezel, or with the ends twirled to spirals, are known to originate from Greece, in the Mycenaean (2nd half of the 2nd mill. BC) and Geometric periods (900–800 BC).[44] Exact parallels to the Veshnaveh types with overlapping spiral ends are known from the (late) Roman or the Sasanian period. However, variants from Cheragh Ali Tappeh (pl. 40, no. 3142) and Madjid-e Suleiman were made by winding wires around the hoop or of two twisted bronze wires, forming the hoop and ending in spirals.

2.5.2.16 Variety 6.1: Rings with Oval Green Glass Inlays (Tab. 2.5.2.16 a)

Two quite similar bronze rings, each consisting of a ribbon hoop broadening towards the top, have an oval green translucent glass inlay (pl. 36, nos. 1108, 1131). The inlays are embedded into an oval opening in the broad part of the hoop. A negative pattern, no longer discernible, was worked into the inlays.

Interpretation of Rings of variety 6.1 (Tab. 2.5.2.16 b)
One fragmented ring from Hassani Mahale is comparable in shape and inlay to the specimens with oval glass inlays from Veshnaveh. By contrast, the silver ring from Djuben, consisting of a band-shaped hoop and attached glass, is not quite similar in shape, but it shows that negative patterns evidently were worked into the glass inlays (in this case a rabbit). A similar case is that of a copper ring from the Iranian province of Gilan. This strengthens

[44] Marshall, 1907, pl.xxxvii,A iii = no.874, pl.xxxix,C i = no.1219.

the assumption that the rings from Veshnaveh may have been signet rings. Unfortunately, it was not possible to recognise the possible motifs on the inlays.

Rings bearing a strong similarity in terms of shape are known from Roman contexts, however. They were found in the Roman Rhine Region in Germany and in Augst, Switzerland. Some of these rings lack inlays, others have inlays of green glass. Also similar in shape is a golden ring from the Alain Olivier collection, with a recessed oval lapis lazuli.

2.5.2.17 Variety 6.2: Finger Rings with Round Blue Inlays (Tab. 2.5.2.17 a)

One bronze ring with blue inlay has a very elaborate and special shape. It has got a ribbon hoop with a broadening bezel. On top of this segment a stepped round bezel is applied. Its middle is filled with light blue, surrounded by white glass or frit. Two bronze bulges at each side decorate the bezel (pl. 37, no. 4182a).

Fragments of a bronze ring and a translucent blue glass inlay cannot be reconstructed (no. 4672a).

Interpretation of Rings of variety 6.2 (Tab. 2.5.2.17 b)

North of the fire altar at Qasr-i Abu Nasr a copper finger ring with round lapis lazuli centre was found. This ring has a less elaborate shape than the ring from Veshnaveh (no. 4282a), but it resembles the item from Veshnaveh. In Chale Ghar 1 another round blue glass inlay was found (pl. 27, no. 1105). It has the same diameter of 0.5 cm and is preserved very well. Its blue glass has contained the shiny translucent appearance.

2.5.2.18 Variety 6.3: Finger Ring with Bezel (Lost Inlay) (Tab. 2.5.2.18)

One bronze finger ring with a hoop of an oval diameter has got a fragmented large oval bezel (pl. 37, no. 4445). Its inlay is lost, but a ruby or beryl inlay was found in Veshnaveh, that could fit into this bezel (pl. 37, no. 1228). The two artefacts were excavated in different features, but the stone might have belonged to this ring, because of very similar measurements of 1.2 × 0.8 cm. It is possible that ring and inlay got out of place within overlapping layers.

2.5.2.19 Variety 7: Finger Rings with Open Ends (Tab. 2.5.2.19 a)

The excavators also found rings made of round or band shaped hoops with open ends. One end is stump and the other spatulate (pl. 38, nos. 1775a; no. 4334). The rings have got an oval and round opening. No. 1775a (pl. 38) is ornamented by several parallel lines on the wire hoop.

Interpretation of Bronze Rings of variety 7 (Tab. 2.5.2.19 b)

In the case of rings with open ends, it can be difficult to distinguish rings from earrings. Nevertheless, the two rings nos. 1775a (pl. 38) and 4334 are defined as finger rings owing to their measurements, their slightly overlapping stub ends and their decorations. The comparison objects, listed below, prove this classification.

Similar bronze rings with various square sections of the hoop and open or overlapping ends have been found at sites of different periods and proveniences, such as Dinkha Tappeh, Surkh Dum-i Luri and Masdjid-e Suleiman, Ghalekuti and Hassani Mahale, as well as in Kamid El-Loz, Uruk, Samad al Shan and Augst (see tab. 2.5.2.19 b). In Dinkha Tappeh, one ring was described as having been found on the right hand of a child. In tombs at Ed-Dur, UAE, this kind of rings was discovered on the finger of the right hand of the buried person, as well as on the left foot of a skeleton (Haerinck, 2001, p.25). Obviously, this kind of ring was used on hands as well as on feet.

2.5.2.20 Variety 8.1: Rings with Oval and Rectangular (Offset or not Offset) Bezel (Tab. 2.5.2.20)

So far decorated rings have been presented, but in Chale Ghar 1, rings with un-decorated bezels were also found. The ornaments might have been destroyed or corroded, but some rings quite clearly appear never to have borne any kind of decoration (pl. 37, no. 1826). No. 4007 has a similar shape to ring no. 1227 with the stag decoration (pl. 32). Both have a ribbon hoop that continues to a broad oval and flat bezel, and both have a fairly small inner ring diameter of 1.45 cm and 1.2 cm. Ring no. 4007 probably shows a profiled head with the neck or shoulders; the face is not very good detectible and the hair seems to be made of 4 rows of punches. Bronze ring no. 6562 may have had a bezel that is fragmented and maybe contained an inlay.

2.5.2.21 Variety 8.2: Rings with Rhombic or Triangular Bezel (Tab. 2.5.2.21 a–b)

Four rings with rhombic or triangular bezels were found at Veshnaveh (pl. 38, 4341a), one of them in Chale Ghar 2.

2.5.2.22 Variety 8.3: Rings with Ribbon Hoop, Broadening to a Bezel (Tab. 2.5.2.22)

Nos. 4338 and 4340 are similar to the rings with decorations of a bird with a horizontally protruding tail, e.g. no. 1793 (pl. 29). There is no offset bezel, but a broader and

thicker section that is flattened slightly (nos. 4338 and 4340) or left slightly convex as with no. 4478 (pl. 38).

2.5.2.23 Variety 9: Corroded Iron Rings (Tab. 2.5.2.23 a)

The iron rings from Veshnaveh are very corroded and fragmented; therefore they are difficult to analyse. A total of 117 iron objects and fragments have been excavated at Veshnaveh. In many cases, it is not possible to identify their type, but some can be described as rings or earrings. Several iron finger rings can be identified as such by the continuous hoop and the bezel (nos. 1066; pl. 38, no. 1110; 1834b, 1834l, 4467, 4467b, 4530, 4556b, 4582a, 4804).

Interpretation of Iron Rings of variety 9 (Tab. 2.5.2.23 b)

Iron rings have been excavated at many sites throughout the Near East. Due to their corroded condition, it is hardly possible to compare them to the Veshnaveh finds. Nonetheless, it is interesting to note that iron rings were popular in different periods as well as in many regions of the Near East and the Roman world. The rings from Veshnaveh show some interesting features. At least one of them has a hollow hoop (no. 4804), and some of the bezels seem to have been hollow, too (nos. 4556b, 4582a). These observations raise questions with regard to the technique used in their manufacture. How and why were the hollow hoops and bezels produced? Was it in order to achieve lighter artefacts? An iron finger ring from Tanais with blue glass inlay may be compared to the ring with green glass inlay (variety 10) from Veshnaveh (Arsen'eva, Bezuglov and Toločko, 2001, pl.54,658).

2.5.2.24 Variety 10: Iron Ring with Green Inlay (Tab. 2.5.2.24)

One fragmented ring still contains a small round greenish inlay (pl. 38, no. 1783a). On account of the heavy corrosion, figures for the rings' diameters are to be treated with caution.

Tab. 2.5.2.1 a: Chale Ghar 1, bronze and silver finger rings of variety 1.1.1.

Find Number	Feature	Material	Shape and condition	Measurements
1097	10012	Silver	Continuous ribbon hoop, rhombic bezel, not offset; complete	D. 1.89 cm, inner D. 1.46 cm
1517	10012	Silver	Continuous ribbon hoop, oval bezel, not offset; complete	D. 1.9 cm, inner D. approx. 1.5 - 1.6 cm
1572	10013	Copper alloy	Continuous wire hoop, soldered rectangular offset bezel; fragmented	Unknown
1814	10013/1	Bronze	Continuous (?) ribbon hoop, offset oval bezel, complete	D. 2.0 cm, inner D. 1.74 cm
4564f	10014	Bronze	Continuous ribbon hoop, soldered oval offset bezel; complete	D. 2.05 cm, inner D. approx. 1.9 - 1.95 cm
4597	10013	Bronze	Continuous ribbon to band shaped hoop, soldered? rectangular offset bezel; fragmented	D. 2.24 cm, inner D. 1.7 cm

Tab. 2.5.2.1 b: Illustrations of standing birds with assurgent tail feathers and crest from Iran, the Near east and adjacent regions.

Date	Object	Provenience	Reference
Pre-Arsacid?	Two rings with bird decoration	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.42,GMIS 217.
Sasanian	Cornelian seal with bird decoration	Qasr-i Abu Nasr/Iran	Brunner, 1978, p.109 no.29.
6th century AD	Silver vase with bird decoration	Acquired in Daghestan/Caucasus in 1902	Brussels, 1993, p.242 no.92.
Late Sasanian	Finger ring with bird decoration	Siah Darreh/Iran	The National Museum of Iran, Tehran, no. 2998.
7th–8th century AD	Fabric with bird pattern	Iran?	Paris, 2006, p.176 no.126.

Tab. 2.5.2.1 b: Illustrations of standing birds with assurgent tail feathers and crest from Iran, the Near east and adjacent regions.

Date	Object	Provenience	Reference
2nd half of the 7th century – beginning of the 8th century AD	Fabric with bird pattern	Hassaout tomb/Caucasus; probably from Egypt or Syria	Paris, 2006, pp.178-179 no.128.
6th – 8th century AD	Ring with rim decoration of incised lines	Unknown provenience	Chadour, 1994, 142 no.478.
Sasanian/end of 8th to beginning of 9th century AD	Two silver plates with bird decoration	Iran? and Tchurinskaia/Viatsk	Brussels, 1993, p.137 no.133, p.217 no.69.
Post Sasanian	Fabric with bird pattern	Iran?	Paris, 2006, p.177 no.127.

Tab. 2.5.2.2 a: Chale Ghar 1, bronze rings of variety 1.1.2.

Find Number	Feature	Material	Shape and condition	Measurements
1793	10013/1	Bronze	Ribbon hoop, broadening to a ‘bezel‘; complete	D. 2.25 cm, inner D. 2.0 cm
4516a	10012/6	Bronze	Ribbon hoop, broadening to a ‘bezel‘; complete	D. 1.85 cm, inner D. 1.45 cm
4519	10012/6	Bronze	Ribbon hoop, broadening to a ‘bezel‘; complete	D. 1.98 cm, inner D. unknown, L. 1.6 cm

Tab. 2.5.2.2 b: Illustrations of simple birds from Iran.

Date	Object	Provenience	Reference
Sasanian	Stone seal with bird decoration	Unknown	Brunner, 1978, pp.110-112 nos.4i-j.
Late Sasanian	Bronze ring with bird decoration	Siah Darreh/Iran	The National Museum of Iran, Tehran, no. 2977.
Late Sasanian	Silver bowl with bird decoration	Quri Qale near Paveh, Kermanshah/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.678 no.304.

Tab. 2.5.2.3 a: Chale Ghar 1, bronze rings of variety 1.1.3.

Find Number	Feature	Material	Shape and condition	Measurements
1846	10013	Bronze	Continuous ribbon hoop, slightly offset oval bezel; complete	D. 1.73 cm, inner D. unknown
4521	10012/6	Bronze	Wire hoop, rectangular slightly offset bezel, complete	D. 2.0 cm, inner D. unknown, L. 1.76 cm

Tab. 2.5.2.3 b: Illustrations of birds in trap position from Iran and Europe.

Date	Object	Provenience	Reference
1st/2nd century AD	Roman gems of jasper and cornelian with bird decorations	Purchased in Rome	Henig, 2004, p.96 figs.9.102, 9.105 and 9.112.
Roman	Golden finger ring with bird and letters	Rottweil/Germany	Henkel, 1913, p.9 no.57, pl.III,57.
Sasanian	Stone seals with bird decorations	Unknown	Brunner, 1978, pp.110-112 no.4i-j.
Sasanian	Bronze finger ring with bird decoration and filling motifs	Rudbar/Iran	The National Museum of Iran, Tehran, no. 2951.

Tab. 2.5.2.4 a: Chale Ghar 1, bronze rings of variety 1.1.4.

Find Number	Feature	Material	Shape and condition	Measurements
1828	10013/1	Bronze	Continuous ribbon hoop, offset round bezel	D. 1.9 cm, inner D. unknown
4531	10012/6	Bronze	Ribbon hoop, oval offset bezel; fragmented. Hoop soldered at two sides of the bezel, not continuous	D. 1.7 cm, inner D. 1.48 cm

Tab. 2.5.2.4 b: Illustrations of roughly incised birds from Iran.

Date	Object	Provenience	Reference
Sasanian	Stone seals (e.g. agate, jasper etc.) with bird decoration	Unknown	Gyselen, 1993, pl.29,30.S.52-64.
Sasanian	Cornelian seal with bird decoration	Takht-e Suleiman/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.767 no.469c.
Late Sasanian	Two bronze finger ring	Sia Darreh and Amolu/Iran	The National Museum of Iran, Tehran, Nos. 2998, 3020.

Tab. 2.5.2.5 a: Chale Ghar 1, bronze rings of variety 1.1.5.

Find Number	Feature	Material	Shape and condition	Measurements
4511	10012/6	Bronze	Continuous ribbon hoop, rhombic offset bezel	D. 1.75 cm, inner D. unknown
4513	10012/6	Bronze	Continuous ribbon hoop, triangular slightly offset bezel; fragmented	D. 1.8 cm, inner D. 1.43 cm
4585a	Unknown	Bronze	Continuous ribbon hoop, triangular offset bezel; complete	Unknown

Tab. 2.5.2.5 b: Ring with triangular bezel and bird decoration from Iran.

Date	Object	Provenience	Reference
Sasanian	Copper finger ring	Qasr-i Abu Nasr/Iran	Frye 1973, 40, fig. 33.

Tab. 2.5.2.6: a Chale Ghar 1, bronze finger rings of variety 1.1.6.

Find Number	Feature	Material	Shape and condition	Measurements
1824	10013/1	Bronze	Continuous ribbon hoop, offset oval bezel, complete	D. 1.8 cm, inner D. unknown
4515	10012/6	Bronze	Continuous ribbon hoop, rectangular offset bezel; complete	D. 1.85 cm, inner D. 1.5 cm

Tab. 2.5.2.6 b: Illustrations of flying birds from Europe.

Date	Object	Provenience	Reference
1st century AD	Fragment of bronze finger ring with inlay of cornelian showing an incised eagle, probably starting to fly	Trier/Germany	Krug, 1995, p.51 no.9, pl.42,9.
6th century AD	Silver vase with bird decoration	Acquired in Daghestan, Caucasus 1902	Brussels, 1993, p.243 no.92.
Sasanian	Stone seals with bird decoration	Unknown	Gyselen, 1993, pl.29,30.S.40-48.

Tab. 2.5.2.7 a: Chale Ghar 1, bronze finger ring of variety 1.2.

Find Number	Feature	Material	Shape and condition	Measurements
4523	10012/6	Bronze	Continuous ribbon hoop, rectangular offset bezel; complete	D. 2.0 cm, inner D. 1.7 cm

Tab. 2.5.2.7 b: Illustrations of griffins from Iran and other origins.

Date	Object	Provenience	Reference
Achaemenid, 6th–5th century BC	Tiles with griffin decoration	Susa/Iran	Musée du Louvre, room 8/10 (salle 13).
Early 3rd–the 2nd century BC	Bronze plaque with griffin decoration	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.78,GMIS 551; Haerinck, 1983, p.14.
Sasanian	2 griffin shaped fibulae	Collection M. Foroughi	Musche, 1988, p.325 nos.4.1, 4.3.
Late Sasanian	Silver plate with griffin decoration	Khorrasan/Iran	Musée Cernuschi, 2006, p.53 no.3.
Late Sasanian	Silver plate with griffin decoration	Quri Qale, Kermanshah/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.678 no.303.

Tab. 2.5.2.8 a: Chale Ghar 1, bronze ring of variety 1.3.

Find Number	Feature	Material	Shape	Measurements
1227	10013/1	Silver?	Thick ribbon to round hoop, passing over to a flat oval bezel with deer motif; complete	D. 1.8 cm, inner D. approx. 1.2 cm

Tab. 2.5.2.8 b: Stag illustrations from Iran and other origins.

Date	Object	Provenience	Reference
Sasanian	Bronze ring with stag illustration	Qasr-i Abu Nasr/Iran	Musche, 1988, p.309, pl.CVIII topleft; Frye, 1973, nos.33-47.
Sasanian	Seals, agate etc. with stag illustrations	Moussa Collection and unknown	Brussles, 1993, p.286 no.127; Gyselen, 1993, pl.22,30.J.1-19.
Sasanian	Gem of chalcedony with illustration of a ‘fallow buck’ with star and crescent filling motifs.	Unknown	Carnegie, 1908, p.12, pl.1,P.27.
Sasanian	Copper ring with animal illustration and crescent motif	Hassani Mahale/Iran	Sono and Fukai, 1968, p.32, pl.LXVIII,10, pl.XL,10.
Sasanian	Metal ring of a continually broadening hoop with stag motif; antlers outspread.	Iran	Stutzinger, 2001, p.73 no.51.

Tab. 2.5.2.9 a: Chale Ghar 1, bronze finger rings of variety 2.

Find Number	Feature	Material	Shape and condition	Measurements
1829	10013/1	Bronze	Ribbon hoop ending below the rhombic offset bezel; fragmented	D. 1.7 cm, inner D. approx. 1.3 cm
4240a	10013	Bronze	Wire hoop attached to the flat oval bezel; fragmented	D. 1.65 cm, inner D. approx. 1.4-1.45 cm
4498	10012/6	Bronze	Continuous ribbon hoop, offset rhombic bezel; fragmented	D. 1.74 cm, inner D. 1.4 cm

Tab. 2.5.2.9 b: Inscribed finger rings from Iran, Iraq and Europe.

Date	Object	Provenience	Reference
Seleucid/Arsacid	Copper/bronze ring with inscription	Uruk/Iraq	Pedde, Heinz and Müller-Neuhof, 2000, p.47 no.745, p.48 no.748, pl.39,745, pl.40,748.
Seleucid/Arsacid	Bronze ring with inscription	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.80,GMIS 627.
Roman, 1st century AD	Gold ring with inscription	Unknown	Chadour, 1994, p.60 no.197.
Roman	53 bronze rings	Bonn/Germany	Henkel, 1913, p.81 nos.819-872, pl.XXXIII,819-872.
Late Sasanian	Two bronze rings with pseudo inscription	Siah Darreh/Iran	National Museum of Iran, Teheran, nos. 2983a, 2983b.

Tab. 2.5.2.10 a: Chale Ghar 1, bronze rings of variety 3.1.

Find Number	Feature	Material	Shape and condition	Measurements
1638a	10012/3	Bronze	Continuous ribbon hoop with thickened bezel; fragmented	D. 1.9 cm, inner D. approx. 1.45 cm
4311d	10012/5	Bronze	Ribbon hoop ending below the offset triangular bezel; complete	D. 1.75 cm, inner D. 1.53 cm
4442a	10012/5-6	Bronze	Ribbon-to-band shaped hoop attaching the slight trapezoid bezel; one end of hoop is made of plated wires; fragmented	D. 1.78 cm, inner D. 1.45 cm
4453	10014	Bronze	Ribbon hoop with a flat rhombic bezel; complete	D. 1.95 cm, inner D. 1.6 cm

Tab. 2.5.2.10 b: Chale Ghar 1, finger rings of variety 3.2.

Find Number	Feature	Material	Shape and condition	Measurements
1274	10012/2	Bronze	Continuous hoop with thickened centre; fragmented	L. of the fragment: 1.4 cm
1427	10018	Bronze	Continuous hoop with thickened centre; fragmented	L. of the fragment: 1.1 cm
1504	10019	Copper alloy?	Continuous hoop with thickened centre; fragmented	D. 1.45 cm, inner D. unknown

Tab. 2.5.2.10 c: Rings with plant motifs from Iran, the Near east and Europe.

Date	Object	Provenience	Reference
Arsacid	Bronze ring with plant illustration	Khark/Southern Iran	The National Museum of Iran, Tehran, no. 3011.
Arsacid	Silver ring with plant illustration	Qazwin/Iran	Zahlhaas, 1985, p.45 no.54.
3rd – early 2nd century BC	Two bronze rings with plant illustration	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.35,GMIS 480a, pl.79,GMIS 606b; Haerinck, 1983, p.14.
Roman, 1st century AD	Two Gold rings with plant illustration	Unknown	Chadour, 1994, p.55 nos.178-179.
1st century AD	Two golden rings with plant illustration	Unknown and Masada	Naumann-Steckner, 1980, p.57 no.137, pl.25; Yadin, 1967, p.150 bottom centre.
Roman	Three gold rings with plant illustration	Worms, Mainz, Köln/Germany	Henkel, 1913, p.8 nos.45-46, p.9 no.60, pl.III,45-b, 46a-b, 60a.

Tab. 2.5.2.10 c: Rings with plant motifs from Iran, the Near east and Europe.

Date	Object	Provenience	Reference
Beginning of the Byzantine period	Bronze ring with raised thickened part	Salamine/Cyprus	Chavane, 1975, pl.43,415. 145.
Late Sasanian	Bronze ring with plant illustration	Siah Darreh/Iran	The National Museum of Iran, Tehran, no. 3009.
12th–18th century AD	Bronze ring with plant illustration	Ghubayra, Kerman/Iran	Bivar, 2000, p.108, pl.70e-f.

Tab. 2.5.2.11 a: Chale Ghar 1, bronze finger rings of variety 4.1.

Find Number	Feature	Material	Shape and condition	Measurements
1091	10012	Silver?	Continuous ribbon hoop with bezel in shape of an upside down-cone; complete	D. 1.91 cm, inner D. 1.64 cm
1820	10013/1	Bronze	Continuous ribbon hoop attached rhombic bezel (hoop broader than picture field!); complete	D. 2.1 cm, inner D. approx. 1.7 cm

Tab. 2.5.2.11 b: Rings of similar shape or with cross decoration from Iran, the Near East and Europe.

Date	Object	Provenience	Reference
Seleucid/Arsacid	Ring with cross motif	Uruk/Iraq	Pedde, Heinz and Müller-Neuhof, 2000, p.47 no.743, pl.39,743.
Roman	Bronze ring with cross motif	Kreuznach/Germany	Henkel, 1913, p.91 no.977, pl.XXXVIII,977a.
3rd/4th century AD	Bronze ring with cross motif	Syria	Zahlhaas, 1985, pl.48 no.61.
5th–7th century AD	Bronze ring with conical bezel	Lebanon	Zahlhaas, 1985, p.53 no.76.
6th–8th century AD	Two silver rings with conical bezel	Lebanon	Zahlhaas, 1985, p.53 no.76.
7th/8th century AD	Three bronze rings with conical bezel	Rayy/Iran Nasser D. Khalili Collection. Mostagedda/Middle Egypt.	Wenzel, 1993, pp.22-23 no.35.
7th–12th century	Bronze ring with conical bezel	Qanat Tappeh, Nishapur/Iran	Allan, 1982, p.68 no.56.

Tab. 2.5.2.12 a: Chale Ghar 1, bronze ring of variety 4.2.

Find Number	Feature	Material	Shape and condition	Measurements
1807	10013/1	Bronze	Continuous ribbon hoop, offset oval bezel; fragmented	D. 2 cm, inner D. 1.54 cm

Tab. 2.5.2.12 b: Rings with dot/eye decoration from Iran.

Date	Object	Provenience	Reference
Late Sasanian	Bronze ring with three incised ‘circle eyes’	Rudbar/Iran	The National Museum of Iran, Tehran, no. 2952.
Late Sasanian	Bronze ring with three incised ‘circle eyes’	Siah Darreh/Iran	The National Museum of Iran, Tehran, no. 3003.
Sasanian	Bronze ring with two incised ‘circle eyes’	Cheragh Ali Tappeh (Marlik)/ Iran	The National Museum of Iran, Tehran, no. 3140.

Tab. 2.5.2.13 a: Chale Ghar 1, bronze finger ring of variety 5.1.

Find Number	Feature	Material	Shape and condition	Measurements
6064a	10022	Bronze	Band shaped hoop soldered at both sides of a smaller rectangle; complete	D. 2 cm, inner D. 1.8 cm

Tab. 2.5.2.13 b: 'Tie ring' from Iran.

Date	Object	Provenience	Reference
Sasanian	Bronze ring	Siah Darreh/Iran	The National Museum of Iran, Tehran, no. 3002. Excavation Hakemi.

Tab. 2.5.2.14 a: Chale Ghar 1, finger ring of variety 5.2.

Find Number	Feature	Material	Shape and condition	Measurements
4574c	10013	Bronze	Band-shaped hoop with repoussé decoration; fragmented	L. of the fragment 2.06 cm

Tab. 2.5.2.14 b: Rings of bronze sheet from the Kuban region.

Date	Object	Provenience	Reference
End of the 1st century AD	Ring made of a decorated bronze sheet, spiral bezel	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.371, p.388, pl.117,5.
1st half of the 2nd century AD	Ring made of a broad, decorated bronze sheet, zigzag decoration	Adygeen/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.376, p.389, pl.205,3.

Tab. 2.5.2.15 a: Chale Ghar 1, bronze finger ring of variety 5.3.

Find Number	Feature	Material	Shape and condition	Measurements
4339a	10012/6	Bronze	Wire hoop, ends are overlapping spirals	D. 2 cm, inner D. 1.5 cm

Tab. 2.5.2.15 b: Spiral rings from Iran, Germany and the Black Sea littoral.

Date	Object	Provenience	Reference
Arsacid	Bronze ring with spiral ends	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.28,GMIS 92; Musche, 1988, p.234, pl.LXXXII,14.2.
Roman	Silver ring with spiral ends	Saalburg/Germany	Henkel, 1913, p.46 no.328, pl.XVII,328.
Roman	16 bronze rings with spiral ends	Throughout Rhine Valley/ Germany	Henkel, 1913, p.75 nos.721-735, pl.XXIX,721–735b.
Roman	Copper ring with spiral ends	Rheinzabern/Germany	Henkel, 1913, p.129 no.1397, pl.LIV,1397a-b.
Roman	Two rings made of gold wire, each with four spirals as bezel	Čuguno-Krepinka/Northern Black Sea Littoral	Simonenko, Marčenko and Limberis, 2008, p.65, pl.66,1b.
1st half of the 1st century AD	Metal ring with band-shaped hoop and one spiral bezel	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.369, p.288, pl.163,5.
Late Roman	Gold ring with spiral ends	Unknown	Marshall 1907, pl. xxv, no. 986.

Tab. 2.5.2.15 b: Spiral rings from Iran, Germany and the Black Sea littoral.

Date	Object	Provenience	Reference
Sasanian	Four bronze rings with spiral ends	Cheragh Ali Tappeh (Marlik)/Iran	The National Museum of Iran, Tehran, nos. 3142 (4 objects with same number).
Recent	Spiral amulets with spiral ends, metal	Khartoum/Sudan	Kriss and Kriss-Heinrich, 1962, fig.45,1-6, figs.46,2-4, figs.47,1-4.

Tab. 2.5.2.16 a: Chale Ghar 1, bronze rings of variety 6.1.

Find Number	Feature	Material	Shape and condition	Measurements
1108	10012	Bronze	Band-shaped hoop, bezel with green glass inlay; complete	D. 1.86 cm, inner D. approx. 1.65 cm
1131	10013/1	Bronze	Band-shaped hoop, bezel with green glass inlay; fragmented	D. 1.8 cm, inner D. approx. 1.7 cm

Tab. 2.5.2.16 b: Rings with glass inlay from Iran, the Black Sea region and Europe.

Date	Object	Provenience	Reference
Early Roman Iron Age	Finger ring with oval garnet inlay	Collection F.L. von Gans	Greifenhagen, 1975, p.78, pl.58,9-10.
Early Roman Iron Age	Finger ring with oval sapphire inlay	Collection Poniatowski	Greifenhagen, 1975, p.78, pl.58,11-12.
1st–3rd century AD	Copper(?) ring	Hassani Mahale/Iran	Musche, 1988, p.226, pl.LXXX,3.2; Sono and Fukai, 1968, pl.LXIII,13, pl.XXXVIII,14.
Arsacid	Silver ring	Djuben/Iran	The National Museum of Iran, Tehran, no. 3029.
1st century AD	Golden ring	Collection Alain Olivier	Chadour-Simpson, 1997, pp.114-116.
2nd half of the 1st century AD	Bronze ring with oval inlay	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.372, p.388, pl.182,5.
Roman and early Roman Iron Age	Two golden rings	Mainz, Rhine area and Trier/Germany	Henkel, 1913, p.22 no.34, p.25 no.157, pl.VII,134a, pl.VIII,157a, p.26, no.171, pl.IX,171a.
1st–3rd century AD?	Copper ring with brownish glass inlay	Gilan/Iran	Fukai, 1977, no.54.
1st–2nd century AD	Iron ring	Augst/Switzerland	Riha, 1990, p.129, pl.5,80.
Late 1st–3rd century AD	Silver ring	Augst/Switzerland	Riha, 1990, p.129, pl.6,92.

Tab. 2.5.2.17 a: Chale Ghar 1, bronze finger rings of variety 6.2.

Find Number	Feature	Material	Shape and condition	Measurements
4672a	10013	Bronze	Fragments of ring and blue glass inlay	D. 2.05 cm inner D. unknown
4182a	10012/4	Bronze	Continuous ribbon hoop, round bezel with blue/white inlay; complete	D. unknown, inner D. approx. 1.4 cm

Tab. 2.5.2.17 b: Ring with blue inlay from Iran.

Date	Object	Provenience	Reference
Sasanian	Copper finger ring	Qasr-i Abu Nasr/Iran	Frye, 1973, p.41 no.47.

Tab. 2.5.2.18: Chale Ghar 1, finger rings variety 6.3.

Find Number	Feature	Material	Shape and condition	Measurements
4445	10012/6	Bronze/Silver?	Oval hoop, attaching the bezel at two sides; fragmented	D. 1.35 cm, inner D. 1.05 cm

Tab. 2.5.2.19 a: Chale Ghar 1, bronze rings of variety 7.

Find Number	Feature	Material	Shape and condition	Measurements
1775a	10013/1	Bronze	Round hoop, one stump, one spatulate end; complete	D. 1.7 cm, inner D. approx. 1.3 cm
4334	10012/6	Bronze	Ribbon hoop, one stump, one spatulate end; complete	D. approx. 1.7 cm, inner D. approx. 1.6 cm

Tab. 2.5.2.19 b: Rings with open ends from Iran, the Near East and Europe.

Date	Object	Provenience	Reference
Dinkha III, 1250–1000 BC	Ring with open ends	Dinkha Tappeh/Iran	Muscarella, 1974, p.44, p.45, fig.12,462.
6th century–the middle of the 5th century BC	Ring with overlapping open ends	Surkh Dum-i Luri/Iran	Overlaet, 2000, p.36, pl.160u.
Terminus post quem 450/440 BC (until probably 370/60 BC)	Two rings with open ends	Kamid El-Loz/Lebanon	Poppa, 1978, p.84, p.124, pl.10,11:1, pl.22,76,19.
Seleucid? and 3rd–2nd century BC	Seven rings with open ends	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.CVIII,1, pl.25, pl.28,GMIS 74, pl.55, GMIS 371d; Haerinck, 1983, p.14.
1st century BC–1st century AD	Three bronze rings with open and overlapping ends, one bronze toe-ring.	Ed-Dur/UAE	Haerinck, 2001, p.25 no.N253, pl.37,2.50., pl.83,5-7.
1st–3rd century AD	Ring with open ends	Ghalekuti/Iran	Sono and Fukai, 1968, p.37, pl.XLVII,7, pl.LXXX,7.
300 BC–200 AD respectively 1000 AD	Rings with open ends	Samad al Shan/Oman	Yule, 2001, p.163, pl.159,4 and 6, pl.426,7, pl.427, 18.
1st–3rd century AD	Two rings with open and overlapping ends	Hassani Mahale/Iran	Sono and Fukai, 1968, pl.LXVI-II,11-12.
No date	Six rings with open ends	Uruk/Iraq	Pedde, 2000, p.49, pl.41,776, 779-780, 783, 787, 794.
Roman	Five rings with open ends	Augst/Switzerland	Riha, 1990, p.138, pl.15,303-307.

Tab. 2.5.2.20: Chale Ghar 1, bronze rings of variety 8.1.

Find Number	Feature	Material	Shape and condition	Measurements
1478	10019	Copper alloy	Ribbon hoop attached to the oval bezel at two sides; complete	D. 1.85 cm, inner D. approx. 1.6 cm
1815	10013/1	Bronze core, silver coating?	Continuous ribbon hoop, rectangular offset bezel; fragmented	D. 2 cm, inner D. approx. 1.9 cm
1826	10013/1	Bronze	Continuous ribbon hoop, oval bezel; complete	D. 1.8 cm, inner D. approx. 1.7 cm
4007	10013	Bronze	Ribbon hoop continuing to a broad, flat oval bezel; complete	D. unknown inner D. 1.45 cm
4263a	10012/5	Bronze	Ring with rectangular to oval offset bezel; fragmented	L. of fragment 1.4 cm
4446	10012/6	Bronze	Continuous ribbon hoop, rectangular offset bezel; fragmented	D. 2 cm, inner D. approx. 1.7 cm
4457b	10012/6	Bronze	Hoop of round diameter attaching the rectangular offset bezel; complete	D. 1.06 cm, inner D. approx. 0.9 cm
4477	10012/6	Bronze	Hoop of round diameter, oval bezel; very corroded, complete	D. 1.9 cm, inner D. approx. 1.7 cm
6562	10050	Bronze	Wire hoop ending below oval fragmented bezel; fragmented	D. 1.75 cm, inner D. 1.5 cm

Tab. 2.5.2.21 a: Chale Ghar 1, bronze rings of variety 8.2.

Find Number	Feature	Material	Shape and condition	Measurements
4341a	10012/6	Bronze	Continuous ribbon hoop, offset rhombic bezel; complete	D. 1.8 cm, inner D. 1.5 cm
4419a	10012/5	Bronze	Ribbon hoop, rhombic offset bezel; complete	D. 1.85 cm, L. 1.5 cm
4485a	10012/6	Bronze	Ribbon hoop, offset triangular bezel, complete	D. 2.0 cm, inner D. approx. 1.8 cm

Tab. 2.5.2.21 b: Chale Ghar 2, bronze ring of variety 8.2.

Find Number	Feature	Material	Shape and condition	Measurements
7181d1	11099	Bronze	Ribbon hoop, probably rhombic bezel; complete, very corroded	D. 1.6 cm, inner D. 0.97 cm

Tab. 2.5.2.22: Chale Ghar 1, bronze rings variety 8.3.

Find Number	Feature	Material	Shape and condition	Measurements
4338	10012/6	Bronze	Broad, ribbon hoop, broadened and flattened bezel; complete	D. 2.2 cm, inner D. 1.72 cm
4340	10012/6	Bronze	Broad, ribbon hoop, broadened and flattened bezel; complete	D. 2.2 cm, inner D. 1.95 cm
4478	10012/6	Bronze	Broad, ribbon hoop, broadened convex bezel; complete	D. 1.8 cm, inner D. 1.5 cm - 1.6 cm

Tab. 2.5.2.23 a: Chale Ghar 1, iron rings of variety 9.

Find Number	Feature	Material	Shape and condition	Measurements
1066	10012	Iron	Band shaped hoop? with thickened bezel; very corroded	D. largest 2.3 cm x 2.62 cm, inner D. approx. 1.3 cm
1110	10012	Iron	Round hoop with thickened bezel; very corroded	D. largest approx. 2.3 cm, inner D. approx. 1.5 cm
1834l	10013/1	Iron	Ribbon hoop with slightly thickened bezel; fragmented, restored	D. largest 2.17 cm, inner D. approx. 1.7 cm
4467b	10012/5	Iron	Hoop with thickened bezel; fragmented, very corroded	D. largest and inner D. unknown
4494b	10019	Iron	Hoop with thickened bezel; very corroded, fragmented	D. largest and inner D. unknown
4530	10012/6	Iron	Round hoop, traces of oval bezel; soldered (?), fragmented, very corroded.	L. of fragment 2.15 cm
4556b	10014	Iron	Oval (original hollow?) bezel with traces of round hoop; fragmented, very corroded	D. largest of fragment 1.7 cm
4582a	10014	Iron	Oval (original hollow?) bezel with traces of round hoop; fragmented, very corroded.	L. of fragment 1.65 cm
4804	10013	Iron	Fragment of continuous hollow hoop, oval convex offset bezel; fragmented, very corroded.	Inner D. 1.4 cm

Tab. 2.5.2.23 b: Iron finger rings from Iran and the Near East.

Date	Object	Provenience	Reference
6th–3rd century BC?	Iron ring	Carthage/Tunisia	Exhibition of the Musée du Louvre AO 6549.
300 BC–1000 AD	Iron ring	Samad al Shan/Oman	Yule, 2001, p.270, pl.175,5.
Seleucid?	Four iron rings	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.35,GMIS 407, pl.55,GMIS 281b.
Last century of the Roman Republic–early Roman Iron Age	35 iron rings with or without inlay	Rhine area	Henkel,1913, pp.130-133 nos.1407-1442.
1st century AD	Iron finger ring with round blue glass inlay	Tanais/Russia	Arsen'eva, Bezuglov and Toločko, 2001, p.45, pl.54,658.
4th–5th century AD	Ring	Tell Mohammed Arab/Iraq	Kind notification of M. Roaf, see also Roaf 1984.
Islamic, terminus ante quem 1393 AD	Ring	Ghubayra, Kerman/Iran	Bivar, 2000, p.124, no.32, fig.59,80-903

Tab. 2.5.2.24: Chale Ghar 1, iron ring of variety 10.

Find Number	Feature	Material	Shape and condition	Measurements
1783a	10013	Iron	Fragment of finger ring with thickened centre and small round greenish inlay.	L. preserved 1.42 cm, inner D. at least approx. 1.1 cm (probably larger!)

2.6 Earrings

Because of their shape, size and pointed, open ends, 35 bronze and corroded iron objects could be identified as earrings. It is very probable that far more earrings were deposited at Veshnaveh: a number of iron objects was found, and they are likely to have contained earrings or finger rings. Because of their corrosion, it is not possible to tell them apart or to date them.

Even though the earrings from Veshnaveh are of simple shapes, they vary in detail: some are made of metal hoops; some are lunula-shaped with a central round and hollow body; some are hollow U-shaped; and there is also an earring with a cone ornament. One shell earring remains unique among the finds from Veshnaveh.

2.6.1 Metal Earrings

2.6.1.1 Simple Hoop Earrings of Bronze or Copper Wire (Tab. 2.6.1.1 a)

The simplest style of earrings are hoops made of a metal wire. In case of the Veshnaveh finds, these types are made of bronze, mainly with a round opening. The table below lists nine earrings: Five of them are manufactured with a round wire, while the others are made of d-shaped (no. 1551), rhombic (pl. 41, no. 1574) and band-shaped metal (no. 4959c). All earrings have pointed ends, aside from one with a spatulate end (pl. 41, no. 1347) and one with probably flat ends (no. 1267a) – due to corrosion, it is not possible to be certain with regard to the shape of the ends in this case. It is remarkable that one wire is made of a hollow tube (see pl. 42, no. 1336b).

Concerning the material, five of the wire-shaped earrings were examined by the Iranian Research Centre for the Conservation of Cultural Relics (RCCCR), and the analysis showed that all five were made of bronze (Ghazian and Ghasemi, 2011). The further declaration of the material as ‘copper alloy’, however, is based on appearance and kind of corrosion.

Interpretation of Simple Hoop Earrings of Bronze or Copper Wire (Tab. 2.6.1.1 b)

B. Musche writes that the basic shape of hoops, made of a metal wire, was known in the Arsacid period and was adopted from earlier times. This shape had been developed further within a long tradition (Musche, 1988, p.51, p.57). Simple hoops of metal wires have been excavated at different archaeological sites in the Near East and Iran and date from different periods. The comparison objects presented here were found in architectural contexts and in burials. With regard to the earring made of a rhombic shaped section of the bronze rod, two earrings from tomb 5 from Ghalekuti, Iran are noteworthy. They are also made of a rhombic shaped rod and were found close to the ear of a female skeleton. These earrings are much more massive than the parallels from Veshnaveh. They have no pointed ends, yet they resemble the specimen with rectangular/rhombic cross section from Veshnaveh and they prove the use of this type as earring, because of their location close to the ear of the deceased.

2.6.1.2 Bronze Earrings with Swelling (Tab. 2.6.1.2)

In contrast to the simple bronze hoops, three corroded and fragmented bronze earrings are not only made of a metal wire, but are also ornamented by a central bulge, or are made of a bulky rod. Two have a thin d-shaped (no. 1856a) and an oval shaped wire (pl. 41, no. 4476a) and a slight central bulge. No. 4476a may also be interpreted as a finger ring, now broken and out of shape. Still, it gives the impression of being an earring. Earring no. 1336b (pl. 42) was manufactured of a thick wire or rod, thickening towards the centre.[45]

2.6.1.3 Small Crescent Bronze Earrings (Tab. 2.6.1.3 a)

Two bronze earrings are similar in shape to the above category, but they differ from the bronze earrings with bulges in size, being much smaller and of a crescent shape with a thickened middle part (pl. 41, 4497a).

Interpretation of Small Crescent Bronze Earrings (Tab. 2.6.1.3 b)

As comparisons from graves of Dura Europos show, it appears that these small hoop-shaped bronze rings from Veshnaveh were worn on the ear. It has not been examined yet, whether these earrings were clamped to the ear or whether they pierced it. Earring no. 4497a (pl. 41) has a remnant of an extension. It is a thin wire that could have been used to penetrate the ear. This simple shape appears in many periods and regions of the Near East.

2.6.1.4 Bronze Earring with Cone Ornament (Tab. 2.6.1.4 a)

A single earring stands out amongst the bronze earrings from Veshnaveh. It is a fragmented bronze earring, which is ornamented with a cone (pl. 42, 6389a1). This piece of jewellery appears to be made of round wire, which, however, is difficult to verify because of severe corrosion.

[45] A fourth fragment found besides the ‘metal sheet ring’ no. 4574c (pl. 35), but without a number, is heavily corroded and cannot be identified for sure, but it seems to be an earring as described above.

Interpretation of one Bronze Earring with Cone Ornament (Tab. 2.6.1.4 b)
This type of earring is very common in different periods and exists in several variants: Semicircular earrings are provided with one or several granules instead of a cone, and sometimes the cone is very pronounced and decorated.

2.6.1.5 Iron lunula Earrings with Round Body (Tab. 2.6.1.5 a–b)

Iron is the material most frequently used in the earrings found at Veshnaveh. Iron objects have been found in both mines, Chale Ghar 1 and Chale Ghar 2. Most are very corroded, and those that are sufficiently well-preserved for observations to be made consist of a hoop with a round bulge (pl. 42, nos. 4188f, 4302a). It is uncertain whether the corroded iron objects originally were finger rings or earrings, but due to the iron having been fashioned into hollow artefacts with pointed ends (when preserved) it would seem appropriate to classify some of the iron rings as earrings. According to P. R. S. Moorey (1985, pp.87-89), earrings often are made of a hollow wire and body either by making two parts and soldering them together, or by leaving a bore hole open and closing it later. Due to corrosion, no measurements are given in the tables.

Interpretation of Iron Lunula Earrings with Round Body (Tab. 2.6.1.5 c)
Hollow lunula-shaped, round-bodied earrings were widespread over a long period. They were already known at least from the early Dynastic period in Mesopotamia (Musche, 1992, pp.82-83). In detail, this shape varies and may be ornamented by granules or wires (Musche, 1992, p.180). While most hollow comparison objects are made of gold or silver, at Veshnaveh this kind of earring is made of iron. The references show that simple earrings made of a wire and a larger or smaller oval bulge are known from a Sargonid grave of the 3rd millennium BC as well as from 11th–10th century Palestine, from a late Assyrian tomb and from reliefs, from 8th–7th century War Kabud and from the 7th to the 6th century Neo-Babylonian Uruk. These earrings are mostly made of gold and sometimes vary in decoration, e.g. the Assyrian ones, which 'have three triple ribs applied round the body' (Maxwell-Hyslop, 1971, p.238). This type is common until the early centuries AD, as comparisons from Kamid El-Loz, Ur and Amazis-Chevi show. The Arsacid references are similar only in their basic shape. The ones presented in B. Musche's work (1988, pp.76-78) are decorated using different techniques and materials. Finds from the Volga region of the 1st to the 2nd century BC, however, are described as finger rings. This may again open the discussion on whether the remains described here are earrings or finger rings.

2.6.1.6 Iron U-shaped Earring (Tab. 2.6.1.6 a)

One iron ornament is made of a completely hollow, U-shaped metal (pl. 42, no. 4527).

Interpretation of a U-Shaped Iron Earring (Tab. 2.6.1.6 b)
Similar earrings, but dating much further back, have been found in Palestine. They are indeed made in a U-shape, but are additionally decorated with granules. From Augst, an earring from the 1st century AD is known which seems to resemble the Veshnaveh type. It is made of a thin, undecorated bronze sheet formed to a U-shaped earring. A hollow, golden example comes from the Volga region and dates to the 2nd–1st century BC.

2.6.2 Shell Earring

2.6.2.1 Description of one Shell Earring (Tab. 2.6.2.1 a)

The only earring to have been made of a non-metallic material is a white circular worked shell, which was found in the entrance area of Chale Ghar 1. It resembles the shape of a rhomboid or an oval with smooth pointed ends that are carved to a ring (pl. 42, no. 6787d).

Interpretation of the Shell Earring (Tab. 2.6.2.1 b)
No exact reference could be found to the shell earring. Two open rings of mollusc shell were found in a grave in Samad al Shan, Oman. While the specimen from Veshnaveh appears thoroughly worked, the earrings from Samad seem to be simply broken off a shell. It is questionable whether these actually served as earrings.

Tab. 2.6.1.1 a: Chale Ghar 1, simple earrings (hoops).

Find Number	Feature	Material	Shape of wire	Diameter of wire (cm)	Diameter of earring
1261	10012/2	Bronze (analysed)	Pointed end?	0.16 cm	Unknown (fragmented)
1267a	10013	Bronze	Round with flat ends	0.2 cm–0.35 cm	D. 1.47 cm
1336a	10013	Bronze (analysed)	Round, pointed ends	0.13 cm	2.3 cm

Tab. 2.6.1.1 a: Chale Ghar 1, simple earrings (hoops).

Find Number	Feature	Material	Shape of wire	Diameter of wire (cm)	Diameter of earring
1336b	10013	Bronze (analysed)	Round, hollow, pointed ends	0.07 cm–0.12 cm	1.7 cm–1.8 cm
1336c	10013	Bronze (analysed)	Round, pointed ends	0.11 cm–0.2 cm	1.9 cm
1347	10013	Bronze (analysed)	Round, one pointed one spatulate end	0.12 cm	1.8 cm
1551	10012	Copper alloy	D-shaped, ends not preserved	0.12 cm × 0.15 cm	1.9 cm
1574	10012	Copper alloy, gold plated?	Rhombic, pointed ends	0.15 cm × 0.2 cm	2.3 cm
4959c	10013	Bronze	Flat band-shaped, pointed ends?	0.16 cm	Unknown (fragmented)

Tab. 2.6.1.1 b: Simple metal hoops from Iran and the Near East.

Date	Object	Provenience	Reference
Late second, early 1st millennium BC	Two earrings made of silver with pointed ends	Ghalekuti/Iran	Egami, Fukai and Masuda, 1965, pl.LXXXI,13-14.
Approx. 16th to 14th century BC	Earring made of an electron wire	Tell Zubeidi/Iraq	Musche, 1992, p.172 type 1, pl.LX.
Seleucid?	Earring of metal wire with small granule ornament	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.55,GMIS 248.
1st century BC/1st century AD	Silver (?) earring (?) with two pointed ends	Ed-Dur/UAE	Haerinck, 2001, p.86, no.BS 228, pl.305,1.
100 AD (non-calibrated ^{14}C date)	Copper earring with pointed open ends	Al Tar/Iraq	Fujii, 1976, pp.241-242 no.3, pl.LXXXII,a.
1st–3rd century BC	Two earrings of a rhombic shaped silver rod	Ghalekuti/Iran	Sono and Fukai, 1968, pl.XLVII,10-11, pl.LXXX,5; Hori 1981, p.50 fig.5,14, p.51.
Arsacid	Earrings made of silver or bronze wire	Dura Europos/Syria	Musche, 1988, p.54 no.1.1.1.
Arsacid	Earrings made of silver or bronze wire	Germi/Iran	Musche, 1988, p.54 no.1.1.1.

Tab. 2.6.1.2: Chale Ghar 1, bronze earrings with swelling.

Find Number	Feature	Material	Shape of wire	Diameter of wire (cm)	Diameter of earring
1336b	10013	Bronze	Round, with one pointed end, fragmented	0.13 cm	2.3 cm
1856a	10013	Bronze	D-shaped, pointed ends	0.1 cm × 0.2 cm	1.91 cm
4476a	10013	Bronze	Oval shaped	Unknown	L. approx. 3 cm

Tab. 2.6.1.3 a: Chale Ghar 1, small bronze crescent earrings.

Find Number	Feature	Material	Shape of wire	Diameter of wire (cm)	Diameter of earring
1957a	10013	Bronze, corroded	Round, one pointed end	Unknown	1.5 cm
4497a	10019	Bronze	Round, pointed ends	0.21 cm	0.85 cm

Tab. 2.6.1.3 b: Small bronze earrings from Syria.

Date	Object	Provenience	Reference
12th century BC	Solid lunate earring made of electron, Type I.1 according to Golani 2013, 234-235	Tell Ashdod/Israel	Golani, 2013, p.235 fig.8,4.
11th–10th century BC	Solid lunate earring made of gold, Type I.1 according to Golani 2013, 234-235	Tel Miqne-Ekron/Israel	Golani, 2013, p.234, p.235 fig.8,3.
7th century BC	Solid lunate earring made of silver, Type I.1 according to Golani 2013, 234-235	Tel Miqne-Ekron/Israel	Golani, 1996, fig.6.1; 2013, p.234, p.235 fig.8,2.
Arsacid	Several small metal earrings; simple hoops	Dura Europos, Syria	Musche, 1988, pp.56-57 fig.2.

Tab. 2.6.1.4 a: Chale Ghar 1, earring with cone ornament from Veshnaveh.

Find Number	Feature	Material	Shape of wire	Diameter of wire (cm)	Length of earring
6389a1	10022	Bronze	Round?	0.14 cm	approx. 1.6 cm

Tab. 2.6.1.4 b: Earrings with cone ornaments from the Near East.

Date	Object	Provenience	Reference
2nd millennium BC. Middle Bronze Age II	Three golden simple earrings with decoration of one or several granules	Tell el-Ajjul/Palestine	Musche, 1992, p.151 type 1, pl.LII.
Late Cypriot Ia (1550–1450 BC)	5 golden earrings with cone or ‘mulberry’ pendants	Enkomi/Cyprus	Maxwell-Hyslop, 1971, pp.129-130 fig.96.
End of the 16th/beginning of the 15th century BC	Two penannular golden earrings with ‘mulberry’ pendants	Ajjul/Palestine	Maxwell-Hyslop 1971, fig. 77a, b. 115, fig. 79. 116, Fig. 80.
1450–1100 BC	Golden earring with cone, decorated with granules	Mycenaean	Higgins, 1980, p.86, pl.12C.
Achaemenid	Silver earring with granulated cone decoration	Ur/Iraq	Musche 1992, 267, type 4.2. pl. CIII.
1st century AD	Earring made of metal with three granules	Uruk/Iraq.	Musche, 1992, p.267 type 4.2, pl.CIII.
1st century AD	Earring made of metal with three granules	Garni/Armenia.	Arakelyan, 1957; Musche, 1988, p.56, pl.VIII,1.5.1.
1st century AD	Metal earring with three granules	Nowruzmahale/Iran	Egami, Fukai and Masuda, 1966; Musche, 1988, p.56, pl.VIII,1.5.1.
Late Arsacid period	2 pairs of metal earring with granules	Nowruzmahale/Iran	Egami, Fukai and Masuda, 1966, pl.XIX,2-3.
200–600 AD	2 copper earrings with cone pendant	Samad al Shan/Oman	Yule, 2001, pl.241, pl.60,2.

Tab. 2.6.1.5 a: Chale Ghar 1, iron lunula-shaped round-bodied earrings.

Find Number	Feature	Material	Shape
1018a	10012	Iron	Fragmented, corroded, wire with oval bulge
1182a	10012	Iron	Fragmented, corroded, wire with oval bulge
1777	10013/1	Iron	Fragmented, corroded, wire with oval bulge
1782a	10013	Iron	Fragmented, corroded, wire with oval hollow bulge
1806	10013/1	Iron	Fragmented, corroded around a stone, wire with oval bulge

Tab. 2.6.1.5 a: Chale Ghar 1, iron lunula-shaped round-bodied earrings.

Find Number	Feature	Material	Shape
4188f	10012	Iron	Fragmented, corroded, wire with oval bulge
4188g	10012/5	Iron	Fragmented, corroded, oval hollow bulge
4302a	10012/5	Iron	Fragmented, corroded, oval hollow bulge
4330a	10012/5-6	Iron	Fragmented, corroded, oval bulge
4430e	10012/5	Iron	Fragmented, corroded, hollow wire with oval hollow bulge
4438a	10012/5	Iron	Fragmented, corroded, wire with oval bulge
4442b	10012/5	Iron	Fragmented, corroded, wire with oval bulge
4442g	10012/5-6	Iron	Fragmented, corroded, wire with oval bulge
4522b	10012/6	Iron	Fragmented, corroded, wire with oval hollow bulge
4525	10012/6	Iron	Fragmented, corroded, oval hollow bulge
4545b	10014	Iron	Fragmented, corroded, wire with oval bulge
4556b	10014	Iron	Fragmented, corroded, hollow wire with oval bulge
4581m	10014	Iron	Fragmented, corroded, wire with oval bulge
4586a	10013	Iron	Fragmented, corroded, wire with oval bulge
4801	10013	Iron	Fragmented, corroded, wire with oval bulge

Tab. 2.6.1.5 b: Chale Ghar 2, iron lunula-shaped round-bodied earrings.

Find Number	Feature	Material	Shape
7123	11097	Iron	Fragmented, corroded oval bulge
7133	11097	Iron	Fragmented, corroded, oval bulge with fragments of wire
7221	11058	Iron	Fragmented, corroded earring with oval bulge

Tab. 2.6.1.5 c: Lunula round-bodied iron rings of the Near East and adjacent regions.

Date	Object	Provenience	Reference
3rd millennium BC	Gold crescent shaped ear-ring, double lunate	Ur/Iraq	Maxwell-Hyslop, 1971, fig.17c.
Early Bronze Age III A	Pair of golden hollow lunula shaped, round bodied earring with two rows of granules	Troy II/Turkey	Musche, 1992, p.116 type 4.1, pl.XL.
First third of the 2nd millenni-um BC	Golden lunula or crescent shaped earring	Ur/Iraq	Musche, 1992, p.136 type 1, pl.XLVII.
Approx. 14th–11th century BC	Golden crescent round bod-ied earrings	Mari, Assur/Iraq	Musche, 1992, p.179, pl.LXII type 1.
11th–10th century BC	Golden crescent round bod-ied earring	Tell el Ajjul/Palestine	Maxwell-Hyslop, 1971, p.227 fig.208.
11th–7th century BC	Round bodied metal lunula earring	Tape War Kabud/Iran	Musche, 1992, p.249 type 2.1, pl.XCIX.
9th–7th century BC	Three gold crescent shaped earrings; not ornamented and with triple ribs	Assur/Iraq	Maxwell-Hyslop, 1971, p.238 fig.129; Haller, 1954, pl.37d.
9th–7th century BC	Reliefs with illustrations of crescent shaped earrings	Assur/Iraq and Til Barsip/ Syria	Maxwell-Hyslop, 1971, pp.238-239, figs.128 and 131.
8th–7th century BC	One gold and one silver crescent shaped earring	War Kabud/Iran	Van den Berghe, 1968.

Tab. 2.6.1.5 c: Lunula round-bodied iron rings of the Near East and adjacent regions.

Date	Object	Provenience	Reference
Middle Bronze Age II	Four golden lunula shaped earrings or pendants with granules ornament	Ajjul Hoard/Palestine	Maxwell-Hyslop, 1971, figs.78-81.
Terminus post quem 450/440 BC (until probably 370/60 BC	24 bronze earrings in crescent shape	Kamid El-Loz/Lebanon	Poppa, 1978, pp.69-70, p.72, p.74, p.86, p.93, p.96, p.100, pp.102-103, pl.3,1,12-17, pl.4.2.9-10, pl.11,13,9-11, pl.14,22,7-9, pl.15,28,3-4, pl.16,34,1-2, pl.16,34,1-2, pl.16,40,12-15.
Achaemenid	4 golden crescent shaped earrings	Ur/Iraq	Rehm, 1992, p.161 no.F27, p.400 fig.94; Woolley, 1962, pl.22,229.
Achaemenid	Gold or silver earrings, lunula or crescent shaped, round bodied	Assur/Iraq; Nerab/Jerusalem; Kamid el- Loz/Lebanon	Musche, 1992, p.266 type 3.1, pl.CIII.
2nd – 1st century BC	Finger ring with hollow, crescent shaped, round bezel, made of gold	Bykovo/Volga Region	Mordvintseva and Khabarova, 2006, p.86 no.44.
2nd century BC	Finger ring with crescent shaped, round bezel, made of gold	Zhutovo/Volga Region	Mordvintseva and Khabarova, 2006, p.99 no.79.
Middle of 2nd century – beginning of 3rd century AD	Gold crescent shaped earring	Amazis-Chevi/Georgia	Apakifze, 1958, pl.CVIII brick grave 3; Musche, 1988, p.252, pl.LXXXVI type 5.
Arsacid	Several crescent round bodied earrings with different ornaments of gold and silver	Assur, Al Tar/Iraq; Dura-Europos/Syria; Garni/Armenia; Hamadan/Iran; Sirkap, Taxila/Pakistan	Musche, 1988, pp.76-78, pl.XIV.

Tab. 2.6.1.6 a: Chale Ghar 1, U-shaped iron earring.

Find Number	Feature	Material	Shape
4527	10012/6	Iron	Fragmented, corroded, hollow U-shape

Tab. 2.6.1.6 b: U-shaped iron earrings from Palestine and Switzerland.

Date	Object	Provenience	Reference
Middle bronze Age II	Pair of U-shaped, hollow metal earrings with granule decoration	Tell el- Ajjul/Palestine	Musche, 1992, p.152 type 5.1.1, pl.LIII.
2nd – 1st century BC	Pair of U-shaped hollow earrings, made of gold	Bykovo/Volga region	Mordvintseva and Khabarova, 2006, p.87 no.46.
1st century AD	U-shaped bronze earring	Augst/Switzerland	Riha, 1990, p.149 no.714, pl.31,714.

Tab. 2.6.2.1 a: Chale Ghar 1, one shell earring.

Find Number	Feature	Material	Shape	Measurements
6787d	10050	Shell	Ovaloid	D. 1.3 cm, L. 1.4 cm

Tab. 2.6.2.1 b: Shell rings from Oman.

Date	Object	Provenience	Reference
Cal. 667 +- 156 BC	Two open shell rings	Samad al Shan/Oman	Yule, 2001, p.153.

2.7 Metal Sheets

In total twenty metal sheets, mostly fragmented, were recovered at the site. For the most part they are made of silver, but a few are of gold and bronze and decorated by repoussé technique. It is hardly possible to establish a chronology for these items due to their unique appearances. Because of their plant or figural decorations and also their shape, they are of special significance for the interpretation of the 'caves' at Veshnaveh.

2.7.1 Silver Sheet with Figural Decoration (Tab. 2.7.1 a)

Among the silver plaques found at Veshnaveh, one is altogether exceptional (pl. 43, no. 4454). It is the only one to depict an anthropomorphic figure. This silver sheet is fragmented at both sides and central pieces are lacking. The figure worked out in repoussé technique is illustrated frontally. Compared to the body, the head appears quite large, and it is unclear whether the figure is wearing a large object of headgear or a voluminous hairdo. Large, clearly formed ears are decorated with spherical or hoop earrings. The figure might be wearing a beard, which seems possible because of the large chin area – however, a break and a missing piece in this location leaves this question open. In the face, a large nose and a mouth are discernible.

Apart from what is probably a knotted cloak around the shoulders, the upper part of the body seems to be naked. Two small breasts or nipples are depicted by round bulges. Arms and hands are not completely preserved anymore and additionally worked in a shallow relief, therefore it is not clear whether the figure holds something in its hands. The lower part of the body is clothed with puffed trousers or a skirt extending beyond the knee, which is decorated in stripes with a lattice design. The simply rendered feet one point to either side, and the arms are only just identifiable. At each side of the head, one string or rivet hole is present. To the left side of the figure a plant is depicted, reaching to the height of the figure's hip. It is a spike-like plant consisting of a stem with oblique shoots or leaves.

Interpretation of the Silver Sheet with Figural Decoration (Tab. 2.7.1 b)

The figure on the plaque from Veshnaveh is not rendered very clearly, but several attributes are identifiable: The large headgear or hairdo and the harem pants or short skirt with a lattice design, as well as the plant beside the figure. Comparison objects are finds from Iran and Mesopotamia and from Achaemenid to Sasanian contexts: Early metal sheets with figural illustrations holding plants are known from the so-called Oxus treasure (Dalton, 1926, pl.14; Ghirshman, p.93 fig.121). And in Masdjid-e Suleiman, Iran, a similar rectangular silver sheet was discovered. It shows a person in frontal posture with trousers and a short tunic, who also seems to wear a hat or large hairdo (Ghirshman, 1976, pl.70, GMIS 618). At Bard-e Nechandeh, Iran, another likely analogue to the silver sheet from Veshnaveh was found: It depicts a male figure with headgear, overhanging hair, a skirt reaching to the knees and a schematically arranged face (Ghirshman, 1976, pl.XXXVII,5).

On Sasanian seals, male figures are depicted with voluminous headgear and striped skirts or puffy trousers. One of those seals shows a man holding a flower, maybe a tulip, in his hand (Brunner, 1978, no.25). Nipples are suggested by two small round bulges, as on the Veshnaveh plaque. A fragmented stone relief from Masdjid-e Suleiman depicts a male seen front-on with trousers and long shirt, holding a plant in his left hand. His head is not preserved (Ghirshman, 1976, 33 fig.15). To the voluminous head dress or gear and the trousers, comparison objects have been found in Arsacid as well as in Sasanian contexts (Curtis, V., 1998). Stone reliefs from Khuzestan, Iran, and and a king's bust also display these attributes (Musée Cernuschi, 2006, p.53 no.3). A Arsacid terracotta figure has an overhanging hairdo (Musée du Louvre AO 25013, https://collections.louvre.fr/en/ark:/53355/cl010149690).

The male is holding his hands above the head, his shirt open, to expose his chest. Legs are not preserved, but traces of paint are. Three late Sasanian plaques from Takht-e Suleiman show male figures with a late Sasanian short dress and in the frontal position with a profiled head, which is – according to D. Huff (2004, p.467; 2011) – a typical Sasanian stylistic combination. The figures either wear a hat or have an oversized head, like the figure on the silver sheet from Veshnaveh. Other similar attributes are a triangular body, feet turned outwards, and a perforation close to the upper edge (Huff, 2011). These plaques, however, are not exactly comparable to the silver sheet from Veshnaveh.

One of the questions concerning the figural plaque is the gender of the person depicted on it. The hinted breasts appear to belong to a female, but the clothes are a male's. No other body contours suggest a female. The above comparisons on seals provide evidence that even male nipples are illustrated quite prominently in Sasanian and Arsacid art. Due to the dress and the comparisons on reliefs from Masdjid-e Suleiman, it seems obvious that the figure from Veshnaveh is intended to be a man.

The references show that clothes, the exposed chest, the headgear or hairdo and the appearance of the silver plaque from Veshnaveh were already common in the Arsacid era. The comparisons from Takht-e Suleiman, however, allow a dating also to the Sasanian and late Sasanian period.

Tab. 2.7.1 a: Chale Ghar 1, figural silver sheet.

Find Number	Feature	Material	Shape and condition	Measurements
4454	10012/6	Silver	Rectangular with figural decoration; fragmented	L. 3.2 cm, W. 1.6 cm, Th. (sheet) 0.02 cm

Tab. 2.7.1 b: Figural metal plaques, reliefs and seals from the Near East.

Date	Object	Provenance	Reference
5th–2nd century BC	4 gold plaques with figural illustration	Oxus treasure/Afghanistan	Dalton, 1926, pl.14; Ghirshman, 1963, p.93 fig.121.
Seleucid/Arsacid	Figure of a warrior	Bard-e Nechandeh/Iran	Ghirshman, 1976, pl.XXXVII,5.
Seleucid/Arsacid?	Silver plaque	Masdjid-e Suleiman/Iran	Ghirshman, 1976, pl.79 GMIS 618.
Arsacid, 2nd century BC	Stone relief	Izeh, Khuzestan/Iran	Pentocelo, 2008.
1st–2nd century AD	Stone relief	Iran?	New York, 2006.
Sasanian	Bust	Kish, Irak, Palace II.	Musée Cernuschi, 2006, p.53, no.3.
Sasanian, 4th century AD	Stamp seal	Unknown	Brunner, 1978, no.25.
Sasanian	Stamp seal	Unknown	Musée Cernuschi 2006, pp.204-205, no.149.
Late Sasanian	2 gold, 1 silver plaque	Takht-i Suleiman/Iran	Huff, 2004, p.467; 2011.

2.7.2 Gold and Silver Sheets with Plant Decoration (Tab. 2.7.2 a)

In addition to the figural plaque, which also depicts a plant, one sheet, decorated with a plant motif and probably made of silver, and one gold sheet with another plant motif were found at the offering place, nos. 4568d, 4581f. The golden plaque is of particular beauty (pl. 43, no. 4581f) and made with care. The plant, probably a flower or reed, was formed using the repoussé technique. A stem with 4 leaves is crowned by an egg-shaped blossom, which in turn is decorated by two striped semi-circles. Just in the lower right-hand corner of the sheet, the remnants of another blossom indicate that the plaque belonged to and was cut out along the plant from a larger golden plaque.

The silver plaque no. 4568d (pl. 43) also seems to have been reused. The incised palm, wheat or sun decoration was also cut out and looped with one central string hole.

Interpretation of Gold and Silver Sheets with Plant Decoration (Tab. 2.7.2 b)

A fragmented very thin gold sheet from Iran is decorated with a herringbone or plant pattern on two wings and a decoration of dots in the centre (Ghirshman, 1976, pl.56, GMIS 348; The National Museum of Iran, Tehran, no. 4546, pl. 45). The sheet is of oval oblong shape, broadening in the middle and narrowing at the ends with holes for attachment. This shape resembles golden chinstraps or taeniae from Tillija Tappeh in northern Afghanistan (Sarianidi, 1985, 254 no.23) or from an Old Babylonian tomb at Uruk. The latter is described as a diadem in the relating excavation report (Van Ess and Pedde, 1992, p.84 no.935, pl.78,935). A plaque, probably Achaemenid, is decorated with lamellae to suggest the plant's structure (pl. 45; The National Museum of Iran, Tehran, no. 2430).

The aforementioned plant-decorated sheets are similar neither to the reed-decorated sheet nor to the silver plaque no. 4568d from Veshnaveh (pl. 43). Nonetheless, they prove the occurrence of plant-decorated metal sheets in different periods and contexts, both cultural and in burials: One of the golden sheets, found below the great temple in Masdjid-e Suleiman, is reminiscent of chin straps, as they were used in graves.

Tab. 2.7.2 a: Chale Ghar 1, gold and silver sheets with plant decoration.

Find Number	Feature	Material	Shape and condition	Measurements
4568d	10013	Silver?/lead?	Trapezoid with line decoration; fragmented	L. 1.08 cm, W. 1.3 cm, Th. (sheet) 0.1 cm
4581f	10014	Gold	Tongue-shaped with a floral decoration; complete	L. 1.88 cm, W. 0.6 cm, Th. (sheet) 0.01 cm

Tab. 2.7.2 b: Gold sheets with plant decoration from Iran.

Date	Object	Provenance	Reference
Achaemenid?	Gold sheet with plant decoration	Unknown	National Museum of Iran, Tehran, no. 2430.
Arsacid	Gold sheet with plant decoration	Masdjid-e Sulleiman/ Iran	Ghirshman, 1976, pl.56,GMIS 348; National Museum of Iran, Tehran, no. 4546.

2.7.3 Animal Shaped Silver Sheets (Tab. 2.7.3 a)

A very special item is a sheet, possibly made of silver, with the sides folded in towards each end to form the shape of a fish (pl. 44, no. 4526). It would seem that the sheet was decorated in repoussé and then formed to a fish-shaped object by folding in the sides leaving the figure´s rear side open. Two holes, which represent eyes, and several small bulges decorate the head. Through the head, a golden wire ring was drawn to which a string would have been attached. On the back of the fish, a central hole is crossed by a fishbone design. The tail was broken and its end folded in.

Another animal-shaped plaque is a quite roughly executed silver sheet (pl. 43, no. 4409a). It is formed in the shape of a floating or sitting bird. A crown seems to decorate the bird's head, and a short beak and a bushy tail complete the oval body.

Interpretation of the Animal Shaped Sheets (Tab. 2.7.3 b)

There are no exact parallels to the bird and fish found at Veshnaveh, but the motifs are known from many cultures and periods, as Egyptian, Roman or Sasanian, and Islamic clay or silver plates show (Cahn and Kaufmann-Heinimann, 1984, pp.165-174, p.169 n.20, pls.71-78.). The fish motif was common on Sasanian silver ware and also was found as an exceptional work of art originating in Romania and the Graeco-Scythian culture group. Both are made of gold sheet, and the latter was recovered in the famous hoard of Vettersfelde (Parzinger, Menghin and Nagler, 2007, pp.318-327, p.322 fig.2). The fish from Veshnaveh is made of what is possibly silver and is 9.25 cm in length. In Egyptian bazaars, small silver and golden fish of 6 to 7 cm are known to have been sold quite recently (Kriss and Kriss-Heinrich, 1962, p.30). Recent fish amulets made of clay are also known from the Iranian city of Ghom (Stöllner, Slotta and Vatandoust, 2004, vol.2, p.815 no.555.).

Tab. 2.7.3 a: Chale Ghar 1, animal shaped silver sheet.

Find Number	Feature	Material	Shape and condition	Measurements
4409a	10012/5	Silver	Bird-shaped; complete	L. 5.93 cm, L. 1.93 cm, Th. (sheet) 0.05 cm
4526	10012/6	Silver	Fish-shaped; complete	L. 9.25 cm, W. 1.12 cm, Th. (sheet) 0.03 cm

Table 2.7.3 b: Fish-shaped pendants, amulets and illustrations from recent Iran, from Turan and Europe.

Date	Object	Provenance	Reference
Late 6th–5th century BC	Golden mounting in shape of a fish	Vettersfelde (Witaszkowo)/Poland	Parzinger, Menghin and Nagler, 2007, pp.318-327, p.322 fig. 2.
5th–4th century BC	Golden mounting in shape of a fish with boar head	Stânceşti/Romania	Parzinger, Menghin and Nagler, 2007, p.307 fig.1.
2nd–1st centuries BC.	Engraved fishes/stone reliefs	Sanctuary of Baite 3/ Ustyurt	Samashev, et al., 2007, p.192, pp.202-203, p.205.
21st century AD	Glazed clay pendant in shape of a fish	Ghom/Iran	Stöllner, Slotta and Vatandoust, 2004, vol.2, p.815 no.555.

2.7.4 Silver Sheets in the Shape of Body Parts (Tab. 2.7.4 a)

A rectangular, fragmented silver sheet shows an eye – a special part of the body (pl. 43, no. 1813). It is embossed in repoussé technique with a bulging upper eyelid or brow and a rhomboid eyeball with a stepped edge. The iris and pupil are indicated by the use of bulging and steps. Below and on the right side of the eye, the sheet is broken. The other sides are straight.

A roughly executed silver sheet represents a wrist and a hand, the forefinger and thumb of which are no longer preserved (pl. 43, no. 4408a).

Interpretation of the Silver Sheets in the Shape of Body Parts (Tab. 2.7.4 b)

A small golden pendant in shape of an eye and eye plaques are known from sites as early as from 2nd millennium BC Alalakh as well as from 8th century BC Ephesos (Musche, 1992, p.190 no.10, pl.LXVIII,10; Woolley, 1955, pp.272-xxx, pl.LXIX,m-w; Marshall, 1969, fig.919, fig.920, fig.922). Golden eye plates from the 2nd to the 3rd centuries AD were discovered in the necropolis of Gorgippa in the Black Sea region (Musche, 1992, p.190 no.10, pl.LXVIII,10; Woolley, 1955, pp.272-xxx, pl.LXIX,m-w; Marshall, 1969, fig.919, fig.920, fig.922). They differ in execution, but evidence the donation of single eyes as funereal or votive offerings. A pendant made of a metal sheet in shape of a hand with decoration of one inlay as well as one three-dimensional pendant in the shape of a hand or wrist were found in the northern Black Sea region (Mordvinceva and Treister, 2007, p.29 no.A43.1, p.50, no.A316.2).

Tab. 2.7.4 a: Silver sheets in shape of body parts.

Find Number	Feature	Material	Shape and condition	Measurements
1813	10013/1	Silver	Rectangular with eye decoration; fragmented	L. 2 cm, W. 1.1 cm, Th. (of sheet) 0.01 cm
4408a	10012/5	Silver	Irregular shaped/wrist; fragmented	L. 3.6 cm, Th. (of sheet) 0.05 cm

Tab. 2.7.4 b: Eye-shaped plaques and pendants from Turkey and Russia.

Date	Object	Provenance	Reference
Late Bronze Age II/III – Iron Age I, 14th–11th century BC.	1 golden eye	Alalakh/Turkey	Musche, 1992, p.190 no.10, pl.LXVIII,10; Woolley, 1955, pp.272-273, pl.LXIX,m-w.
1550–1330 BC	1 golden eye pendant	Alalakh/Turkey	Maxwell-Hyslop, 1971, p.135 fig.100,3.
8th century BC	Several gold and metal eye plaques	Ephesus/Turkey	Marshall, 1969, fig.919, fig.920, fig.922; Hogarth, 1908, p.108, pl.VII,39-42 and 44.
2nd century BC–2nd century AD	Pendant in the shape of a hand, made of metal (gold or silver?)	Northern Black Sea region	Mordvinceva and Treister, 2007, p.29 no.A43.1
2nd century BC–2nd century AD	Pendant in the shape of a hand or wrist	Northern Black Sea region	Mordvinceva and Treister, 2007, p.29 no.A43.1, p.50 no.A316.2.
2nd–3rd centuries AD	6 golden eye plaques	Gorgippa/Russia	Moscow, 1987, pp.167-168 nos.253-254, p.171 pl.91.

2.7.5 Gold, Silver and Bronze Sheet Fragments (Tab. 2.7.5 a)

Two fragmented silver sheets are decorated by a repoussé bulge. No. 4183a originally was square or rectangular in shape, but is fragmented at two sides (pl. 45). The little bulge is placed in the centre, while on no. 4457a the bulge fills in the whole space and is oval in shape (pl. 45).

Further sheet fragments include a perforated bronze plaque (pl. 45, no. 1883a), where one and a half preserved holes are executed from one side, so that the metal protrudes at the rims.

Other items in this category are very small silver and gold fragments (pl. 45, no. 4424a; nos. 4954c2, 4407c (gold), 6095a2) and folded remains of thin gold sheets (no. 1832; pl. 45, no. 4750a; nos. 4226, 6305b, 6381). Two fragmented band-shaped sheets are made of bronze (both no. 1396a).

Interpretation of Gold, Silver and Bronze Sheet Fragments (Tab. 2.7.5 b)

One silver sheet with a bulge very similar to the one from Veshnaveh (pl. 45, no. 4457a) is known from Masdjid-e Suleiman (Ghirshman, 1976, pl.28,GMIS 91, pict.45; Haerinck, 1983, p.14). It is of a semi-oval shape with an oval bulge and an off-centre sting hole. Our piece may have been similar and perhaps was also used as a pendant or an ornament on garments. The possibility of this adoption has already been proved by a square gold ornament with a central boss and two perforated holes from Tell Brak (Maxwell-Hyslop, 1971, p.xii fig.25a).

The perforated bronze piece found at Veshnaveh (pl. 45, no. 1883a) is reminiscent of perforated clay ves-

sels from other times, such as the Harrappean culture.[46] From 7th century BC Syria, a fragment of a bronze grater as well as bronze vessels from Ed-Dur in Oman resemble our fragment (Buhl, 1983, p.71, pl.21; Haerinck, 2001, pl.94,27-28.). Though the listed comparisons suggest a use as sieve or straining vessel for the bronze fragment from Veshnaveh, this assumption must be treated with caution. The holes of the bronze sheet are quite large (D. approx. 0.6 cm), and it is therefore questionable that it would have been of much use as a sieve. Probably it belonged to a kind of an incense burner (Piller, 2009, p.183 fig.8,5).

Last but not least, there are the very small and thin sheets of folded gold. Similar fragments were discovered, in possibly religious contexts, at the sites of Bard-e Nechandeh and Masdjid-e Suleiman (Ghirshman, 1976, pl.16,GBN 180, pl.54,GMIS 286.).

Tab. 2.7.5 a: Chale Ghar 1, fragmented metal sheet.

Find Number	Feature	Material	Shape and condition	Measurements
1396a	10012/2	Bronze	Band-shaped; fragmented (two pieces)	L. 2.4 cm, W. 0.5 cm, Th. (sheet) 0.16 cm and L. 0.75 cm, W. 0.3 cm, Th. (sheet) 0.06 cm
1832	10013	Gold	Irregular; fragmented	L. 0.3 cm
1883a	10013	Silver/lead?	Irregular; fragmented (three pieces) with perforations	L. 1.5 cm, 0.95 cm and 0.9 cm; Th. (sheet) 0.03 cm
4183a	10012	Silver	Rectangular; fragmented	L. 1.25 cm, Th. (sheet) 0.03 cm
4226	10013/1	Gold	Irregular; fragmented	L. 0.5 cm, Th. (sheet) 0.01 cm
4407c	10012/5	Silver	Irregular; fragmented	L. 0.8 cm, Th. (sheet) 0.03 cm
4424a	10012/5	Silver	Irregular; fragmented (two pieces)	L. 1.64 cm, W. 1.11 cm, Th. (sheet) 0.04 cm
4750a	10019	Gold	Irregular; fragmented (four pieces)	L. 0.5 cm, Th. (sheet) less than 0.01 cm
4954c2	10022	Silver	Irregular; fragmented	L. 1.4 cm, W. 0.76 cm, Th. (sheet) 0.04 cm
6095a2	10022	Gold	Irregular; fragmented	L. 0.45 cm, W. 0.1 cm
6305b	10022	Gold	Irregular; fragmented	L. 0.5 cm, W. 0.35 cm, Th. (sheet) 0.09 cm
6381	10022	Gold	Irregular; fragmented	L. 0.55 cm, Th. (sheet) 0.04 cm

Tab. 2.7.5 b: Gold, silver and bronze sheet fragments from Iran and the Near East.

Date	Object	Provenance	Reference
3rd millenium BC	Golden plaque with central boss	Tell Brak/Syria	Maxwell, Hyslop, 1971, p.xii fig.25a.
7th century BC	Fragment of a perforated bronze grater	Tell Sukas/Syria	Buhl, 1983, p.71, pl.24.
3rd – early 2nd century BC	Silver sheet with bulge	Masdjid-e Suleiman/ Iran	Ghirshman, 1976, pl.28,GMIS 91, pict. 45; Haerinck, 1983, p.14.
No indication	Fragments of folded or thin gold sheet	Bard-e Nechandeh/ Iran	Ghirshman, 1976, pl.16,GBN 180.
Seleucid?	Fragments of folded or thin gold sheet	Masdjid-e Suleiman/ Iran	Ghirshman, 1976, 1976, pl.54,GMIS 286.
1st century BC – 1st century AD	Two perforated bronze vessels	Ed-Dur/Oman	Haerinck, 2001, pl.94,27-28.

[46] Fragments of the 3rd millennium BC from Dhalewan/Punjab, India, see Archaeological Survey of India, 2005, p.126 fig.111; from the Gomal Valley in Pakistan, see Dani, 1970-1971, p.123 fig.31, pp.281-289.

2.8 Miscellaneous Objects

Several finds are subsumed in this section. They were not grouped into one of the categories, because they represent individual and very significant objects. Among them a spacer bead made of gold and garnet or ruby is discussed as well as gold and silver appliqués, an arrow-head, a grinding stone and some not definable, but noteworthy objects. Artefacts of organic material include one decorated bone disc and a 'yo-yo'-shaped wooden object.

2.8.1 Glass Objects

2.8.1.1 Glass Phallus (Tab. 2.8.1.1 a)

In the entrance area of Chale Ghar 1, a small glass object was found. It is made of two oval small glass balls and an elongated piece, all three attached to each other, clearly resembling a phallus. The object has no string hole or eyelet (pl. 46, no. 6560b2).

Interpretation of the glass phallus (Tab. 2.8.1.1 b)
Glass pendants in the shape of a phallus have frequently been found and are widespread. They are usually made of greenish glass or frit in shape of male genitals with pubic hair, scrotum and penis; they have an eyelet on top. This type is stereotypical and has been found in the whole Near East, like one example from Germi, Iran (pl. 46, no. 3352), and even in Ukraine. The object from Veshnaveh is also made of green glass and represents a penis with scrotum, but it differs from the other phallus pendants in three points. First of all it has no eyelet, secondly it is made of glass and not of frit or faïence, thirdly it is made in a very simple manner without pubic hair and other details; only the glans is well-defined. Additionally, unlike the stereotypical pendants, the penis is slightly erected, rather than hanging downward. With its plain appearance, the pendant from Tell Anafa resembles the phallus from Veshnaveh the closest.

At first sight, the abundant occurrence of phallus pendants in the Near East, especially in the 1st century BC – 2nd century AD (De Waele, 2007, p.304) may lead to a dating to the Roman/Arsacid period for the phallus from Veshnaveh. However, this object differs from the stereotypical phallus pendants and may be dated even to a later period.

2.8.1.2 Unidentifiable Glass Object (Tab. 2.8.1.2)

An object made of green opaque glass was found in the main chamber of Chale Ghar 1 (pl. 46, no. 6751). It is a semicircular or crescent-shaped piece with a triangular recess in the middle. Being bent, it may have been attached to another object. It is noteworthy that the surface is quite smooth, while the inside is corroded and rough.

2.8.1.3 Globular Glass Vessel (Tab. 2.8.1.3 a)

One small globular vessel with a height of just 3.37 cm was found in Chale Ghar 1. It is of translucent light greenish glass with an iridescent weathering and is preserved intact (pl. 46, no. 4553a). It has a short cylindrical neck with an everted round rim and a flat base. The vessel most probably was blown, quite probably not in a mould. Then the rim was folded outward.

Interpretation of the Globular Glass Vessel (Tab. 2.8.1.3 b)
M. Negro Ponzi (1968-69, pp.330-331) dates this type of plain, globular glass vessel with an everted, 'curled in' rim to the later Arsacid period and states that this form seems to appear rarely in the Sasanian era. D. Whitehouse (1998, p.40), on the other hand, states that this type of vessel came into use in Mesopotamia in the Arsacid period and occurred in variations in the Sasanian time. According to him, these globular jars are attributable in particular to the 3rd–4th century AD. Examples from Ghubayra show that such small vessels, in varying forms, were made at least until the early Islamic period.

All the comparison objects discussed here have a 'curled in' rim and resemble the vessel from Veshnaveh, slight differences notwithstanding (Negro Ponzi, 1972, p.224). Their height varies between 3 and 7.65 cm, but most vessels range between around 3.5 and 4.5 cm. It seems that this kind of jars had been a common type bottle for toiletries or ointments. Glass blowing with a pipe was invented in the 1st century BC (Stern and Schlick-Nolte, 1994, p.19). The globular vessel from Veshnaveh obviously is a blown vessel. Therefore, there is a terminus post quem including the 1st century BC. The references date the vessel to the Arsacid period. As the examples of the late Sasanian and early Islamic periods show, this type of vessel was probably revived, however in variations, that do not exactly match the shape of the vessel from Veshnaveh.

2.8.1.4 Green Rim Fragment of a Bowl (Tab. 2.8.1.4 a)

A unique rim fragment was unearthed in Chale Ghar 1. It is a fragment of a vessel with a hollow round rim, probably from a small open bowl. Its special attribute is its dark green colour (pl. 46, no. 7141).

Interpretation of the Green Glass Vessel (Tab. 2.8.1.4 b)
Due to its fragmented condition, it is not possible to understand the method of manufacture used here without subjecting the object to special analysis. According to M. Stern (2001, p.37), the technique used to obtain hollow rims was established in the second half of the 1st century AD. Probably, the fragment belonged to a small open

bowl which may have been used for e.g. makeup (Stern and Schlick-Nolte, 1994, p.164).

Green-coloured vessels of different shapes and various hues, as listed in the table below, are known from the 1st century BC until the early Islamic period. The colour may indicate the origin of some glass vessels, since dark colours were preferred in the Eastern Mediterranean region (Stern, 2001, p.38).

However, dark green colours, like the one of the fragment from Chale Ghar 2, seem not to appear in Sasanian contexts and rarely in the late Sasanian time; therefore it seems likely that the fragment belongs to the late Sasanian or early Islamic period.

Tab. 2.8.1.1 a: Chale Ghar 1, glass phallus.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements
6560b2	10050	Opaque glass, blackish green 39-0-8	Phallus, fragmented	L. 0.5 cm, W. 0.46 cm

Tab. 2.8.1.1 b: Phallus pendants of glass or frit from Iran, the Near East and adjacent regions.

Date	Object	Provenance	Reference
6th–2nd century BC	Necklace of different kinds of pendants, among them 2 phallus pendants of glass paste (?) of blue colour	Kertch/Ukraine	Musée du Louvre Bj 657, Collection Messaksoudy 1920.
Arsacid	Phallus made of blueish greenish glass or frit	Tappeh Djujeiran/ Iran	The National Museum of Iran, Tehran, no. 3352. Kambakhsh Fard, 1998, p.87.
Late 2nd century BC	Glass pendant in Phallus shape, with scrotum, no pubic hair, eyelet on top	Tel Anafa/Israel	Weinberg, 1969, pp.246-247; 1971, pp.7-35; 1973, pp.113-117. Illustration in: Schmeisser, 1975, p.171.
1st century BC	Male genital with pubic hair, scrotum and penis. Eyelet on top. Opaque glass, frit or faience	Babylon/Iraq	Musche, 1988, p.171, pl.LVII,22.3; Schmidt, 1957, pl.41,b.
1st century BC	Male genital with pubic hair, scrotum and penis. Eyelet on top. Opaque glass, frit or faience	Masjide-e Suleiman/ Iran	Ghirshman, 1976, pl.25,GMIS 95.
1st century BC – 1st century AD	Two pendants of phallic shape made of frit	Tell Šēḫ Ḥamad/ Syria	Novák, Oettel and Witzel, 2000, p.56 fig.112, p.103 fig.330.
1st century BC – 1st century AD	Pendants of phallic shape made of glass paste? of blueish-greenish colour	Saar and Karranah/ Bahrain	Harriet and Rice, 2000, p.186 nos.328 and 331.
1st century BC – 2nd century AD	Male genital with pubic, scrotum and penis. Eyelet on top. Opaque glass, frit or faience	Ed-Dur/UAE	De Waele, 2007, p.304 fig.7.
2nd half of the 1st century AD	Faience pendant, male genital with pubic, scrotum and penis. Eyelet on top	Ust'-Labinskaja/ Kuban region	Simonenko, Marčenko and Limberis, 2008, p.351, pl.83,3.
1st – 2nd century AD	Green glazed phallus pendant	Dura Europos/Syria	Rostovzeff, et al., 1946, p.80 no.8, pl.IV tomb 40-XIV.
1st – 2nd century AD	Male genital with pubic, scrotum and penis. Eyelet on top. Opaque glass, frit or faience	Hassani Mahale/Iran	Sono and Fukai, 1968, p.19, pl.LXIV,12, pl.XXXVIII, 2.
1st–2nd century AD	Male genital with eyelet on top	Germi/Iran	Sarkhosh Curtis and Simpson, 2000, p.159 fig.11,3.
Arsacid/Sasanian	Three frit pendants in Phallus shape, with pubic hair and scrotum, eyelet on top	Bastam/Iran	Kleiss, 1988, p.162 fig.5,7, p.180 fig.18,4.
Hellenistic/Roman	Male genital with pubic hair, scrotum and penis, eyelet on top, opaque glass, frit or faience	Selenkahiye/Syria	Van Loon, 2001, pl.13.17.

Tab. 2.8.1.2: Chale Ghar 1, unknown glass object.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements
6751	10013	Opaque glass, light grey green 39-2-3 colour	Semicircular piece, smooth outside, rough inside, in the middle of the semicircle a triangle is recessed; fragmented	L. 1.09 cm, L. 0.65 cm

Tab. 2.8.1.3 a: Chale Ghar 1, globular glass vessel.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements
4553a	10014	Translucent green white 1-39-6 glass	Globular jar, short cylindrical neck, everted rim, plain base; complete, iridescent weathering	D. of rim, 2.2 cm, D. of bottom: 1.2 cm, H. 3.37 cm, Th. 0.15 cm – 0.25 cm

Tab. 2.8.1.3 b: Globular glass vessels from the Near east and Iran.

Date	Object	Provenance	Reference
1st century BC – 1st century AD	Globular glass vessel of translucent yellowish green glass; blown, with everted rim	Ed-Dur/UAE	Whitehouse, 1998, p.40 no.94, fig.9,4, pl.9,94.
1st century AD	Eight globular vessels of light green, olive or colourless glass (translucent?). Short cylindrical neck, everted rim, flat, sometimes concave base	Abu Skhair/Iraq	Negro Ponzi, 1972, pp.223-225 nos.12-19, fig.20,12-19.
Late Arsacid period	Five globular vessels of pale green and grey green glass (translucent?), short neck and everted mouth/rim	Tell Mahuz/Iraq	Negro Ponzi, 1968-69, pp.330-332 nos.19-23, fig.153,19-23.
1st century – 1st half of the 3rd century AD	Vessel of light green glass, globular body, short neck, everted rim	Dura Europos/Syria	Perkins, 1963, p.141 no.749, pl.XVI, pl.XXXVI,749, p.150.
3rd century AD	Two globular vessels of colourless, greenish, translucent glass; blown with several bubbles. Both vessels are fragmented	Sidon/Lebanon Syro-Palesitian production	Arveiller-Dulong and Nenna 2005, p.420 nos.1164, 1166.
2nd – 4th/5th century AD	28 globular glass vessels, short neck, everted rim, flattened or concave base	Saar/Bahrain	Lombard, 1999, p.188 no.292; Andersen, 2007, p.56, pp.67-68, p.69 fig.268, p.70 fig.273.
4th – 5th century AD	Three globular vessels of clear glass with a faint brownish tinge, short cylindrical neck, everted rim	Tell Mohammed Arab/Iraq	Kind notification of M. Roaf
Sasanian	Globular glass vessel with short neck and everted rim. Slightly concave bottom	Choche/Iraq	Negro Ponzi Mancini, 1984, p.34 fig.1,12.
Abbasid, 8th – 10th century AD	2 glass vessels with globular body, slightly bell-mouthed rim.	Tureng Tepe/Iran	Boucharlat and Lecomte, 1987, p.11, pl.160,g-h.
Early Islamic, probably 8th – 10th century AD	Small globular brownish-green vessel with short neck and everted rim	Ghubayra/Iran	Bivar, 2000, p.208, pl.136,c.
11th – 15th century AD	Small globular scent bottle with a short neck and everted rim, green glass	Ghubayra/Iran	Bivar, 2000, p.25, p.27, p.203, pl.137,d.

Tab. 2.8.1.4 a: Chale Ghar 2, rim fragment of a glass vessel.

Find Number	Feature	Material and Colour	Shape and Preservation	Measurements
7141	11097	Glass of blackish blue green colour 39-31-8 in metallic appearance. Translucent?	Rim fragment, round, hollow rim. remains of straight (?) wall	L. of fragment 4.5 cm, D. 11 cm, Th. of wall remains: 0.25 cm, Th. of rim: 0.6 cm

Tab. 2.8.1.4 b: Green coloured glass vessels from the Near East and Iran.

Date	Object	Provenance	Reference
1st century BC – 1st century AD	Complete preserved balsamarium with conical body and long neck, made of green, blown glass	Phoenicia, product of the eastern Mediterranean region	Arveiller-Dulong and Nenna, 2005, p.205 no.581. Mission E. Renan, 1860–1861, unpublished; from files of the Musée du Louvre.
4th century AD	Fluted amphoriscos of green mould blown glass	Syro-Palestian production	Arveiller-Dulong and Nenna, 2005, p.414, no.1142.
Early Islamic	Ten bowl fragments of green-blue glass	Seleucia/Iraq	Negro Ponzi, 1970, nos.54b, 58, 72, 75, 81h, 81m, 82a-c, 83f.
8th–13th century AD	Several fragments of bowls of dark green glass	Kush/UAE	Worrell and Price, 2003, p.248, p.250.
Found in Islamic context, terminus ante quem 1393 AD	Vessel fragments of dark green translucent glass	Ghubayra/Iran	Bivar, 2000, p.204.
Found in Islamic context, terminus ante quem 1393 AD	Foot and base fragment of a small bowl, emerald green glass with patchy buff weathering; with pontilmark	Ghubayra/Iran	Bivar, 2000, p.213.
Found in Islamic context, terminus ante quem 1393 AD	Part of the shoulder and neck of a globular dark green glass vessel; with remains of decoration	Ghubayra, Iran	Bivar, 2000, p.223.

2.8.2 Miscellaneous Metal Objects

2.8.2.1 Bronze Arrow Head (Tab. 2.8.2.1 a)

As far as its classification – as weapon – is concerned, but also its dating, the arrow head which was found in Chale Ghar 1 differs from the other finds (pl. 47, no. 4492a). The object is corroded and has the shape of a two-winged blade with a rounded point; each wing is grooved and the cylindrical shaft is equipped with one barb. Traces of wood remain in the shaft.

Interpretation of the Bronze Arrow Head (Tab. 2.8.2.1 b)

Based on comparisons with other two-winged, barbed arrowheads – from Ziwiyeh, Iran and Büyükkale, Turkey – the weapon from Veshnaveh can be dated to approximately the 7th century BC. It is of a type obviously distributed at least as far as northern Iran, Turkey and to north-east of Persia, as one find from the Ustyurt Plateau shows. As most metal finds from Veshnaveh date to the centuries AD, the discovery of a bronze arrow head from the 7th century BC is of special interest: Either it belongs to the early phase of the use of the mines, or it was an heirloom or a found object, which got into the mine this way. Because the arrowhead was not found in one of the lower layers of the mine, the latter theory may be true.

In the Kuban region (Black Sea region) one similar arrowhead was found in a grave from the end of the 1st or the beginning of the 2nd century AD. In a scenario comparable to that in Chale Ghar 1, this blade probably also came into the grave as a heirloom.

The wooden remains in the shaft of the arrowhead prove that it was used as a real weapon and not as an ornament, like earrings which may recall hanging arrow heads and which are known from Assyrian reliefs, where they are worn by the king (Maxwell-Hyslop, 1971, no.248; Hrouda, 1991, p.127, p.131).

2.8.2.2 Golden Shank Buttons/Appliqués (Tab. 2.8.2.2 a)

Owing to the accurate digging and the washing of the excavated earth, four very small shank buttons or appliqués were discovered in Chale Ghar 1. The golden objects with the numbers 1172, 1957k, 6704 and 6931 are made of a disc-shaped, slightly concave panel with a band- or wire-shaped shank. Two buttons, one fragmented (no. 6931), with a flat apex to their panel and a

similar eyelet made of a golden band seem to be quite alike (pl. 47, nos. 6704, 6931). Two further buttons are disc- (pl. 47, no. 1172) and semi-circular-shaped (pl. 47, no. 1957k).

Interpretation of the Golden Shank Buttons/Appliqués (Tab. 2.8.2.2 b)

Disc-shaped appliqués similar to those from Veshnaveh and to specimens from the J. Paul Getty Museum find 'close parallels in tombs of the late first century BC to early first century AD in Afghanistan ...' (Pfrommer, 1993, p.215). Semicircular appliqués were found in Iranian sites from the 8th to 7th century BC (Musche, 1992, p.243, pl.XCIII,2; Ghirshman, 1938/39. pp.XXVII-XXVIII, pl.L; Boehmer, 1965, p.802; Maxwell-Hyslop, 1971, p.212, pl.179) and in Roman-Arsacid graves at Tell Sheikh Hamad, Syria (Novák, Oettel and Witzel, 2000, p.64).[47] The latter were made of silver and, with a diameter of 1.5–1.7 cm, are larger than the finds from Veshnaveh.

At first sight, two buttons from Chale Ghar 1 seem to belong together due to their shape. Yet they were found in two totally different places within mine 1: no. 6704 was found in the rear chamber and no. 6931 in the entrance area (pl. 47). These locations of discovery make it unlikely that they should belong together. All four buttons were clearly laid down individually. Because of their fairly generic shape, dating is difficult.

2.8.2.3 Bronze and Iron Nail Heads (Tab. 2.8.2.3 a–b)

Needles are personal ornaments that were used to keep clothes or hair in place (Musche, 1988, p.294); nails or needles fixed and embellished e. g. wooden objects. It is possible that one bronze item from Veshnaveh no. 1465 was a nail, which was used as a fastening as well as a decoration (pl. 47, no. 1465); it originally had two parallel extensions that are broken, so their length remains uncertain. Two iron fragments may have belonged to a simple nail, but no. 7147 in particular is too corroded to confirm this observation (pl. 47, no. 7147).

Interpretation of the Bronze and Iron Nail Heads (Tab. 2.8.2.3 c)

Simple metal nails, similar to the two fragments from Veshnaveh (no. 4328; pl. 47, 7147), were found at Tell Sukas in Syria.

2.8.2.4 Gold, Silver and Bronze Appliqués (Tab. 2.8.2.4 a)

Six objects, probably appliqués, were excavated in Chale Ghar 1. Two small golden caps have a string hole with which they could have been sewn onto a garment or another piece of fabric (pl. 47, nos. 1232, 1252). One bronze appliqué probably was also attached by its centre hole (pl. 47, no. 6131e), while one metal, one silver and one bronze cap do not show any holes for fixation (pl. 48, no. 4468a; pl. 48, 4476a1). They may have been attached to objects or tools as knobs.

Interpretation of the Silver and Bronze Appliqués (Tab. 2.8.2.4 b)

The appliqués discussed above are of different shapes and made of different metals, and some are provided with holes for sewing, while others are without any means of fixation. No exact parallels could be found to them; however, one bronze capsule from Masdjid-e Suleiman, Iran, from the Arsacid period broadly resembles the bronze and silver caps (pl. 48, no. 4476a1; pl. 48, no. 4468a). A mediaeval silver belt from the north-eastern coast of the Caspian Sea seems to be very similar to knob no. 4468a: The hemispherical middle piece of the belt has a bulge in the centre and a row of small bulges around it; in the present instance with a space in between, while on the object from Veshnaveh, the surrounding dots are clustered closely around, indeed attached to the centre.

The golden appliqués nos. 1232 and 1252 (pl. 47) are similar to the rosette appliqués of the kind found in Salamine, Cyprus, or to metal ornaments decorated with crosses or stars from Tappeh Giyan, Masdjid-e Suleiman (pl. 50, no. 4546), Susa, Dailaman, Iran. They belong to a long tradition of 'rosette' decorations, which were available in different qualities. According to B. Musche, the forerunners of Arsacid appliqués have been found in Scythian and Sarmatian graves and can be seen on illustrations from the Achaemenid era (Artamonov, 1970, fig.67; Rostovzeff, 1922, fig.17; Kantor, 1957, pp.1-23, pl.6,11). In contrast to these, Arsacid ornaments are of a simpler finish (Musche, 1988, p.261). This observation may apply to the two golden appliqués found in Veshnaveh. They are quite plainly decorated and may belong to these later periods.

The motif of the rosette, that is to say, the star motif, is an old Mesopotamian pictogram (Musche, 1994, p.49), which according to U. Moortgat-Correns and E. Van Buren symbolises the divine and is connected to the goddess Inanna, later known as Ishtar. It appears in Susa as an adopted form of the archaic rosette. U. Moortgat-Correns (1994, p.365) further writes that the rosette never lost its relevance and symbolism, on account of its appearance in every artistic field, but was always connected to the divine. The rosette motif is a deliberately created ornament based on the study of nature. According to B.Musche (1994, p.50) one may have tried to magically influence his environment by

[47] The above comparable finds are not described as buttons by the authors, but since these appliqués are believed to be sewn onto garments, they probably would have some kind of eyelet (Maxwell-Hyslop, 1971, p.212), like a rosette-decorated shank button from the necropolis of Kaluraz, Iran of the first century BC (personal observation, The National Museum of Iran, Tehran, no. 6501). B. Musche (1988, p.278) describes appliqués with hidden possibility for attachment.

use of the rosette. It remains doubtful whether the individuals who deposited these appliqués were aware of the divine significance of the items and that the symbol of the rosette or star was connected to a female goddess. Because the rosettes of Veshnaveh are quite plain in appearance, one should not overestimate their symbolic meaning. Probably they came into the mine simply as individual personal ornaments.

2.8.2.5 Golden Chain Links (Tab. 2.8.2.5 a)

Nine golden chain links are presented here. Seven of them were found in the rear chamber, one in the entrance area (pl. 48, no. 6892) and another one in the main chamber of Chale Ghar 1 (pl. 48, no. 4563). They obviously do not belong to the same necklace, for they differ in appearance and in the technique of their manufacture: The links are either made of a simple wire of different diameters or from a sheet; one is even made of a hollow wire (no. 6219).

Interpretation of the Golden Chain Links (Tab. 2.8.2.5 b)

At Veshnaveh, few and isolated chain links came to light, while at other sites, whole necklaces made of golden chain links were discovered (Pollak, 1903, pl.XIV,381; Musche, 1988, p.148, nos. 5.2., 5.4., pl.XLIII,5.2., 5.4.; Belin de Ballu, 1972, 1972, pl.LXXVIII,3). It is remarkable that such tiny pieces were laid down – as it appears – separately. Similar occurrences are known from a grave in Ed-Dur, where a single bronze chain link, which was found on the skull of a buried child, probably as an individual item decorated a textile head cover (Haerinck, 2001, p.78 no.BQ 67, pl.245,2). Apparently, each of these small objects was of individual value and worthy of being dedicated in the mines one by one.

Concerning the manufacturing technique of metal wires A. Oddy (1977, p.80) writes that the time of the appearance of metal wire is uncertain, while R. Higgins describes several methods used to produce wire in antiquity. The technique used in the case of the chain links from Veshnaveh would be 'twisting a block of metal until it was more or less round in section and finally rolling it between plates of bronze.' (Higgins, 1980, p.15). This pertains to the wires with round cross sections. The ones with rectangular cross sections may have been hammered into shape, while the hollow chain link 'is made by hammering strips of sheet metal into grooves in a block of wood or metal'.

2.8.2.6 Gold and Bronze Mountings with or without Stone (Tab. 2.8.2.6 a)

Mountings of gold and stone belong to the more valuable objects found in Veshnaveh, notably nos. 1617 and 1251 (pl. 48). No. 1251 is made of a gold mounting with a nicely polished garnet or ruby inlay. The spacer bead no. 1617 also seems to be made of gold at first sight, but in fact is not made completely of gold, but of a compound covered by thin gold sheet; the oval inlays are probably made of garnet. Another gold and 'stone' bead or spacer bead is made of a simple flat cylindrical mounting with an off-white inlay (frit? pl. 48, no. 1907b). The inlay of one small round golden mounting is, however, lost (pl. 48, no. 1468).

On account of their shape, the bronze mountings found in the main chamber of Chale Ghar 1 are very interesting. One rectangular specimen is quite fragmented and corroded, but still contains its turquoise inlay (pl. 49, no. 4450). A bronze cogged 'wheel' shaped mounting has no inlay anymore. The mounting is open at one and closed at the other side with a central string hole (pl. 49, no. 1809). In this manner, the piece of jewellery could be threaded on a string. The third bronze mounting is very fragmented and contained a white, translucent oval glass inlay (pl. 49, no. 4485b).

Interpretation of the Gold and Bronze Mountings with or without Stone (Tab. 2.8.2.6 b)

Each of the seven mountings is distinct in shape, colour and technique. Except for one spacer bead, no parallels to mountings presented here can be provided. No. 1617 (pl. 48), a gold encased spacer bead with two oval inlays, resembles necklaces from Iran dated to the Arsacid/Sasanian period and the 7th century AD.

The round gold mountings with stones (pl. 48, nos. 1251, 1907b) are very similar in style to these necklaces and seem to belong to later periods (probably Sasanian).

2.8.2.7 Bronze Strap End (Tab. 2.8.2.7)

One object, which is made of a strap-shaped bronze sheet with a triangular cut at one end, was discovered in the main chamber of Chale Ghar 1 (pl. 49, 1096). Traces of zigzag decoration remain on the metal. Although it is just 4.42 cm, long it resembles the shape of a strap end and it is possible that this object belonged to a child due to its very small size.

2.8.2.8 Iron 'Chain' (Tab. 2.8.2.8 a)

A chunk of highly corroded iron deserves special attention (pl. 50, no. 6928). Although the fragment is very small and poorly preserved, several rings can be discerned within it. The rings are obviously joined, which suggests that the fragment formed part of an ornament or a piece of chain mail. Unfortunately, this artefact could not be exported and further analysed, so this assumption remains open to debate.

Interpretation of the Iron 'Chain' (Tab. 2.8.2.8 b)
It appears that no comparable iron chains or fragments have been found in Iran or have not been published so far. There are reports that some years ago fragments of metal chain mail were discovered in Ziwiyeh, Iran.[48] At the same site, a golden ornament for the back of the hand was discovered. It is made of chain links, joined together to form a lattice and connected to finger rings. It is possible that the fragment from Veshnaveh was some kind of item of jewellery, too, like a fragment from Tell Sheikh Hamad, Northern Syria, which was found on the pelvic bone of a buried female and may have been part of a belt buckle.

Another suggestion regarding the iron chain fragment is that it is a piece of chain mail: While Achaemenid warriors still wore a cuirass, chain mail is depicted on the Sasanian relief from Firuzabad and on the bas-relief of Taq-e Bustan in Iran (Robinson, 1967, p.21 fig.9, p.23 fig.11, p.24; Gall, 1990; Trümpelmann, 1992, p.47 fig. 76; Herrmann and Curtis, 2002; Taq-e Bostan 1998–2009).[49] Furthermore, a soldier with mail was drawn on the famous graffito from Dura Europos (Baur, Rostovtzeff and Bellinger, 1933, pl.22,2; Bishop, 2002, pl.74,8.9). In Firuzabad, the king is allegorised defeating the Parthians, who still wear scale armour, while Ardashir I is depicted wearing 'modern' chain mail. Was this supposed to serve as a showcase, boasting of the better equipment of the superior dynasty who beat the Parthians? Obviously chain mail was known in the Arsacid period, and the technique was adopted by the Sasanian military in the late Arsacid and early Sasanian period (Shabazi, 2004). This would set limits to the probable fragment of chain mail from Veshnaveh by a terminus post quem of the second to the third century AD.

Because it was not possible to examine the iron fragment from Veshnaveh scientifically, the question of whether it was part of a weapon or of an item of jewellery remains open. Producing such chain mail requires a great deal of work, time and skill (Burgess, 1953, pp.48-55) and it would be a valuable item to sacrifice to a sanctuary. One example of chain mail being dedicated to a sanctuary was found in the Romano-British temple at Woodeaton (Jope, 1957, p.106) and parts of chain mail used as grave gifts are known from the Kuban region (Simonenko, Marčenko and Limberis, 2008, pls. 20,9 and 87,4).

2.8.2.9 Gold, Silver, Bronze, Iron and Lead Objects – Not Definable (Tab. 2.8.2.9 a)

Twelve fragments and fragmented objects are probably remains of rings (nos. 1973d, 4052a, 6737), gold ingots (pl. 49, nos. 1949p and 4692a) or pieces of lead and bronze (nos. 4584a; pl. 49, 6921c). Other fragments are distinctively shaped, but are quite difficult to define, like one flat barrel-shaped hollow silver object (pl. 49, no. 4416a) and two trapezoid bronze fragments (no. 1166a; pl. 50, no. 4732d).

Interpretation of the Gold, Silver, Bronze, Iron and Lead Objects – Not Definable (Tab. 2.8.2.9 b)
One of the pieces allows for further investigations, i. e. the bronze item no. 4732d. It is of slightly trapezoid shape with a decoration of grooves (pl. 50). These attributes seem to recall parts of so called elbow fibulae. As far as a dating is concerned, these suggestions are too vague, as well as the dating of the elbow fibula still being debatable: 'However, I must call attention to his (Stronach) dating of the elbow fibula with grooved rings on each arm, which in connection with the material from Dura he dates as late as the 1st century AD. In his review of Dura Europos II, the Necropolis, by N. Toll, P. J. Riis remarked that the elbow fibulae, although occurring in 9th and 8th century BC contexts, were still in use in the Hellenistic Period.' (Buhl, 1983, p.73).

Some objects seem to have been laid down just by virtue of their material, like the gold ingots nos. 1949p and 4692a (pl. 49) or pieces of lead and bronze (no. 4584a; pl. 49, no. 6921c).

Tab. 2.8.2.1 a: Chale Ghar 1, bronze arrow head.

Find Number	Feature	Material	Shape	Measurements
4492a	10013	Bronze	Two-winged, one separate barb	L. 3.82 cm, W. 1.29 cm, D. (shaft) 0.65 cm

[48] Personal conversation with the collegues of the National Museum of Iran, Tehran.

[49] In Europe earliest finds of chain mail are documented, dating to the 4th century BC, and it is believed that the technique of chain mail was adopted by the Romans from the Celts in the 3rd century BC (Robinson, 1967, p.10-11; Rusu, 1969). Fragments of iron chain mail have been found in Northern Caucasian graves.

Tab. 2.8.2.1 b: Arrow heads from Iran and adjacent region.

Date	Object	Provenance	Reference
800–600 BC	Bronze arrowhead, double-bladed with barb	Ziwiyeh/Iran	Medvedskaya, 1982, fig.15,6.
7th century BC	Bronze arrowhead, double-bladed with barb	Büyükkale/Turkey	Boehmer, 1972, pl.31,930-931.
Unknown	Bronze arrowhead, double-bladed with barb	Ustyurt Plateau	Samashev, et al., 2007, p.155.
End of the 1st – beginning of the 2nd century AD	Bronze arrowhead, double-bladed with barb	Tbilisskaja/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.347, pl.67,5.

Table 2.8.2.2 a: Chale Ghar 1, golden shank buttons.

Find Number	Feature	Material	Shape	Measurements
1172	10013/1	Gold	Disc-shaped made of a thin sheet, narrow rim bent downwards, with shank made of gold wire (round diameter)	D. 0.3 cm
1957k	10013	Gold	Sheet embossed to a semicircular shape with shank of rectangular gold sheet	D. 0.53 cm
6704	10022	Gold	Sheet embossed to a slight semicircular shape and flat apex. Shank of band shaped gold sheet	D. 0.65 cm, L. 0.19 cm. thickness of metal sheet 0.01 cm
6931	10004	Gold	Fragmented button of gold sheet; embossed to a slight semicircular shape and flat apex, shank of rectangular gold sheet	D. 0.43 cm, W. 0.34 cm, Th. of gold 0.01 cm

Tab. 2.8.2.2 b: Appliqués from Iran and other regions.

Date	Object	Provenance	Reference
New Elamite, 2nd half of the 8th century BC	Button shaped iron jewellery to sew on ends of sleeve	Tape Sialk/Iran	Musche, 1992, p.243, pl.XCIII,2; Ghirshman, 1938/1939, p.XXVII-XXVIII, pl.LII; Boehmer, 1965, 802-803.
8th–7th century BC	Semicircular appliqués	Ziwiye/Iran	Maxwell-Hyslop, 1971, pl.179.
1st century BC – 1st century AD	Disc-shaped appliqués of gold, edges bent back	Collection of the J. Paul Getty Museum, California/USA	Pfrommer, 1993, p.215 no.121.
2nd half of the 1st century AD	4 silver round buttons with eyelet	Tell Sheikh Hamad/Syria	Novák, Oettel and Witzel, 2000, p.64 fig.145, p.105, fig.347.

Tab. 2.8.2.3 a: Chale Ghar 1, bronze and iron nail heads.

Find Number	Feature	Material	Shape	Measurements
1465	10019	Bronze	Ring-shaped nail head, flattened at the underside with two nails? Broken	D. 1.65 cm
4328	10012/5-6	Iron?	Fragment of nail head, disc-shaped, hollow	L. 2.1 cm, Th 0.3 cm

Tab. 2.8.2.3 b: Chale Ghar 2, iron nail head.

Find Number	Feature	Material	Shape	Measurements
7147	11097	Iron	Very fragmented nail head?	D. 1.2 cm

Tab. 2.8.2.3 c: Nails from Syria.

Date	Object	Provenance	Reference
1st century AD?	Two metal nails	Sūkas/Northern Syria	Buhl, 1983, pl.XXIII,430-431.

Tab. 2.8.2.4 a: Chale Ghar 1, metal appliqués.

Find Number	Feature	Material	Shape	Measurements
1232	10013/1	Gold	Fragment of gold sheet, maybe disc-shaped, perforated in the 'centre'	L. 0.62 cm, W. 0.61 cm, Th. (metal sheet) 0.01 cm
1252	10012/2	Gold	Fragmented concave cap embossed and decorated (like a Bundt cake pan), perforated in the centre	D. 0.7 cm, Th. (metal sheet) 0.02 cm
4333	10012/5-6	Metal	Concave cap without any decoration	Unknown
4468a	10013	Silver	Concave or semicircular cap with central decoration of 11 concentrical running bumps (different size) with one larger middle bump	D. 1.55 cm, H. 0.77 cm, Th. (metal sheet) 0.03 cm
4476a1	10013	Bronze	Concave cap, fragmented, with decoration of small bumps around the rim	D. 1.8 cm
6131e	10022	Bronze	Concave fragmented and bent cap with hole in the centre. Less than 0.5 cm around the centre there is a slight concentric, slightly elevated ridge	L. 2.6 cm, W. 1.1 cm, Th. (metal sheet) 0.05 cm

Tab. 2.8.2.4 b: Metal appliqués from Iran and other regions.

Date	Object	Provenance	Reference
14th century – 7th century BC	Small round sheet of gold; with a pattern of 2 lines crossing a centre boss. 2 bosses decorate the each quarter	Tappeh Giyan, Lurestan/Iran	1 piece, Musée du Louvre AO 16021. Mission of R. Girshman 1931.
12th century BC (Shutrukid Dynasty)	Round gold pendant with eyelet; in repoussé technique; decoration of four crossed lines with dots in the quarters	Susa/Iran	1 piece, Musée du Louvre Sb 5769.
Late 2nd/early 1st millennium BC	Round gold ornament with slight boss in the centre and line, zigzag and boss decoration around it	Ghalekuti/Iran	Egami, Fukai and Masuda, 1965, pl.LXXIX,199.
Hellenistic/3rd century BC	4 discs of gold sheet, decorated with rosettes or stars	Unknown. Coll. F. L. von Gans	Greifenhagen, 1975, p.103, pl.72,13-15.
Arsacid	Capsule of bronze in the shape of a hat with round bulge and rim; incised lines around the rim and a tenon in the centre	Masdjid-e Suleiman/ Iran	Ghirshman, 1976, pl.30,GMIS, 143.
Arsacid	Round golden appliqué with central bulge and ten smaller bulges decorating the rim irregularly; three string holes are arranged in a triangle	Masdjid-e Suleiman/ Iran	The National Museum of Iran, Tehran, no. 4546.
2nd half of the 1st century AD	Two round golden appliqués with central bulge, one decorated with surrounding smaller bulges	Kazanskaja, Tifliss-kaja/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.347, pl.68,4.
Time of Kypchaks, 11th – 13th centuries AD	Belt made of silver and bronze with a silver (?) hemisphere, decorated with a central bulge, surrounded by 19 smaller bulges	Destroyed burial of the Necropolis of Tubezhik I, at the north-eastern Caspian sea coast	Samashev, et al., 2007, p.271.
Unknown	10 rosettes of metal sheet, fragmented	Salamine/Cyprus	Chavane, 1975, pl.41,406.

Tab. 2.8.2.5 a: Chale Ghar 1, golden chain links.

Find Number	Feature	Material	Shape	Measurements
1430	10018	Gold	Gold wire of round cross section, bent to an oval; deformed	D. 0.3 cm, D. of wire 0.05 cm
1431	10018	Gold	Gold wire of oblong oval cross section, narrowing to the ends, bent to a U-shape, compare no. 6076	L. 0.35 cm, W. 0.3 cm, Th. of wire 0.03 cm
1440	10018	Gold	Gold wire of round to oval cross section, bent to an oval; overlapping ends; damaged	D. 0.3 cm
4563	10014	Gold	Rectangular metal sheet bent to an oval, overlapping ends; deformed	D. 0.35 cm, L. 0.15 cm, Th. of sheet 0.01 cm

Tab. 2.8.2.5 a: Chale Ghar 1, golden chain links.

Find Number	Feature	Material	Shape	Measurements
6076	10022	Gold	Gold wire of oblong oval cross section. Narrowing at the ends, bent to a U-shape, cf. no. 1431	L. 0.29 cm, W. 0.1 cm
6078	10022	Gold	Gold wire of rectangular cross section, bent to a hanger, now deformed	L. 0.55 cm. W. 0.4 cm
6088	10022	Gold	Ring made of gold sheet	D. 0.51 cm, L. 0.21 cm, Th. of sheet 0.03 cm
6219	10022	Gold	Hollow wire bent to an oval	L. 0.55 cm, W. 0,35, Th. of wire 0.13 cm
6892	10004	Gold	Fragment of wire with round cross section with one twisted end; bent to an oval	L. 0.58 cm, Th. of wire 0.1 cm

Tab. 2.8.2.5 b: Chain links from the Near East and Europe.

Date	Object	Provenance	Reference
1st century BC/1st cent AD	Bronze chain link	Ed-Dur / UAE	Haerinck, 2001, p.78 no.BQ 67, pl.245,2.
Arsacid, 2nd century AD	Necklace made of eyelet-like golden chain links with beads and pendants	Caesarea (present-day Kayseri) / Turkey	Pollak, 1903, pl.XIV,381; Musche, 1988, p.148 no.5.2, pl.XLIII,5.2.
1st–2nd century AD	Necklace of golden wire/ chain links and bound beads	Olbia/Italy	Belin de Ballu, 1972, pl.LXXVIII,3; Musche, 1988, p.148, no.5.4, pl.XLIII,5.4.

Tab. 2.8.2.6 a: Chale Ghar 1, metal mountings with stone or lost stone.

Find Number	Feature	Material	Shape	Measurements
1251	10012/2	Gold, inlay, garnet/ ruby?	Oval gold mounting with dark red garnet or ruby inlay; fragmented on the reverse; rim of the mounting profiled with three concentric lines; stone inlay polished and shiny	D. 0.75 × 0.8 cm, Th. of gold 0.02 cm
1468	10018	Gold	Ring shaped mounting fragmented at the backside; lost inlay	D. 0.4 cm, L. 0.18 cm, Th. of gold 0.03 cm
1617	10012/3	Bitumen? covered with gold, inlay, garnet/ruby?	Spacer bead with two small string holes; rectangular, smooth edges. Made of bitumen? Covered with a thin layer of gold sheet, at some points the sheet is fragmented; two inlays of oval red garnet stones	L. 0.9 cm, W. 0.65 cm
1809	10013/1	Bronze	Round mounting with concave space for an inlay (lost); appearance of a cogged wheel: 15 vertical grooves and a concentric groove crossing all of them	D. 1.3 cm, Th. of metal 0.5 cm
1907b	10013	Gold, inlay, stone?	Round mounting of band shaped gold sheet with whitish convex inlay; drilled sideways	D. 0.8 cm, L. 0.3 cm, Th. of gold 0.12 cm, D. of string hole 0.1 cm
4450	10012/6	Bronze? Inlay, turquoise?	Rectangular bronze mounting with turquoise stone; covered with metal at 5 sides; corroded and fragmented, especially at the corners	L. 0.74. W. 0.67 × 0.54 cm
4485b	10012/6	Bronze, inlay, glass	Oval shaped mounting with white glass inlay; mounting fragmented and corroded	Inlay: L. 1,14 cm, W. 0.8 cm

Table 2.8.2.6 b: Metal mountings from Iran.

Date	Object	Provenance	Reference
7th century AD	Necklace of beads, spacers and one pendant made of garnet	Iran?	Musée du Louvre AO 21421.
2nd–3rd century AD, Parthian to early Sasanian?	Necklace of two parallel strings with rubies, golden spacer beads and rectangular spacer beads with two oval ruby inlays	Djuben, Gilan/Iran (illicit digging)	Bochum 2004, vol. II, 742 no. 417.

Tab. 2.8.2.7: Chale Ghar 1, bronze strap end.

Find Number	Feature	Material	Shape	Measurements
1096	10012	Bronze	Made of bronze sheet, oblong, one side rounded, a triangle is cut out at the other end, traces of incised zigzag decoration	L. 4.42 cm, W. 0.7 cm

Tab. 2.8.2.8 a: Chale Ghar 1, iron chain.

Find Number	Feature	Material	Shape	Measurements
6928	10004	Iron	Fragmented	L. 2.7 cm, W. 2. 3 cm, D. 1.0 cm

Tab. 2.8.2.8 b: Chain jewellery or illustrations of chains from Iran and the Black Sea region.

Date	Object	Provenance	Reference
11th–7th century BC	Golden ornament for the hand	Ziwiyeh/Iran	Ghirshman, 1963, p.378, pl.538; Musche, 1992, p.248.
1st half of the 1st century AD	Fragment of iron chain mail	Michajlovskaja, Kurgan 2/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.339, pl.20,9.
150 AD	Iron fragment of clasp, corroded	Tell Sheikh Hamad/ Dur-katlimmu/Syria	Novák et al. 2000, 584, fig. 935.
2nd half of the 1st century AD	Fragment of iron chain mail	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.372, p.388, pl.179,10.
1st half of the 2nd century AD	Fragment of iron chain mail	Ust'-Labinskaja/ Kuban region	Simonenko, Marčenko and Limberis, 2008, p.353, p.383, pl.87,4.
3rd century AD	Sasanian relief with illustration of a chain mail garment	Firuzabad/Iran	Trümpelmann, 1992, p.47 fig.76
3rd century AD	Sasanian relief with illustration of a chain mail garment	Taq-e Bustan/Iran	Taq-e Bostan 1998–2009.

Tab. 2.8.2.9 a: Chale Ghar 1, metal objects - not definable.

Find Number	Feature	Material	Shape, preservation	Measurements
1166a	10013/1	Bronze	Oblong rectangular piece of bronze, corroded	L. 2.14 cm
1548	10012	Bronze	Three rod shaped bronze fragments with jointed parts	Unknown
1949p	10013	Gold	Oblong piece of gold, D-shaped cross section	L. 1.12 cm, W. 0.26, Th. 0.1 cm
1973d	10013	Silver?	2 fragments, corroded, ripped ring, rounded, very crumbly material (burned?)	D. 0.25 cm
4052a	10013	Silver	Two lunula-shaped objects with pointed ends	D. 0.59 cm, L. 0.57, 0.5 cm
4584a	10014	Bronze?	Hollow, fragment of a bezel? One side convex, other slightly concave	D. 0.27 cm, L. 0.72. W. 0.49 cm
4416a	10012/5-6	Silver	Flat cylindrical hollow object, fragmented, side wards decoration of 4-5 grooves	D. 1.75 cm, Th. of metal 0.03 cm
4692a	10013	Gold	Oblong d-shaped piece of gold	L. 1.2 cm

Tab. 2.8.2.9 a: Chale Ghar 1, metal objects - not definable.

Find Number	Feature	Material	Shape, preservation	Measurements
4732d	10013	Bronze	Slightly trapezoid bronze object, rectangular cross section, decorated with grooves at the thinner part	D. 0.52–0.6 cm × 0.32 cm, L. 1.63 cm
6533b	10013	Bronze	Pinhead? Cuboid with opening at one side, incised or embossed dotted circle decoration at four sides	D. 0.6 cm, L. 0.8 cm
6737	10050	Iron	Small round fragment, picture field of finger ring or little disc/coin	D. 1.1 cm, L. 0.3 cm
6921c	10004	Lead	Heavily corroded rod, broadening, broken end, one groove alongside	D. 0.6 cm, L. 4.3 cm

Tab. 2.8.2.9 b: Elbow fibulae from the Near East.

Date	Object	Provenance	Reference
7th– 9th century BC	2 bronze elbow fibulae with groove decoration.	Sendschirli/Turkey	v. Luschan, 1943, pp.89-93, Pl.46,12-13.
Iron Age	Bronze elbow fibula with groove decoration	Sarpeta/Lebanon	Pritchard, 1975, fig.59,10.
Terminus post quem 450/440 BC (until probably 370/60 BC)	9 pieces of banded bow fibulae, bronze; ornament of circulating grooves (graves 4 (adult), 8 (adult), 9 (adult), 11 (adult), 27 (adult), 28 (child), 68 (adult) and stray finds)	Kamid El-Loz / Lebanon	Poppa, 1978, p.76, p.81, p.84, pp.96-97, p.116, pp.132-133, pl.5,4,6, pl.8,8,6, pl.9,9,1, pl.10,11,7, pl.15,27,1, pl.15,28,1; pl.20,68,2, pl.25, 10 and 13.
300 BC – 100 AD	2 fragments of an elbow fibula	Dura Europos/Syria	Frisch and Toll, 1949, pl.10,1,5.
1st cent AD	14 elbow fibulae with or without groove decoration	Sūkas/Syria	Buhl, 1983, pl.XXIII,404, 406, 408-409, 411-413, 415-417, 419-420, 426.

2.8.3 Unworked Stones and one Grinding Stone

2.8.3.1 White, Red and Black Stones (Tab. 2.8.3.1 a–b)

A number of stones found their way into the mine that appear not to have been manufactured as artefacts, but which nonetheless attract attention due to their colour or shape. Three white stones were unearthed, of which one has a spherical shape (no. 4407a), another seems to be shaped like a mushroom (no. 4769i), while the last seems not to be worked at all (no. 4581a). One black stone is of a spherical shape and is not drilled like the other stones presented here (no. 1834c). It is unclear whether these stones were shaped or whether this is their 'natural' condition. Three red stones have obviously not been worked on, but their intense red to orange colour stands out among the remaining stones that were found in Chale Ghar 1 and 2.

2.8.3.2 Grinding Stone (Tab. 2.8.3.2 a)

One oblong ovaloid grinding stone of grey colour was excavated in Chale Ghar 2 (pl. 50, no. 1289b). It is fragmented and broken along the off-centre string hole.

Interpretation of the Grinding Stone (Tab. 2.8.3.2 b)
As the table below shows, oblong ovaloid or conical grinding stones were in use during many periods and in various regions. Therefore, it remains difficult to situate the grinding stone from Veshnaveh more precisely.

Grinding stones were found together with precious objects and were sometimes even equipped with a golden cap, as in the hoard of Vettersfelde (Parzinger, Menghin and Nagler, 2007, p.320 fig.1). Obviously, these stones had been important tools and were esteemed as votive gifts, as can be seen on the burials from Ed-Dur or the Michajlovskaja Kurgan 2, where grinding stones were dedicated to the deceased person and buried with them. The grinding stone was not found in the south-east corner of the mine with all the beads and other objects, but in the north-west area. Therefore it might not belong to the intentional depositions of the south-east corner at all.

Tab. 2.8.3.1 a: Chale Ghar 1, white stones, without string hole.

Find Number	Feature	Material	Shape	Preservation	Measurements
4407a	10012/5	White stone	Spherical	Complete	D. 0.63 cm
4581a	10014	Lime stone	Irregular	Complete	L. 2.6 cm
4769i	10015	Chalcedony? (white and black colour)	Mushroom shaped	Fragmented	D. 0.73 cm, L. 0.6 cm

Tab. 2.8.3.1 b: Chale Ghar 1, red and black stones without string hole.

Find Number	Feature	Material	Shape	Preservation	Measurements
1716c	10013/1	Red/Orange stone with white/greyish veining	Irregular	Complete	L. ca. 2.2 cm
1834c	10013/1	Olive black 3-7-10 stone	Spherical	Complete	D. 0.45 cm
4313b	10012/4	Orange/red stone (silicified schist?)	Irregular	Complete	L. 1.65 cm
4404a	10012/5	Red/Orange stone with white/greyish veining	Irregular	Complete	L. ca. 2.25 cm

Tab. 2.8.3.2 a: Chale Ghar 2, grinding stone.

Find Number	Feature	Material	Shape, preservation	Measurements
1289b	11037	Grey stone with white grain	Oblong ovaloid, fragmented.	D. 1.74 cm, L. 7 cm

Tab. 2.8.3.2 b: Ovaloid and conical grinding stones from the Near East and adjacent regions.

Date	Object	Provenance	Reference
1200 BC and 1000 BC	6 different oblong grinding stones with string hole at one end.	Büyükkale/Turkey	Boehmer, 1972, p.230 app.1, pl.XCVIII,2432, 2441, 2443-2444, 2450.
Phrygian period	4 oblong ovaloid grinding stones	Alishar Hüyük/Turkey	Von der Osten, 1937, p.426 fig.482,e1068, e693, e129, e185.
6th–5th century BC	Oblong grinding stone with string hole through one end	Barrow of Beittobe/ Ustyurt Plateau	Samashev, et al., 2007, p.149, p.154.
4th century BC – 2nd century AD	2 conical grinding stones with string holes	Aï Khanum/Afghanistan	Guillaume and Rougeulle, 1987, p.46, nos.0910-0911. pl.XII,0910-0911.
Seleucid/Arsacid	3 grinding stones of oblong ovaloid shape with hole at one end	Masdjid-e Suleiman/ Iran	Ghirshman, 1976, pl.61,GMIS 325,a-c.
3rd century BC	4 oblong, ovaloid grinding stones	Dykyltas/Ustyurt	Samashev, et al., 2007, p.162.
1st half of the 1st century AD	Oblong, ovaloid grinding stone	Michajlovskaja Kurgan 2/Northern Caucasus	Simonenko, Marčenko and Limberis, 2008, p.339, pl.20,2.
25 – 50 and 75 AD	Grey flat rectangular whetstone with off-centre string hole	Ed-Dur/UAE	Haerinck, 2002, p.53 no.AV 108, pl.105 no.118.
2nd half of the 1st century AD	Oblong/oval, ovaloid grinding stone	Krasnodar/Kuban region	Simonenko, Marčenko and Limberis, 2008, p.372, p.388, pl.184,3.

2.8.4 Organic Materials: A Bone Disc and a Wooden Object

2.8.4.1 Bone Disc (Tab. 2.8.4.1 a)

One half of a rectangular to round bone disc was preserved in the rear chamber of Chale Ghar 1. It is decorated with three drilled or incised circles. Its breakage is very smooth over part of the length, while the second half appears splintered along the edge.

Interpretation of the Bone Disc (Tab. 2.8.4.1 b)
No exact parallels can be presented to match the bone disc from Veshnaveh, but bone discs with circular decorations are known from graves in Ed-Dur and from Samad al Shan. Probably, these discs had been inlays or tokens.

The fragmented bone disc was clearly cut in two halves deliberately. One half was discovered in the rear chamber of Chale Ghar 1, while the other could not be found. The breakage is smooth over part of the length and splintered along the remainder, as though someone had cut the disc with a knife or another sharp object part of the way and then cracked the rest of the disc by hand.

2.8.4.2 Wooden Toy (Tab. 2.8.4.2)

In the main chamber of Chale Ghar 1, one extraordinary object was discovered (pl. 50, no. 4149c): It is a small cylindrical roll or wheel of wood with a central groove.

Interpretation of the Wooden Toy (Tab. 2.8.4.2)
Due to the fact that wooden objects have barely been found preserved in Iran and Mesopotamia, the preservation of this wooden artefact may be considered sensational. For lack of references, one can only make conjectures about the function of this object. Probably, it was a toy or part of a toy, for example a wheel or a yo-yo.

Tab. 2.8.4.1 a: Chale Ghar 1, decorated bone disc.

Find Number	Feature	Material	Shape, preservation	Measurements
6079a4	10022	Bone	Quadrangular with round edges, circle decoration	D. 1.5 cm, W. 1 cm, Th. 0.6 cm

Tab. 2.8.4.1 b: Bone discs from the UAE.

Date	Object	Provenance	Reference
300 BC – 200 AD	12 rectangular inlays with an ornament of 5 circles or eyes	Samad al Shan/ Oman	Yule, 2001, p.163, p.246, pl.78,3.14; Yule and Kazenwadel, 1993, p.265 fig.6, cat. no.18.
1st century BC – 1st century AD	Disc-shaped bone plaque with circular incisions	Ed-Dur/UAE	Haerinck, 2001, p.77 no.BQ 39, pl.239,3.

Tab. 2.8.4.2: Chale Ghar 1, cylindrical wooden object with central groove.

Find Number	Feature	Material	Shape, preservation	Measurements
4149c	10013	Wood	'Yo-yo'-shaped, complete	D. 2 cm, L. 2.2 cm

2.9 Summary: Content and Results of the Catalogue

2.9.1 Introduction

Mainly in Chale Ghar 1, and to a lesser degree in Chale Ghar 2, several coins, a large number of beads and pendants of different materials, inlays and one gem, finger rings, earrings, decorated metal sheets and quite a number of interesting miscellaneous finds were unearthed. It seems that a large number of finds could be dated to the Arsacid period, several finds to the Sasanian period, and only a few to the early Islamic period.

In this conclusion, a short outline of the results of the research on these small finds will be given: a short description of the separate find groups is followed by a note on technical aspects, where appropriate. Wherever possible, the date of the objects is given, and specific annotations on the cultural meaning of selected specimens are sometimes made. A general discussion of the cultural and religious interpretation of the finds will be concluded in a separate chapter alongside a stratigraphical examination (chapters 4 and 5).

2.9.2 Coins

Description: Coins are introduced here before any other small finds are discussed, because they give a first indication to the chronology of Chale Ghar 1. Five coins could be dated and belong to following reigns and periods: Mithridates IV (129–140 AD), Bahram II (276–293 AD), Hormizd II (303–309 AD), Shapur II (309–379 AD) and the Umayyad period (661–750 AD). They were all found in the main chamber of Chale Ghar 1. Some fragments of coins that were impossible to date, however, were discovered in the entrance area and in the rear chamber.

Date: The coin finds attest to activity in mine 1 at least from the Arsacid to the early Islamic period. The Umayyad coin that was found in one of the upper layers of Chale Ghar 1 (10012/6), and that more or less frames the terminus ante quem for the use of the mine, is of the greatest interest in this context.

2.9.3 Beads

2.9.3.1 Monochrome Glass Beads

Description: The 349 monochrome glass beads that were found in Chale Ghar 1 and 2 are categorised by shape into 17 groups. The colours of the beads are limited mostly to yellow, green and blue, which account for the large majority; only a few beads are brown, orange, red, black or colourless/white. The colours may bear special meanings, as will be argued in a separate chapter in this study. Most of the simple monochrome beads were discovered in the larger mine, Chale Ghar 1, while only few beads were unearthed in Chale Ghar 2.

Technical aspects: A number of interesting observations can be made on the monochrome spherical beads. Several beads show technical details which are visible to the naked eye, for instance, funnel shaped string holes or an indication of the folding technique. The latter can mostly be distinguished by the seam of the fold. At least one white bead seems to be made of a drawn glass tube; the length-wise lines, which were generated by the manufacturing process, are clearly visible (no. 6144a1). One spherical blue bead did not reveal its manufacturing technique without a scientific examination (no. 4419f). This spherical blue bead, which at first sight seemed to have been made by winding, is actually made of drawn glass, as the analysis of J. Lankton and B. Gratuze has shown and will be outlined below (see subsection 3.2.2). In their study, technical as well as chemical aspects of this bead are compared to blue glass beads from the Indo-Pacific region.

Date and interpretation: Among the monochrome beads, three types are of great interest: The melon-shaped beads, the cornerless cube-shaped beads and the green hexagonal beads. The spherical melon beads cannot be dated due to their frequent and widespread occurrence, but they evidently have a special meaning (Eisen, 1930, pp.21–25). Their magical power was apparently connected to the blue colour. E. Riha (1990, p.77) writes about melon shaped beads found at the Roman sites of Augst and Kaiseraugst in Switzerland, stating that they were notable for never appearing in a string of beads. They seemingly were not worn with other melon beads as amulets. They, however, could be combined with several other types of beads, or with those made of seeds and wood. This statement, although made in connection with beads from another geographical region, seems equally appropriate to the circumstances at Veshnaveh, where the melon beads appear as unique ornaments.

A dating can be given to the cornerless cube-shaped and the hexagonal beads: The cornerless cube-shaped beads, especially the blue-coloured ones that were only found in Chale Ghar 1, can be placed within the Arsacid period. Green hexagonal beads may be compared to finds from the Sasanian and late Sasanian periods. The other monochrome groups elude precise chronological fixation. Simple monochrome glass beads of the kind found at Veshnaveh were universally produced, and in different periods (Riha, 1990, p.86).

2.9.3.2 Overlay and Gold-in-Glass Beads

Description: 20 Overlay beads were found only in Chale Ghar 1. Most of them consist of a yellow or white core of opaque glass with a greenish cover. Just three

of them have a blueish cover, and only two contain a translucent, colourless core.

Also only in Chale Ghar 1, several completely preserved gold-in-glass beads, as well as fragments, were discovered (20 beads). In Chale Ghar 2, no beads of this kind were unearthed. A broad range of shapes and techniques is represented by the objects: Simple spherical beads, segmented beads, so-called 'collared' beads and one 'mulberry' bead. Some fragments and overlay beads without gold foil may be supposed to imitate gold-in-glass beads.

Technical aspects: On some of the overlay beads, an interesting observation was made: Clearly, they are made of cores of drawn glass tubes, while the cover seems to be wound or applied in another way – probably with glass powder, as was suggested for the gold-in-glass beads. This observation by the naked eye was verified through the scientific examination carried out on one bead by J. Lankton and B. Gratuze (pl. 6, no. 1872h; paragraph 3.2.2).

There is an ongoing discussion of the manufacturing technique of gold-in-glass beads, especially concerning the translucent glass cover. So far, the use of two drawn glass tubes that were slipped into each other, or dipping into hot glass, have been considered. A new suggestion is made in this study: Powdered glass, which is attached onto the gold foil-covered core of the bead, was melted to generate the translucent cover glass. This method, indeed, may require further elaboration, but it does demonstrate further possibilities. Probably, different methods were used side by side. In any case, it would seem that the manufacture of the ancient gold-in-glass beads is still in need of further consideration.[50]

Date: Hardly any parallels are available for the overlay beads, and on this basis, a dating is not possible. However, the use of the drawing technique indicates a terminus post quem of the Hellenistic period for these beads.

To judge by the references, at first sight the appearance of gold-in-glass beads covers a date range from the Arsacid to the Sasanian periods and possibly even to the Middle Ages, due to an often broadly given dating of gold-in-glass beads. St J. Simpson (2003, p.67), however, states that 'gold-glass beads have not been reported [for the Sasanian period – N.B.] nor is this technique used for Sasanian glass ware.'[51] This would signify a hiatus of gold-in-glass bead production or trade during the Sasanian period. According to their technique and the references, the spherical and segmented gold-in-glass beads from Veshnaveh were dated to the Arsacid period. However an assignment to later periods may not be precluded.[52] The so-called collared beads date to the late Arsacid period and the 'mulberry'-shaped beads came into fashion in the 1st century AD, which corresponds with the references that mainly date them to the 1st to 3rd centuries AD.

2.9.3.3 Stripe-/Trail-Decorated Glass Beads

Description: 44 beads have been subsumed under a single heading because of their stripe decoration. These beads, however, are very different from each other and have again been separated into five groups. Some have yellow, green and red stripes. Others are blue, brown or black beads with a white stripe decoration. Beads of this kind were not discovered in Chale Ghar 2, only in Chale Ghar 1.

Technical aspects: Concerning the last group described above, it seems clear that, on a basic bead, the glass stripes were applied and only briefly heated, just enough to allow the glass to fuse with the plain bead (Stern, 2001, p.29).

The stripe-decorated beads from Veshnaveh show how fragile yellow glasses must have been (compare Lierke, 2009, p.9 fig.94), because most of the yellow parts are very corroded or completely lost. This can be observed especially well on one fragment of a green and yellow bead that is classified as a mosaic bead by J. Lankton and B. Gratuze (pl. 8, no. 4582b; subsection 3.2.2). The classification of this bead as belonging to the mosaic technique may be plausible, while two further bead fragments, described as mosaic by J. Lankton and B. Gratuze, fit better into the category of the stripe- and trail-decorated beads (pl. 7, no. 4596d; pl. 9, no. 4416b). Bead no. 4596d belongs to the type of beads with parallel rings. These are made of pre-manufactured glass stripes that were folded afterwards. No. 4416b was probably made by applying glass stripes onto a basic bead that, in this case, obviously consisted of translucent blue glass. The mosaic technique usually operates with pre-manufactured glass rods that were bundled to form ornaments. The application of stripes is not included in the mosaic technique in this study.

Date: Wherever a dating was possible, the chronology of the beads points to dates in the first centuries AD: The so-called 'zoned' bead seems to date to the 1st–4th century AD. The stone imitation beads are common since the 2nd, or at the latest the 1st millennium BC. However, the appearance of the Veshnaveh stone imitation beads and their parallels might indicate the Arsacid and Sasanian periods, at least, for them. As these beads were

[50] Several, mostly modern, techniques of the gold-in-glass production are briefly discussed in an article by M. Jönsson and P. Hunner (1995).

[51] Unfortunately, St J. Simpson (2003, p.70 n.33) does not give more details regarding this matter. He further writes that 'The Sasanian attribution of a gold-glass bowl in the Corning Museum of Glass exhibited in an exhibition in Brussels on the *Splendeur des Sasanides* is dubious' (Overlaet, 1993, p.266 no.155).

[52] From the 8th century AD onwards, larger gold-in-glass beads were blown. They do not fit into the class of the rather small beads from Veshnaveh.

supposed to mimic agate, they most probably were endowed with the same talismanic attributes as the real stones (Schneider and Stemplinger, 1950, col.67). It is unclear whether the glass version was cheaper, or whether it was considered to be fashionable.

Variously Decorated Glass Beads

Description: The chapter of the variously decorated beads contains 5 beads which are quite unique and only appear in Chale Ghar 1. They feature elaborate decorations, such as a sun motif, or are made of marbled glass.

Date: The production process of the variously decorated beads is still subject to debate. Hopefully, their publication along with specifications of measurements, colour and appearance in this study will serve as an aid to subsequent interpretations.

2.9.3.4 Mosaic glass beads

Description: Within the ensemble of Chale Ghar 1, the 6 mosaic beads are of high quality and represent unique artefacts: Four chequer board patterned beads, one flower-decorated bead and one elaborately manufactured bead with a bird illustration. In Chale Ghar 2, no mosaic beads were unearthed.

Technical aspects: Most probably, the mosaic beads from Veshnaveh were not produced locally. To make such elaborate patterns, greater experience and skill would have been needed. Due to their different appearance and the diverse technical features, the beads probably originate from various workshops. Unfortunately, the locations of such centres are still unknown, especially for Iran (Spaer, 2001, p.121).

Date: The three types of mosaic beads seem to have been produced during a period in which the mosaic technique already was well developed. They certainly were made after the 3rd century BC. The chequer board pattern seems to become more important in the course of the Hellenistic and Roman periods; the latter period corresponds more or less with the Arsacid period. It is used as a filling motif and an element of decoration on Hellenistic ceramics and on Roman mosaic floors (Strauss and Olbrich, 1994, p.433). A manufacture of this pattern also in later periods may not be precluded.

2.9.3.5 Eye Glass Beads

Description: Eight groups of eye beads were discovered at Veshnaveh. Most of the 38 beads were found in Chale Ghar 1, while only one eye bead was excavated in Chale Ghar 2. The beads have been classified according to their decoration, their colour and the technique employed in producing the eyes. Alongside the blue beads with white eyes, green beads with yellow and red eyes are also presented. A special bead is one so-called 'compound' eye bead that has stripe-decorated eyes.

Technical aspects: The first group of eye beads is defined according to technical factors and the decoration of white and blue eyes. These eyes were created by rods that were pressed into a hot glass stripe, or embedded in glass powder, and then fused. This pre-manufactured, eye-decorated glass stripe was then folded around a rod. The second category of eye beads is represented by one bead with applied eyes (pl. 10, no. 4311b). In this specimen, drops of white glass for the iris and of blue glass for the pupil were applied to a very hot plain bead. The only eye bead found in Chale Ghar 2 (pl. 10, no. 7002a) may have been decorated in the same way. However, it is too corroded to confirm this assumption.

A number of blue glass beads is associated with the eye beads because of their blue basic colour and the rather marble-like white decoration. This decoration may resemble an eye decoration in a rather rough manner.

The so-called compound eye bead has stripe-decorated eyes. These are sections of pre-manufactured rods that were attached to the plain bead. Bead no. 4483 was probably made of sections of pre-formed rods that were embedded in glass powder or a glass stripe (pl. 11). A glass stripe that was produced in this manner was then folded around a rod. J. Lankton and B. Gratuze classify this bead as belonging to the mosaic technique, which may be correct, because a clear definition of the mosaic technique is still lacking (subsection 3.2.2). The 'powder technique' is very close to the mosaic technique (Stern and Schlick-Nolte, 1994, p.63; Lierke, 2009. p.19 fig.97) and frequently not recognised, only to be counted among the mosaic technique.[53]

Date and interpretation: As will be discussed in a separate subsection (4.3.6.1), the eye beads have been endowed with a magical meaning in the Near East, which endures to this day. Their blue colour and their eye decoration are supposed to ward off evil. It is unclear whether the green and red eye beads were used in the same tradition.

In her chapter on the eye beads, M. Spaer (2001, pp.77-87) gives an outline of the chronology of Near Eastern eye beads that is applied here to the observations regarding the Veshnaveh eye beads. According to her, the first eye beads were inlays in gold jewellery in the 2nd millennium BC, while from the 1st millennium onwards, trailed and stratified eye beads were most common. Later, eye beads were mainly made by the mosaic technique, in which sections of cut multi-coloured rods

[53] Cf. von Saldern, 1966; Lierke, 2009, p.19 fig.97. Various colourful glass beads are also found in the in the province of Arabia of late-Roman and Byzantine time (Eger and Khalil, 2013).

were applied onto the bead. M. Spaer (2001, p.87) argues that this new style of eye beads started to appear only as late as the 3rd century BC. The beads from Veshnaveh meet certain criteria, such as the mosaic technique used on the compound bead and the canes that were pressed into the bead, that, according to M. Spaer, would suggest a production of these eye beads not earlier than the 3rd century BC.[54]

Unfortunately, barely any relevant archaeological material is available for comparison studies of late eye beads of the kind found at Veshnaveh. The references that were quoted for the eye beads from Chale Ghar 1 and 2 lack detailed descriptions. For this reason, the comparison of the Veshnaveh beads to possible counterparts results in a wide range of possible datings:

- The blue/white eye beads with inserted rods have counterparts from the 6th to the 1st centuries BC.
- The blue/white eye beads with the applied eyes can be compared to beads from the 12th to the 2nd centuries BC.
- The green beads with yellow and red eye decorations more likely belong to the Roman period, which corresponds partly with the Arsacid period, while the type of compound bead with striped eyes is widespread from the Hellenistic to the Byzantine Period, which corresponds with the Seleucid to the Sasanian period.
- The 'powder' bead with yellow/red eyes may date from the Roman period or the partly contemporaneous Arsacid period.

It must be stressed that these dates are assumptions and need further evidence. Nonetheless, possible datings of the eye beads that were found at Veshnaveh can be narrowed down at least to the Hellenistic and Roman periods, because of technical aspects as explained above.[55]

2.9.3.6 Metal Beads

Description: 28 metal beads were unearthed in Chale Ghar 1, while Chale Ghar 2 did not contain any metal beads. On the whole, the specimens are of rather simple shapes, however, several so-called golden 'granular beads' and one silver 'granular' bead are of special interest.

Technical aspects: Most of the granules of the golden beads seem to be hollow. This is remarkable, not least because this attribute is barely mentioned in the literature on antique 'granule' jewellery. Questions centre on how these beads were produced and whether it is even appropriate to speak of granulation in the present context, since the technique's definition is contentious (Carroll, 1974; Wolters, 1983).

Date: Most of the metal beads from Veshnaveh are simple in shape and cannot be dated. Still, the comparisons show that there was a long tradition of producing metal beads in the Near East. For example, the melon-shaped gold beads were found in the context of the Early Bronze Age as well as in sites of the Arsacid period.

Even though 'granular beads' are known as early as Sumerian times, the metal beads from Veshnaveh belong instead to the late Arsacid and Sasanian period, on the basis of appearance and technique.

2.9.3.7 Stone Beads

Description: The undecorated cornelian beads account for the majority of the stone beads that were found at Veshnaveh. Most of these undecorated beads (436 beads!) are of simple shapes. However, 13 cornelian beads warrant closer attention. They are etched beads with white decorations of crosses, zigzags and dots as well as tendrils. Such beads were only found in Chale Ghar 1, while Chale Ghar 2 contained no finds of this kind.

It is noticeable that hardly any agate was found in the mines, aside from one fragmented pendant (see below: 2.9.4.3 stone pendants). Apart from the cornelian beads, garnet, lapis lazuli, gagat, turquoise and azurite beads and various brown, red and pink stones and white stone beads as limestone, marble and rock crystal were unearthed at Veshnaveh. In Chale Ghar 2, a number of cornelian beads were found, as well as one ovaloid garnet bead and one rectangular chalcedony bead.

Date: Undecorated cornelian beads appear frequently, both in terms of chronology and of geography. Therefore these beads cannot be dated, aside from the cornerless cube-shaped ones that may belong to the time frame of the Roman period. A different case is that of the etched cornelians which, based on their decoration, can be dated to the Arsacid-Sasanian period (beads with lines and dots), the Sasanian period (beads with zigzag decoration) and the late Sasanian/early Islamic period (beads with tendril decoration). The other stone beads from Veshnaveh could not be dated, but the gagat beads show a tendency to the Arsacid and Sasanian periods, and a cornerless cube-shaped lapis lazuli bead has a terminus post quem of the Arsacid period, on account of its shape.

[54] The white glass rods most probably were manufactured by the drawing method which, according to M. Spaer (1993, p.10), was introduced in the Hellenistic period, some time prior to glass-blowing in the 1st century BC.

[55] In this context, a remark by the Crowfoots (in: Crowfoot, Crowfoot and Kenyon, 1957, p.391) is very appropriate and still valid today. It is stated that techniques were not only used consecutively, but also in parallel: 'It has been stated that the impressed ring method was the oldest, the stratified the next oldest, and that the cane bead was very much later. Recent discoveries do not confirm this, and I think that the three types overlapped considerably in the periods during which they were made.'

2.9.3.8 Amber Beads

Description: Only 62 amber beads have been discovered in Chale Ghar 1. They are mostly honey- or orange-coloured, are rather small and come in shapes like spherical, ovaloid, cylindrical and cornerless cube. Some beads have a triangular or droplet-shaped cross section.

Origin: The results of the chemical analysis of 14 amber samples from Veshnaveh carried out by E. Stout and C. W. Beck are most interesting (see below: subsection 4.1.4). The beads are quite certainly made of Baltic amber, known as succinite. Because the samples were randomly chosen, it may be assumed that the other beads are also made of succinite.

Date: The amber beads that were found at Veshnaveh are rather small and of simple shapes, which makes dating them difficult. However, some beads have a triangular cross section and may be dated to the Arsacid or Sasanian period, while the cornerless cube-shaped beads rather belong to the Arsacid period.

2.9.3.9 Shell Beads

Description: 66 shell or coral beads and cowries fitted with a string hole were found in the entrance area of Chale Ghar 1 and in Chale Ghar 2. Among the shell/coral beads, spherical and cylindrical shapes are the most numerous. One remark should be made with regard to their size: The shell/coral beads from Veshnaveh are smaller than their counterparts from the Near East and the Black Sea littoral.

Two small mother of pearl beads were discovered, one in each of the mines. One cylindrical bone bead was found in Chale Ghar 2.

Material: The assignment of the material of the shell or coral beads remains unclear due to a lack of scientific examination. Most of these beads are made of a white material with a textured surface, which might indicate coral. Some beads, mostly those from Chale Char 2, are smooth without any veining. These are probably made of another material, possibly shell.

Date: Shell, coral and cowry beads are widely distributed in terms of chronology and geography. Therefore, a dating of beads of this material is not possible. Mother of pearl or pearl most often is not preserved, so there is a lack of references.

2.9.4 Pendants

2.9.4.1 Glass Pendants

Description: In this study, 11 pieces of jewellery with off-centre string holes are described as pendants. Only a few glass pendants were discovered in Chale Ghar 1. They are conical, bag-shaped or lunula-shaped and made of blue, yellow, brown or multi-coloured glass. In Chale Ghar 2, no glass pendants were found.

Date and interpretation: The first group, the monochrome blue pendants, may fit into the period between the Hellenistic and the Sasanian eras. Their colours – blue or turquoise – very probably had an apotropaic meaning. One brown bag-shaped pendant is made of a highly translucent glass that resembles amber. Considering the bag-shaped amber pendants of the Roman period (see below: 2.9.4.4) and four references that date from the 1st century BC to the 1st century AD, it may be possible that this object from Veshnaveh belongs to the Arsacid period.

Two blue lunula-shaped pendants are hung with an eyelet upside down. This form, though made of other materials, i.e. gold, is common in Persia since at least the 4th millennium BC. Such lunulae made of glass, however, seem to appear in the last century BC and were in use until the Islamic period. The pendants from Veshnaveh could be dated to the Arsacid and Sasanian periods. The magical power of the lunulae might have been strengthened by their blue colour and their decoration of eyes and trails. Both colour and shape were believed to ward off evil.

Based on comparable finds, the multi-coloured pendants should be dated to the Arsacid period. Their wavy glass layers of different colours might imitate agate, a stone which, in popular belief, has the power to defend against evil. It is probable that certain combinations of colours were preferred in certain regions. Maybe brown, white and blue were preferred in Northern Iran, as the finds from Veshnaveh and comparisons would suggest. Yet this assumption requires many more sources for verification.

2.9.4.2 Metal Pendants

Description: 13 pendants made of bronze or gold were unearthed in Chale Ghar 1. Especially the golden pomegranates, the bronze bells and a golden pendant with turquoise stone inlay are significant. Other pendants have quite abstract shapes or are fragmented.

Interpretation: The cultural interpretation of bells and the grenadine fruit that is imitated by the small golden pendants from Veshnaveh is very interesting. Pomegranates play an important role as a 'cultic plant' and bells can be described as a 'cultic instrument'. Whether these objects had this purpose when they were laid down in Chale Ghar 1 remains unclear. In any case, whether consciously or not, they had a special significance for the worshipper.

Date: Due to their design and technical composition, the golden pomegranates have been dated to the Arsacid and Sasanian eras, while the shape of the bronze bells with horizontal grooves applies to periods from the Achaemenid dynasty to the Arsacid rulers.

Even though the gold-turquoise pendant is of special appearance, no further evidence is available with regard to it. Turquoise is known to have been available from Iranian sources such as Baghoo and Nishapur, and it was found in several periods as early as the late 2nd to early 1st millennium BC at Ghalekuti in Northern Iran (Egami, Fukai and Masuda, 1965, pl.LXXVIII,175-176). Evidence regarding the wire, lenticular, gold sheet and remaining bronze pendants is similarly scarce: they too lack comparison objects and interpretation.

2.9.4.3 Stone Pendants

Description: Only 4 stone pendants were unearthed, all in Chale Ghar 1. They are more or less trapezoid and are made of chalcedony, cornelian, agate and gagat/jet. The agate pendant is the only agate object to have been found in the mines.

Date: Due to their simple appearance and to a lack of comparison objects, it was not possible to date these pendants

2.9.4.4 Amber Pendant

Description: Besides one ovaloid and one triangular amber pendant, another amber pendant stands out among the Veshnaveh finds. It is made in a bag- or bottle-shape with a vertical string hole. Grooves around the neck of the specimen indicate that it was worn as a pendant.

Date and origin: While the ovaloid and the triangular amber pendants lack referent finds, the bag-shaped amber pendant very clearly can be dated to the Roman or the partly contemporaneous Arsacid period. Its shape indicates that it originated in Eastern Europe, and references with cross decoration may imply that it was reworked in the Near East or Iran.

2.9.5 Inlays and one Gem

2.9.5.1 Glass Inlays and one Glass Gem

Description: Besides the inlays that were found in or together with the finger rings, 7 monochrome, undecorated glass inlays of different colours were unearthed in Chale Ghar 1. Chale Ghar 2 did not contain finds of this kind. The inlays were found without any setting, but their small sizes imply that they were inlays for finger rings; the possibility that they belonged to decorated earrings or another kind of jewellery cannot be precluded.

One gem of translucent blue glass was found in Chale Ghar 1. It is of an oval shape and is decorated with an engraved or moulded figural motif. It was probably made as inlay for a finger ring.

Date: Because the inlays are not decorated, and due to a lack of references, it was not possible to date them. However, the Hellenistic period may be suggested for them as a probable terminus post quem. Glass gems have been manufactured since the late Bronze Age (Stern 2001, 358). They were increasingly widely distributed in the Hellenistic period and reach their maximum distribution in the Augustan period (1st century BC and early 1st century AD). Glass gems were manufactured until the late Roman period. The figural decoration of the gem shows a Hellenistic or Roman representation of a warrior and may be an import from the eastern provinces of the Roman Empire.

At any rate, the glass inlays and the glass gem presented here can be dated to the Hellenistic and Roman periods; the latter is more or less contemporaneous to the Arsacid period.

2.9.5.2 Stone Inlays

Description: 4 stone inlays were also discovered in Chale Ghar 1. They are semi-ovaloid and made of garnet or of chalcedony. These stone inlays may also have belonged to finger rings and at least one fits perfectly into the vacant setting of a finger ring that was also found in Chale Ghar mine 1 (pl. 37, nos. 1228, 4445).

Date: A dating of these inlays was not possible.

2.9.6 Finger Rings

2.9.6.1 Glass Finger Ring

Description: One finger ring stands out as a unique object among the finds of Veshnaveh. It is the only glass ring to have been found in Chale Ghar 1 and is made of a hoop of twisted yellow and colourless glass with a bezel of a white and blue eye.

Date: The references for similar glass finger rings indicate a date range for the ring from Veshnaveh between the 1st and 4th centuries AD or the late Arsacid period.

2.9.6.2 Metal Finger Rings

Description: 142 metal finger rings were excavated in Chale Ghar 1 and 2. Mostly, they are made of bronze or another non-ferrous metal or iron; only a few were made of silver. The iron rings are much too corroded for further conclusions to be drawn; however, one ring was found with a green inlay. This is very interesting, because we know hardly anything about the shapes and styles of Near Eastern iron finger rings of the Sasanian and Arsacid periods.

The rings are classified according to their decoration, and one significant group is that of the finger rings decorated with bird motifs. These rings are ornamented with incisions of birds rendered in different manners. Other animal-ornamented rings are a stag- and a griffin-decorated bronze ring. Further finger rings found in Veshnaveh are of various shapes and decorations, e.g. a spiral ring or rings with what may supposed to be inscriptions.

Interpretation: Closer consideration of the ornaments of the rings make it seem plausible that the animal decorations – especially the birds – were endowed with apotropaic and protective qualities (see subsection 5.3.6.3). The griffin has attributes similar to those of the avian animals, though it emanates more power than the birds. The stag also appears on Sasanian gems, but its meaning remains uncertain for the present. One further group of rings consists of those with plant decorations, which are associated with fertility. But not only decoration and shape are significant: The ring size can also provide interesting information.

Date: Based on shape and decoration, most of the finger rings could be dated to the Sasanian period, though a few may belong to the Arsacid period, for instance the bronze finger rings with green glass inlays. One bronze finger ring with a conical bezel and circle decoration probably belongs to the late Sasanian or early Islamic period. Together with the Umayyad coin, it gives a chronological limit to the site.

2.9.7 Earrings

2.9.7.1 Metal Earrings

Description: In some cases, it is difficult to tell finger rings and earrings apart, especially in cases of fragmentation or of rings with overlapping ends. The group of bronze and iron objects presented here has been classified as earrings because of their shape, size or the pointed, open ends (39 rings).

Technical aspects: The earrings from Veshnaveh yield some technical and cultural information: They are mostly hollow, probably to make them lighter and more comfortable to wear. They seem to have been deposited not in pairs, but individually, which emphasises their individual value and significance.

Date: Due to their simple shapes, the earrings from Veshnaveh are barely dateable, yet they form an interesting group: Iron earrings have seldom been found and published as could be done here. Iron rings in particular were usually not preserved very well, therefore few parallels remained from other archaeological sites. Often, this metal is in very bad condition when excavated, and sometimes a discolouration in the earth is all that remains to hint at its presence. Of course, iron jewellery has not been produced earlier than the dawn of iron mining (Schienerl, 1980, p.486).[56]

2.9.7.2 Shell Earring

Description: One shell object with pointed ends is classified as an earring. It is the only find of this kind and was excavated in the entrance area of Chale Ghar 1.

Date: Because this earring is a unique find and no parallels could be found, a dating was not possible.

2.9.8 Metal Sheets

Description: 20 decorated or blank metal sheets came to light in Chale Ghar 1, while Chale Ghar 2 contained no finds of this kind. The sheets are made of different materials, mostly of silver, few of gold and bronze. Some are ornamented with figural or plant motives or embossed in the shape of an animal, a bird or a fish, or a body part, hand and eye. Other sheets are very fragmented and bear no discernible decoration.

Interpretation: Though dating of most of the plaques is not possible, they are of the utmost interest, especially the silver sheet with figural decoration: It depicts

[56] Before the 2nd millennium BC, iron was seldom used and was considered a rather rare and special material (Stöllner, 2005, pp.462-463).

a cultic scene in which a male figure is shown with a plant. Against the background of the Iranian pre-Islamic religion, the plaques in the shape of body parts suggest a defensive connotation, and the golden plant-decorated or the animal-shaped sheets may also be connected to such religious beliefs as guarding against evil or bestowing fertility.

Date: Based on dress and appearance as well as references, the figural plaque may be dated to the Arsacid-Sasanian period, possibly even to the late Sasanian era. The other metal sheets could not be dated conclusively.

2.9.9 Miscellaneous Objects

Description: 55 different objects of unique appearance have been subsumed under this heading. The larger number of these objects was found in Chale Ghar 1 and only one iron nail head, the grinding stone and the green glass fragment were unearthed in Chale Ghar 2. Among the miscellaneous finds are a green phallus, a globular glass vessel, an arrow head, shank buttons, nails, appliqués, chain links, mountings with or without stone, a small strap end, an iron chain, a bone disc with a circle decoration and what is probably a wooden toy.

Considerations on the interpretation of some miscellaneous objects: Some objects seem to have been deposited into the mine merely on account of the material, like the golden ingots (pl. 49, nos. 1949p, 4692a), others due to their value or symbolism, like the golden 'rosette' appliqués. It is noticeable that such small objects as the golden buttons and chain links were laid down one by one, probably due to the metal's value or the worshipper's personal attachment to the item.

Despite the fact that just one arrow head was unearthed in Chale Ghar 1, one should not overestimate this find. Probably it was laid down not for a special purpose, but because of its material, its status as an heirloom or some individual meaning we can no longer discern.

A few stones attracted attention by virtues of their colour or shape. They are white, red or black and stand out among the other stones found in the mines. Obviously the stones that were found in Chale Ghar 1 as filling material, do not represent prehistoric debris, but were brought into the mines from outside to cover the deposited objects or simply as filler, for covering the objects or for an unspecified reason. The colourful stones may simply have formed part of this filler. Another possibility would be to consider a special purpose for the stones: Might they have been sacrificed individually?

The bone disc displays interesting traces. Obviously, it was cut to a certain point with a sharp tool and then broken manually. It appears that the disc was intentionally destroyed. The wooden 'yo-yo' may have been part of a toy.

Date: Most of the finds that were subsumed under the 'miscellaneous' heading could not be dated. Only the glass phallus may be linked to the occurrence of stereotypical phallus pendants that were frequently found in the Near East. A dating to the period between the 1st century BC and the 2nd century AD may thus be supposed for the phallus from Chale Ghar 1 at first sight. However, its quite different appearance from the Roman phalli may suggest a later date for this type.

Glassblowing with a pipe was invented in the 1st century BC and developed in the last quarter of the 1st century BC (Stern and Schlick-Nolte, 1994, p.19). This terminus post quem and the references date the small globular glass vessel to the Arsacid period.

Three gold and stone spacer beads fit into the Arsacid period, as does the golden 'rosette' appliqué. The bronze arrow head clearly can be dated to the 7th century BC. It probably came into the mine as an heirloom.

3 Excursus: Chemical Analyses

3.1 Outline of Archaeometrical Analyses of Iranian Glass and Amber

Until today, most Iranian archaeological finds have not been analysed archaeometrically. A comprehensive survey of Iranian glass is especially missing.[57] Yet such analyses have the merit of being able to support or disprove suggestions either about manufacturing techniques or about long-distance exchange of goods. One of the most detailed publications offering chemical analysis of Iranian glass is the study of S. Oda about glasses from Nowruzmahale (Oda, 1966). On the basis of X-ray fluorescence and a spectroscopic and a quantitative analysis, he analysed the chemical composition of one vessel, one finger ring, spindle whorls and beads with different appearances, and considered the technical methods used on the Nowruzmahale beads. The base glasses obviously consisted of so-called alkali-lime glass and lead glass (Oda, 1966, p.46). The main colouring compound was copper, supplemented by other minerals, such as cobalt, nickel, iron and manganese. Oda further compared the Nowruzmahale glasses with glass from the neighbouring site of Ghalekuti, and with glass from Syria (Oda, 1966, p.48 tab.X). In his judgment, these glasses appear to have similar compositions. He felt able to offer a firm conclusion about the Nowruzmahale glasses, namely that they are proportionally analogous to Roman glass, while the glasses from the neighbouring site of Ghalekuti resemble Egyptian glass (Oda, 1966, p.49).[58]

E. McGovern, S. J. Fleming and C. P. Swann (1991) chemically examined nine frit and glass beads from Dinkha Tappeh, Iran. The glass samples were of an alkali-lime glass, with a high potassium oxide-magnesia content. According to the authors this is typical of Near Eastern glasses of the 2nd millennium BC (McGovern, Fleming and Swann, 1991, pp.399-400). Together with finds from Geoy Tappeh, the silicate beads from Dinkha Tappeh indicate the existence of a glass industry in Azerbaijan in the 2nd millennium BC, but the authors admit that more technical studies are needed to confirm this hypothesis (McGovern, Fleming and Swann, 1991, p.402).[59] R. Vahidzadeh and Gh. Afrund suggest relations of Persian glass with China based on analyses of vessel glass from Rayy (Vahidzadeh and Afrund, 2010). They also refer to glass analyses made of glasses from islamic Nishapur (Brill, 1995).

Amber artefacts have been found sparsely but nonetheless frequently in Iran, although no sources of amber are known within the Near East except insignificant occurrences in Lebanon and in parts of Jordan and Israel. So an important question arising from the amber found in Iran is: where does the material come from? Scientific analysis of amber offer reliable possibilities for determining the origin of the amber artefacts. However, only one Iranian amber artefact is known to have been analysed for its elemental composition, which is a bead from Tappeh Marlik (Beck and Muroga, 1972). It is a fragment of a ring-shaped bead that, according to C. W. Beck and T. Muroga, is made of succinite or Baltic amber.

These few examples show that an archaeometric examination of glass as well as amber analyses are still insufficient in Iranian and Near Eastern archaeology.

Within the project 'Ancient Mining and Metallurgy', the composition of eight glass samples, eight metal samples and fourteen amber samples from Veshnaveh could be analysed; detailed breakdowns of the data are given for the glass in a contribution of J. Lankton and B. Gratuce in a following section and in separate articles for amber and metal (Hazian and Ghasemi, 2011;Bagherpour Kashani, Rustaei and Stöllner, 2011). An outline of the analyses will be offered at this point and the results of the examination of the Veshnaveh glass carried out and presented by Lankton and Gratuce will be discussed.

[57] An exception is the study by C. Rösch, et al. (1997), and it is of interest not only for the investigation of Iranian glass. Generally glass beads are very seldom analysed in contrast to glass used for vessels; a similar situation pertains to stone beads. The examination completed by C. Rösch, R. Hock, U. Schüssler, P. Yule and A. Hannibal offers additional data for the comparison of glass, ultramafic rocks, garnet beads and synthetic steatite beads from Oman and Sri Lanka. The composition of garnet from Oman and Sri Lanka obviously matches, so probably the stone was imported from Sri Lanka to the Persian Gulf (Rösch, et al., 1997, p.780). In line with this result, one bead from Veshnaveh (no. 4419f) indicates a connection between the site and the Indo-Pacific region, as will be discussed below in this chapter. The analyses of C. Rösch and her four colleagues once more show how revealing and supporting archaeometric analyses can be for archaeological research.

[58] Different compositions of glass resulted in different features. Egyptian glass was a 'short glass' with only a short time delay separating the material being workable and it ceasing to be. Because of the low alkali concentration the objects were surprisingly resistant. Mediterranean glass, however, belonged to the 'long glass' category, which contained more alkali and could therefore be worked over a longer time frame. This facilitated the craftsmen's work. This glass has proven to be less resistant against corrosion, except where calcium or magnesium has had the contrary effect (Scholze, 1977, pp.126-128; Pfaender and Schroeder, 1980, pp.26-29; Stern and Schlick-Nolte, 1994, p.37).

[59] Although not in Iran, but neighbouring, few Late Sasanian and Early Islamic glass finds from Kush, that have archaeometrically been analysed, are interesting. These finds are similar in composition to Sasanian glass from Mesopotamia, and the Early Islamic glass is also comparable to the Mesopotamian group of Islamic glass (Keller, 2010, 79).

3.2 Analysis of Glass from Veshnaveh

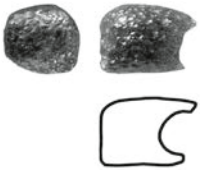
3.2.1 The Samples (Tab. 3.2.1)

In 2010 it was possible to export eight fragments of glass beads from Iran for technical and chemical analysis at the UCL Institute of Archaeology in London, and at the IRAMAT, Institut de Recherche sur les Archéomatériaux, Centre Ernest Babelon, C.N.R.S., at Orléans in France (Lankton/Gratuze in this volume). James Lankton and Bernard Gratuze performed the analyses and obtained striking results. At this point the samples are described first, then J. Lankton and B. Gratuze present their analyses, which are discussed in a final section by the author of this monography.

The eight glass samples were selected on account of their technical distinction and whenever one bead belonged to a group of beads that could be termed a type. Owing to Iranian regulations it was possible to export only a small number of fragmented beads, one complete spherical blue glass bead being an exception (no. 4419f).

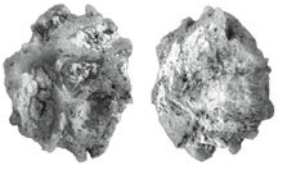
Three fragments of simple beads and one pendant were chosen for analysis (pl. 6, no. 1872h; nos. 4419f; pl. 8, no. 4582b; no. 4596d; pl. 23, no. 4189b). Another three fragments belonged to individual beads manufactured with noticeable techniques like the mosaic technique (nos. 1831a, 4416b; pl. 11, no. 4483).

Tab. 3.2.1: Eight glass samples from Veshnaveh that were chosen for analysis.

Find Number	Feature	Type[60]	Measurements	Illustration
1831a	10013	Not assigned to a special type	D. 1.24 cm, L. 1.2 cm	 scale 1:1
1872h	10013	Overlay bead	D. 0.5 cm, L. 0.45 cm	 scale 2:1 (pl. 6)
4189b	10012	Conical-shaped pendant	D. 0.43 cm, L. 0.55 cm	 scale 2:1 (pl. 23)
4416b	10012/5-6	Stripe-/trail-decorated bead	D. 2.04 cm, L. 1.26 cm	 scale 1:1 (pl. 9)

[60] The type here denotes the category under which the bead is described in this volume. Lankton and Gratuce technically specify in their table 3.2.2.4.1. For example, they categorise the powder bead as mosaic bead.

Tab. 3.2.1: Eight glass samples from Veshnaveh that were chosen for analysis.

Find Number	Feature	Type[60]	Measurements	Illustration
4419f	10012/5	Blue ring-shaped bead	D. 0.46 cm, L. 0.25 cm	 scale 2:1
4483	10012/6	Powder bead	D. 2.4 cm, L. 1.7 cm	 scale 1:1 (pl. 11)
4582b	10014	Greenish-yellowish bead fragment	D. 0.55 cm, L. 1.06 cm, W. 0.8 cm	 scale 2:1 (pl. 8)
4596d	10013	Wound bead of yellow, red, white and blue glass	D. 0.75 cm, L. 0.33 cm	 scale 2:1 (pl. 7)

No. 1872h is an overlay bead with a colourless translucent glass core and a blueish green cover (pl. 6; tab. 3.2.1). Nineteen more beads of this kind were excavated in Chale Ghar 1 and classified as so-called overlay beads.[61] The ring-shaped blue bead no. 4419f is one of fifteen similar dark blue glass beads that nonetheless vary slightly in size and appearance.[62] Very fragmented and corroded, but with three counterparts is the green-and-yellow piece of glass bead, no. 4582b (pl. 8; tab. 3.2.1).[63] It consists of layers or facets of green and very corroded yellow glass. One bead made of four different-coloured glasses that alternate in horizontal stripes or rings; this bead very clearly represents the group of twelve beads with concentric different-coloured rings (pl. 7, no. 4596d; tab. 3.2.1).[64]

The fragment of a conical pendant of translucent blue glass no. 4189b (pl. 23; tab. 3.2.1) was analysed as being representative of three conical blue glass pendants that were found in Chale Ghar 1.[65]

Among the Veshnaveh beads one spherical bead made of opaque white, red and translucent green glass was not designated as belonging to a special type of bead (no. 1831a; tab. 3.2.1), but is interesting because of its technical features. The three differently coloured glasses seem to have been fused into each other without a comprehensible pattern.[66] By contrast, the fragment no. 4416b (pl. 9; tab. 3.2.1) was manufactured with clear vertical and horizontal stripes of black, white, green, yellow and red-brown glass.[67] No. 4483 has a red-and-yellow eye decoration against a blueish background. It is referred to in the chapter about the eye beads (pl. 11; tab. 3.2.1).[68]

[61] See paragraph about overlay beads.

[62] Dark blue ring-shaped beads made of translucent glass include: nos. 1716d, 1821e, 1825a, 4179a, 4407g, 4419h, 4457e, 4468c, 4578d, 4666c, 6264a6, 6347, 6841, 6961b1 (see paragraph about monochrome glass beads: blue ring-shaped beads).

[63] Counterparts are nos. 4496h, 4570b, 4579e. See chapter about beads with various forms of horizontal stripe decoration.

[64] See paragraph 2.2.3.

[65] See paragraph 2.3.1.1.

[66] In the first instance this bead was classified with the overlay beads: green/blue overlay beads with yellow or white cores, but a new classification needs to be considered.

[67] See paragraph 2.2.3.

[68] See paragraph 2.2.6.5.

3.2.2 Glass from the Chale Ghar 1 mine, Veshnaveh, Iran: Technological and chemical compositional analysis

by James Lankton and Bernard Gratuze

3.2.2.1 Introduction

We analysed a total of eight different beads or bead fragments found in the ancient mine Chale Ghar 1, near the village of Veshnaveh in the central mountains of Iran. Seven of the samples were recovered through sieving of excavated material, while the eighth sample was found in situ. It was evident from the excavations that these glass objects had been deposited long after the active period of copper extraction from the mine, but not clear what the actual dating of the material might be,with associated ceramics from the Arsacid period and ornaments suggesting a Sasanian date. Radiocarbon dating, combined with the find of an Islamic coin, gave a broad date range from 800 BCE to the 8th century CE.

Important archaeological questions relating to the glass finds revolved around issues of dating, technology and provenance of the various beads or bead fragments. In particular:

1. How were the various beads made, and what are the implications for these technologies?
2. Does the chemical composition of the glass itself help us to understand the provenance of the finished objects, and, in particular, is there any evidence for centralized, or even localized, production?
3. Where does the glass evidence fit along the broad chronological continuum suggested for the site?

3.2.2.2 Materials

One intact bead and fragments of seven others were presented for analysis (Fig. 3.2.2.2). Samples are listed in Table 1, along with brief descriptions including possible date, method of manufacture, colour, size and overall chemical compositional type.

3.2.2.3 Methods

For manufacturing technology, the beads were examined with a binocular microscope at low to medium power. In order to determine the chemical composition of the glass, all samples were analysed by the authors at IRAMAT, Institut de Recherche sur les Archéomatériaux, Centre Ernest-Babelon (CNRS/Univ. Orleans), Orleans, France, using the technique of laser ablation-inductively coupled plasma-mass spectrometry (LA-ICPMS). LA-ICPMS provides 'virtually non-destructive' analysis, and is particularly useful for archaeological samples that cannot be destroyed, since the sampling mark left on the object is invisible to the naked eye. The LA-ICPMS equipment consists of four parts: a Nd:YAG (Yttrium Aluminium Garnet) pulsed laser with wavelength 266 nm used to release a small amount of material from an area approximately 100 microns in diameter by 200 microns deep; an argon plasma torch to fully dissociate the glass into its component ions; a magnetic sector mass spectrometer to separate the various ions present and a three stage detector system: a conventional dual mode secondary electron multiplier combined with a single Faraday collector. The outer, weathered, glass present on all ancient samples is removed by a pre-ablation of 20 to 30 seconds, followed by an analytical time of 60 seconds. The precision and accuracy of the LA-ICPMS method for glass analysis may be determined by measurement of glass standards of known composition, and, in general, range from 5 to 20 relative percent for most elements. For archaeological glasses that are seldom entirely homogeneous in composition, precision will vary with the degree of heterogeneity and the actual spots sampled, and, while the measurement may be accurate for the particular area analysed, whether it is accurate for the entire object must be considered during the interpretation of the results. In all, we performed 27 individual analyses for the eight beads, since each colour was analysed separately. For a more complete explanation of the analytical procedures please see Gratuze (2013).

The raw chemical data, including trace elements, were compared to that of published and unpublished samples from our database, using the multivariate statistical tools Principal Component Analysis (PCA) and cluster analysis.

3.2.2.4 Results

As stated above, the general chemical types of the glass samples, along with the forming technology where this could be determined, are indicated in Tab. 3.2.2.4.1. The complete compositional results are given in Tab. 3.2.2.4.2. From the eight original objects, we report a total of 22 analyses, reflecting separate analyses for each colour on the multi-colour beads. Major and a few minor elements are reported as weight percent (wt%), and most minor and trace elements as parts per million (ppm, where 1000 ppm equals 0.1 wt%). All areas sampled were soda-lime-silica glass with magnesia (MgO) values greater than 1.5%, suggesting the use of plant ashes as the source of alkali or flux for the glass. This glass type has been designated HMG (Sayre and Smith, 1961) because of the relatively high MgO levels. Metals and metal oxides used as colorants include copper (Cu^{2+}) for greenish blue and green (particularly when in the presence of lead), precipitated metallic Cu for red, cobalt (Co^{2+}) for dark or purplish blue, and tin-lead (Sn-Pb) oxide for yellow. Black areas are rather high in iron (Fe^{3+}) and white glass is coloured and opacified with precipitated tin oxide (SnO_2).

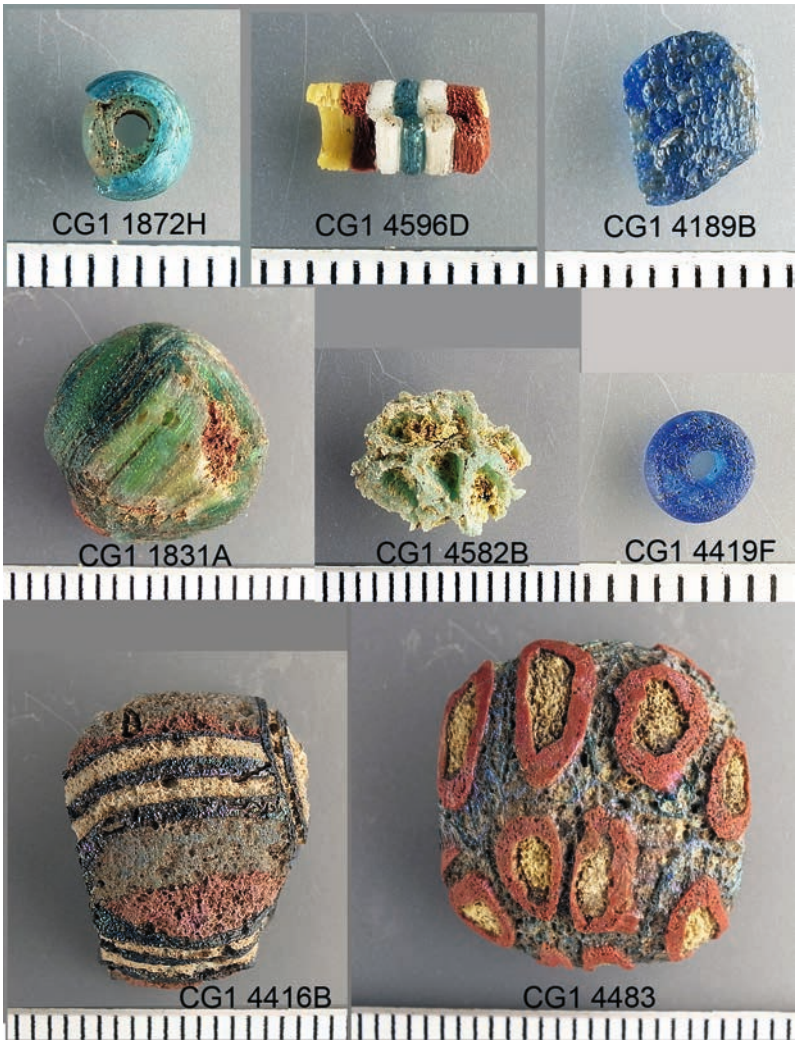


Fig. 3.2.2.2: Composite photograph of Chale Ghar 1 bead samples. Note that large and small beads are to different scales (in mm) (photos: J. Lankton).

Tab. 3.2.2.4.1: Sample list including suggested date, forming technology, colour, size and glass compositional type HMG (high-magnesia plant-ash glass).

number	date	technology	colour	size (mm)[69]	type
CG1 1831a	Early Islamic	pierced cane mosaic bead	green, red, yellow	20	HMG
CG1 1872h	Sasanian ?	wound layer over core	greenish blue, colourless	5	HMG
CG1 4189b	Early Islamic	bead fragment	cobalt blue	5	HMG
CG1 4416b	Sasanian	mosaic layer over core (?)	blue, green, red, white, black	20	HMG
CG1 4419f	Sasanian	drawn bead	cobalt blue	4	HMG
CG1 4483	Early Islamic	fused-cane millefiori mosaic bead	blue, red, yellow	20	HMG
CG1 4582b	Sasanian	fused-cane millefiori mosaic bead (?)	green, red, yellow	10	HMG
CG1 4596d black	Sasanian	rolled pad mosaic bead	black, red, white, yellow	7	HMG

[69] Due to different measuring methods, the values in table 3.2.1 differ, i.e. the diameter or the length of a bead can vary when using different methods. In principle, however, the largest length or diameter applies. Since the beads were returned to Ghom, Iran, we were unfortunately unable to subsequently check which measurement was correct.

Tab. 3.2.2.4.2: Chemical compositions in wt% (weight percent, major and some minor elements) and ppm (parts per million, trace elements).

number	CG1 1831A green	CG1 1831A red	CG1 1831A yellow	CG1 1872H gr. blue	CG1 1872H colourless	CG1 4189B blue
SiO2	63.7%	59.4%	63.6%	66.8%	69.7%	62.3%
Na2O	16.3%	16.0%	15.5%	12.7%	13.8%	17.9%
K2O	2.3%	2.2%	2.4%	2.5%	2.3%	4.6%
MgO	3.8%	3.8%	4.1%	3.1%	2.4%	4.0%
CaO	8.6%	8.0%	8.9%	8.1%	7.9%	6.8%
Al2O3	1.2%	1.2%	1.1%	0.9%	1.3%	1.4%
Li	31	24	23	15	9	6
B	86	87	90	64	71	90
P2O5	0.2%	0.5%	0.2%	0.2%	0.3%	0.3%
Cl	9860	8922	9941	9427	8646	9043
Ti	320	405	318	330	471	457
V	14	25	16	13	21	16
Cr	12	22	12	26	84	44
MnO	0.23%	0.27%	0.36%	0.06%	0.03%	0.27%
Fe2O3	1.0%	2.7%	0.9%	0.8%	1.1%	0.9%
Co	3	6	3	3	3	258
Ni	24	113	20	42	33	106
CuO	0.9%	1.9%	1.0%	3.49%	0.0%	0.21%
Zn	87	95	85	130	54	74
As	74	241	76	30	3	3
Rb	40	28	36	10	14	9
Sr	618	586	660	492	511	341
Y	3	3	2	3	3	3
Zr	16	18	15	15	20	17
Nb	0.8	0.9	0.7	0.8	1.3	1.2
SnO2	0.1%	0.9%	0.1%	0.1%	0.0%	0.0%
Sb	67	368	79	12	3	3
Cs	4.9	2.1	4.7	0.4	0.6	0.1
Ba	97	219	190	110	56	69
La	2.6	3.0	2.6	2.8	3.7	3.0
Ce	5	6	5	7	7	5
Nd	2.5	2.8	2.5	3.5	3.8	2.6
Sm	0.7	0.8	0.6	0.5	0.8	0.6
Eu	0.2	0.2	0.2	0.1	0.2	0.1
Tb	0.1	0.1	0.1	0.1	0.1	0.1
Dy	0.6	0.6	0.5	0.5	0.6	0.5
Ho	0.1	0.1	0.1	0.1	0.1	0.1
Tm	0.0	0.0	0.0	0.0	0.0	0.0
Yb	0.3	0.3	0.3	0.3	0.4	0.3
Hf	0.4	0.5	0.5	0.4	0.6	0.5
Ta	0.2	0.1	0.0	0.1	0.1	0.1
Au	0.3	1.0	0.3	1.4	0.3	0.0
PbO	0.4%	1.9%	0.5%	0.1%	0.1%	0.1%
Bi	3	21	2	2	0	0
Th	0.7	0.9	0.7	0.8	1.0	0.8
U	0.4	0.5	0.4	0.5	0.7	0.3

Tab. 3.2.2.4.2: Chemical compositions in wt% (weight percent, major and some minor elements) and ppm (parts per million, trace elements).

number	CG1 4416B blue	CG1 4416B black	CG1 4416B green	CG1 4416B red	CG1 4416B white	CG1 4419F blue
SiO2	62.7%	61.1%	59.8%	59.3%	58.5%	62.8%
Na2O	15.6%	17.1%	17.6%	16.1%	16.0%	15.9%
K2O	3.1%	3.3%	3.3%	3.0%	3.1%	4.1%
MgO	5.3%	4.3%	5.0%	4.8%	4.9%	3.7%
CaO	6.6%	6.7%	7.0%	7.2%	7.1%	6.7%
Al2O3	3.3%	3.8%	3.6%	4.1%	4.0%	2.2%
Li	11	10	12	10	10	12
B	128	134	132	131	124	98
P2O5	0.2%	0.3%	0.2%	0.3%	0.3%	0.5%
Cl	7219	11344	8981	10482	8526	8190
Ti	875	1377	1054	1259	1174	1436
V	19	20	20	19	21	30
Cr	142	241	172	167	230	99
MnO	0.05%	0.04%	0.05%	0.04%	0.04%	0.04%
Fe2O3	1.7%	1.1%	1.3%	1.2%	1.2%	1.9%
Co	858	5	544	17	4	627
Ni	64	29	67	44	29	25
CuO	0.25%	0.05%	0.20%	1.66%	0.09%	0.14%
Zn	75	105	59	60	40	1182
As	30	4	11	049	15	21
Rb	19	18	20	18	18	18
Sr	408	418	465	447	486	542
Y	5	5	5	5	5	6
Zr	71	117	78	87	90	311
Nb	2.2	2.9	2.2	2.9	2.4	3.0
SnO2	0.0%	0.5%	0.1%	0.1%	2.3%	0.0%
Sb	13	2	3	75	11	2
Cs	0.3	0.3	0.3	0.3	0.4	0.4
Ba	169	185	180	180	187	132
La	5.4	6.1	5.6	6.4	5.7	9.0
Ce	11	12	10	11	11	18
Nd	4.9	5.4	4.9	5.6	5.2	7.9
Sm	1.0	1.2	1.1	1.1	1.1	1.6
Eu	0.2	0.3	0.3	0.3	0.3	0.3
Tb	0.2	0.2	0.1	0.2	0.2	0.2
Dy	0.9	1.0	0.9	1.0	0.9	1.3
Ho	0.2	0.2	0.2	0.2	0.2	0.3
Tm	0.1	0.1	0.1	0.1	0.1	0.1
Yb	0.6	0.7	0.6	0.7	0.6	0.9
Hf	2.0	3.1	2.2	2.4	2.3	8.3
Ta	0.2	0.2	0.2	0.2	0.2	0.3
Au	1.6	0.8	2.8	1.4	0.7	0.1
PbO	0.2%	0.1%	0.2%	0.6%	1.2%	0.4%
Bi	1	1	1	3	1	0
Th	1.6	2.0	1.6	1.8	1.8	4.3
U	0.6	0.6	0.6	0.6	0.5	1.1

Tab. 3.2.2.4.2: Chemical compositions in wt% (weight percent, major and some minor elements) and ppm (parts per million, trace elements).

number	CG1 4483 blue	CG1 4483 red	CG1 4483 yellow	CG1 4582B green	CG1 4582B red	CG1 4582B yellow
SiO2	59.1%	56.7%	53.5%	58.8%	55.1%	49.7%
Na2O	15.3%	14.2%	12.3%	15.1%	12.0%	8.7%
K2O	3.1%	2.4%	3.0%	2.4%	2.0%	1.5%
MgO	3.3%	3.7%	3.1%	5.8%	4.9%	3.5%
CaO	8.7%	9.4%	8.6%	6.6%	6.1%	4.9%
Al2O3	3.0%	3.6%	3.5%	2.9%	3.7%	5.3%
Li	13	12	10	19	16	9
B	83	98	81	64	52	36
P2O5	0.4%	0.4%	0.4%	0.5%	0.9%	0.6%
Cl	8138	6895	7701	5741	4541	3930
Ti	1012	1220	1235	831	1282	1057
V	26	32	46	39	99	45
Cr	96	102	110	166	274	257
MnO	0.29%	0.49%	0.66%	0.08%	0.06%	0.02%
Fe2O3	1.6%	3.0%	1.5%	1.2%	1.9%	1.5%
Co	8	12	4	3	3	2
Ni	66	73	26	33	31	19
CuO	2.61%	1.89%	0.15%	1.14%	1.50%	0.80%
Zn	74	120	73	224	148	34
As	47	49	22	47	61	25
Rb	19	19	18	15	12	10
Sr	577	547	647	516	514	523
Y	6	6	6	4	7	4
Zr	73	66	70	49	81	58
Nb	2.8	3.0	3.0	2.4	3.5	3.1
SnO2	0.3%	0.6%	1.9%	1.3%	3.3%	5.2%
Sb	17	24	44	40	58	19
Cs	0.8	1.3	0.9	0.3	0.2	0.4
Ba	152	175	178	112	190	219
La	7.6	7.9	8.0	5.0	7.1	4.8
Ce	18	16	17	10	17	10
Nd	7.0	7.0	6.5	4.4	7.6	4.6
Sm	1.3	1.5	1.4	1.0	1.5	0.8
Eu	0.3	0.3	0.3	0.1	0.4	0.1
Tb	0.2	0.2	0.2	0.1	0.2	0.1
Dy	1.1	1.2	1.1	0.8	1.3	0.8
Ho	0.2	0.3	0.2	0.2	0.3	0.2
Tm	0.1	0.1	0.1	0.1	0.1	0.1
Yb	0.7	0.7	0.6	0.5	0.8	0.5
Hf	2.0	1.8	2.0	1.4	2.2	1.5
Ta	0.2	0.2	0.2	0.2	0.3	0.2
Au	1.0	1.4	0.1	1.1	5.9	0.4
PbO	1.1%	2.6%	10.2%	3.4%	7.5%	17.6%
Bi	4	4	3	4	10	6
Th	2.1	2.2	2.2	1.7	2.5	1.9
U	0.8	0.8	0.7	0.7	1.6	0.4

Tab. 3.2.2.4.2: Chemical compositions in wt% (weight percent, major and some minor elements) and ppm (parts per million, trace elements).

number	CG1 4596D black	CG1 4596D red	CG1 4596D white	CG1 4596D yellow
SiO2	66.5%	59.4%	60.3%	55.2%
Na2O	14.8%	14.9%	13.7%	12.6%
K2O	2.4%	2.4%	2.3%	2.1%
MgO	1.9%	1.8%	1.9%	1.6%
CaO	7.0%	6.3%	6.2%	5.9%
Al2O3	1.1%	1.3%	1.1%	1.0%
Li	15	15	13	13
B	60	58	60	50
P2O5	0.3%	0.3%	0.5%	0.2%
Cl	7765	9129	7951	6963
Ti	404	451	629	360
V	14	17	20	12
Cr	92	103	157	80
MnO	0.03%	0.03%	0.03%	0.02%
Fe2O3	0.8%	1.3%	1.3%	0.7%
Co	6	10	6	4
Ni	58	73	48	45
CuO	3.05%	3.06%	0.13%	0.37%
Zn	75	200	31	29
As	46	120	16	196
Rb	8	9	8	7
Sr	289	336	276	247
Y	3	4	3	2
Zr	18	21	23	17
Nb	1.1	1.4	1.4	1.0
SnO2	0.7%	1.0%	9.9%	2.9%
Sb	20	48	7	36
Cs	0.1	0.3	0.3	0.1
Ba	55	80	54	47
La	3.3	5.8	4.0	3.4
Ce	6	8	8	5
Nd	3.0	4.8	3.7	2.9
Sm	0.6	0.9	0.7	0.5
Eu	0.1	0.2	0.2	0.1
Tb	0.1	0.1	0.1	0.1
Dy	0.5	0.7	0.7	0.5
Ho	0.1	0.2	0.1	0.1
Tm	0.0	0.1	0.1	0.0
Yb	0.3	0.4	0.4	0.3
Hf	0.5	0.6	0.6	0.5
Ta	0.1	0.1	0.1	0.1
Au	1.4	1.6	0.7	0.6
PbO	0.4%	7.0%	1.4%	16.5%
Bi	2	7	1	3
Th	0.8	1.1	1.1	0.7
U	0.8	0.7	0.8	0.7

3.2.2.5 Discussion and interpretation

This discussion will follow the questions outlined in the Introduction.

1. *How were the various beads made, and what are the implications for these technologies?*

Five of the eight beads were made using one of up to four different mosaic glass techniques. By this, we mean that coloured glasses arranged in a pre-prepared pattern were used in the construction or decoration of the beads. CG1 4483 provides perhaps the best example. In this case, slices of mosaic cane have been arranged to form both the decoration, a pattern of yellow and red 'eyes' in what was probably a blue and white ground, and the structure of the bead itself, since these mosaic canes go through to the perforation of the bead, indicating that the canes were fused together without a layer of underlying glass. Particularly when the mosaic canes are more complex, such mosaic beads are often termed 'millefiori' to refer to the repeating mosaic pattern on the surface. The very fragmentary CG1 4582b is probably the remnant of a similar millefiori bead. The earliest millefiori mosaic glass dates to the 2nd millennium BCE, and millefiori mosaic beads were probably made in one location or another from that time to the present.

On the other hand, CG1 4596d, although also formed from pre-patterned coloured glass, shows a very different technology. In this case, a 'ribbon' or pad of strips of coloured glass was prepared in advance. Small segments cut from this pad were then wrapped around an iron wire or mandrel, and the free ends were fused together. Such beads may be termed folded or rolled pad mosaic beads, and were most likely made over a very long period of time, particularly in western Asia and Egypt. Diagnostic for these beads is that the join of the two fused ends of the rolled pad usually shows a slight misalignment. Had the bead been made by winding the glass directly on the mandrel, each colour would be continuous around the circumference of the bead.

It is difficult to determine the exact forming technology for CG1 4416b because of the small size and poor condition of the remaining fragment. However, the regularity of the pattern of coloured glass suggests that a pre-fabricated section of striped glass was used for the decoration. It is not clear whether the circumferential stripes at the best preserved end were part of the original pattern or were added separately. On the interior of the bead, there seems to be a layer of cobalt-blue glass underlying the other colours, suggesting that the beadmaker may have made the original striped pad by laying stripes of contrasting colours over a thin layer of cobalt-blue, then wrapped this unit over what may have been a monochrome glass core.

CG1 1831a, although also in poor condition, probably represents a fourth mosaic glass technology, the pierced cane mosaic bead. The beadmaker started with a prepared mosaic rod or cane; this original cane would have been striped in various shades of green or yellow. Once a section of the desired length was cut off, it would have been reheated enough so that an iron needle or mandrel could be pushed through the glass to make the perforation. Because the bead has broken in cross section, we can see that the perforation is much broader at one end than the other; the perforating iron would have been pushed into the broad end and come out on the narrow end. Pierced cane mosaic beads were most likely the easiest type to prepare, and, like the other three types mentioned above, were made over a long time from the earliest days of glassworking into the Islamic period.

Although these four types of mosaic beads are not specific for period or geography, they generally represent an Egyptian or West Asian, rather than East Asian, technology. During the Roman period, mosaic glassworking was perhaps more characteristic for Egypt than for the Levant, and this tradition may have continued into the Islamic period as well, with Fustat being a possible centre for mosaic glass beadmaking. On the other hand, there is no reason that mosaic glassworking, particularly for the simpler mosaic techniques, could not have been practiced in western Asia or Iran, even though actual production evidence so far is lacking.

Most small beads in the Roman and Islamic worlds were 'wound' beads, made by winding a small amount of glass around a wire or mandrel. On the other hand, the vast majority of small beads found in South and Southeast Asia were made by first drawing out a narrow tube of glass, then cutting this tube into small beads. In order to smooth the resulting sharp edges, these beads were subsequently reheated at a temperature lower than that required to actually melt the glass. This was the forming technology for so-called Indo-Pacific beads, produced in the millions in South and Southeast Asia. CG1 4419f is such a drawn bead, and, although there is little comparative material from Iran, its discovery at Veshnaveh is something of a puzzle. Very similar beads, with similar although not identical chemical compositons, have been found in South and Southeast Asia, as well as Korea and Japan in northeast Asia, beginning around the 3rd to 4th century CE. Although the base glass for these beads is similar to Sasanian glass, the forming technology is more South or Southeast Asian, and we have wondered whether such beads were made in South or Southeast Asia using imported Sasanian raw glass or cullet (Lankton and Dussubieux, 2006). Increasing Sasanian control over sea trade on the Indian Ocean during this period seems consistent with such an hypothesis. Thus, the drawn bead CG1 4419f may have been made in South or Southeast Asia from Sasanian (Mesopotamian or Iranian) glass, then re-exported to Iran. If there are many such beads at Iranian sites, we may need to revise our thoughts on the places of manufacture.

The forming technology for CG1 4189b is not clear. The fragment itself seems to be broken from a toggle-shaped bead that was probably wound then pressed

into shape. Such beads are rare in South and Southeast Asia, and I would suspect a western Asian or Iranian manufacture.

CG1 1872h is perhaps the most unusual bead in the group. Here, there are two layers of glass, the underlying layer colourless and the outer layer blueish green due to copper. The colourless part of the bead seems to have been drawn, with the suggestion of longitudinal striations where the surface is exposed. On the other hand, the circumferential marks on the outer blue layer would have been produced by winding the blue glass around the colourless core. Whether this type is common in Iran would be very interesting to know.

We do not know the extent to which ancient beadmakers specialized in one or a few manufacturing methods, but, in general, it seems to be uncommon to see both wound and drawn beads made at the same sites. Making mosaic glass beads was a further specialization, and, even today, remains one of the most difficult techniques. Because the Chale Ghar 1 beads were made by up to seven different techniques, it seems very unlikely that they were all made by the same beadmakers, although we cannot rule out different groups of beadmakers, using different techniques, but located in the same general geographic area. There is good evidence that craftworkers, including beadmakers, were often itinerant, following markets and marketplaces, so that beadmakers from different technological traditions may have worked at the same sites.

2. Does the chemical composition of the glass itself help us to understand the provenance of the finished objects, and, in particular, is there any evidence for centralized, or even localized, production?

As stated in the Results section, all of the analysed glass areas were plant-ash soda glass, or HMG. However, there is great variability within this large group. The chemical compositions of plant-ash glasses combine elements from the plants that were burned to provide the ash/flux, and from the silica (SiO_2) source, either relatively pure sand or ground quartz or a mixture of the two, to provide the structural backbone of the glass. The general theory is that the plant-ash derived elements will reflect the water taken up by the plants, thus reflecting the overall geology of the plant growing area, while heavy minerals, not usually taken up by plants, will reflect the source of the sand or quartz component of the glass. The interpretation of the chemical analyses of plant-ash glasses is made more complicated by the fact that while some elements, notably soda (Na_2O), come mainly with the ash component, others, such as lime (CaO), will have contributions from both the plant ash and the sand, if sand were used. In addition, we now know that not all plant species grown in the same region will have identical chemical compositions, and these differences may extend even to different parts of the same plant.

Mirti, et al. (2008; 2009) have studied the HMG glasses found at Sasanian Veh Ardašīr in Iraq, using the values for MgO (magnesia) and K_2O (potassia), plus the ratio of the two, along with P_2O_5 (phosphate), to characterize the plant-ash flux, and heavy minerals such as REEs (rare-earth elements) to describe the sand sources as relatively pure (low in REEs) or impure (higher in REEs). They found, on this basis, that at least three types of plant-ash glass were used at Veh Ardašīr from the 3rd to the 7th century. Investigating the same glasses with the technique of strontium and neodymium isotope ratios analysis, Ganio, et al. (2013) have shown that the observed differences in chemical composition did not correlate well with differences in isotope ratios, suggesting that the different chemical compositional groups at Veh Ardašīr could simply be the result of using different materials from the same general area. On a more positive note, these authors did conclude that the isotope ratio patterns from Veh Ardašīr were sufficiently different from those of glasses produced along the Mediterranean coast to constitute a distinct and new group.

We can apply the same criteria used by Mirti, et al. (2008; 2009) to the plant-ash glasses from Chale Ghar 1, as illustrated in Fig. 3.2.2.5.1 comparing the MgO/K_2O ratios (the plant-ash component) to the values for hafnium (HfO_2, representing the heavy mineral content of the silica component). The Veh Ardašīr samples studied by Ganio, et al. (2013) are included for reference.

The eight Chale Ghar 1 beads fit into the general zones defined by Mirti, et al. (2008; 2009) for the Veh Ardašīr samples. While the base compositions for the various colours of a particular bead are generally quite similar, best illustrated by CG1 4596d, there is considerable difference between the beads, as, for example, between CG1 4596d and CG1 4582b. Following the reasoning of Mirti, et al. (2008; 2009) we would interpret beads 4596d, 4189b and 1872h as being made by combining very pure sand or even powdered quartz with plant ash rather low in MgO. In particular, CG1 4596d and CG1 4189b are similar in this regard, suggesting a possible similarity in the base glass, even though the technology for making these two beads was quite different. CG1 4419f stands out for its very high HfO_2 content coupled with a low MgO/K_2O ratio because of the high K_2O value of 4.3 wt% (Tab. 3.2.2.4.2). This bead was also unique because it was made by the drawing technique, generally rare in western Asia and Iran. One point of caution is that while it is tempting to associate the Chale Ghar 1 beads with the corresponding Veh Ardašīr samples, if we were to include on this same plot some of the other 5th to 10th c. glasses from areas as diverse as the Levantine coast and Nishapur in Iran, we would find that these glasses also show similar patterns of more-or-less pure sand vs MgO and K_2O contents, so that the compositions identified for Veh Ardašīr are not unique to Veh Ardašīr, nor to the Chale Ghar 1 beads.

In sum, the wide variability of bead compositions and technologies makes it unlikely that all beads originate from

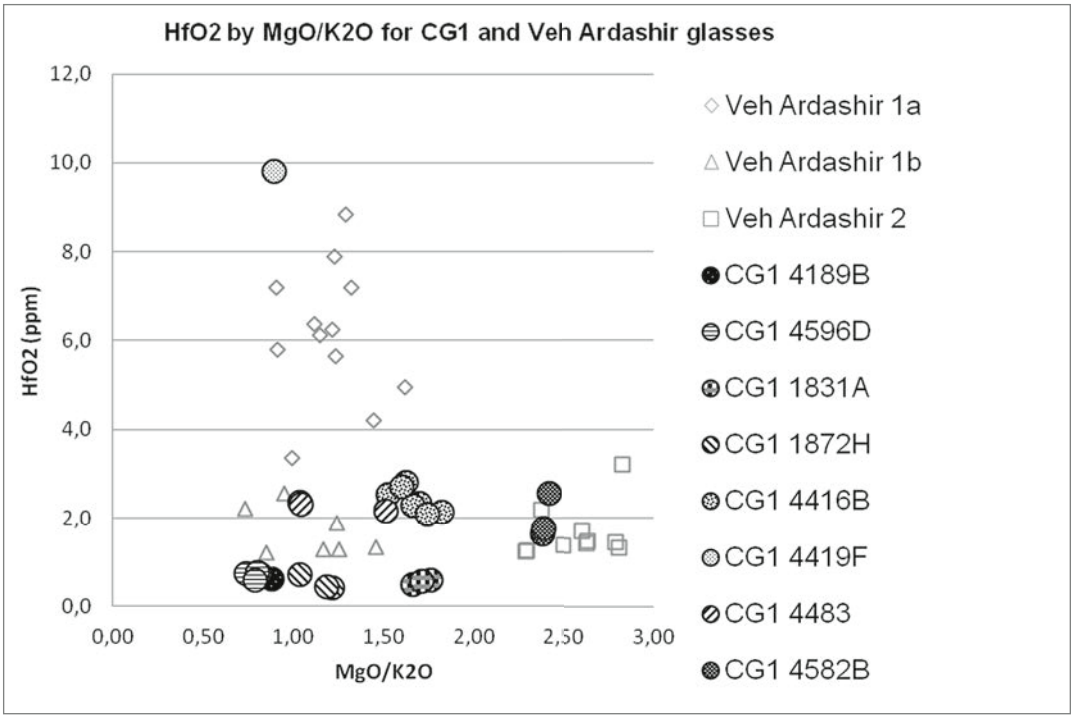


Fig. 3.2.2.5.1: MgO/K20 by HfO2 for Chale Ghar 1 beads and Veh Ardašīr vessels studied by Ganio, et al. (2013).

the same production centre. So far, the tentative evidence (see below) suggests greater compositional similarity of the CG1 glasses to samples from Iran and Iraq, rather than from glassworking sites in Egypt and the Levant, providing at least some backing for regional manufacture. Where in the Iran/Iraq region the beads might have been made remains uncertain, although there does seem to be greater compositional similarity with glasses from Nishapur and Hamadan than to those from either Ray or Qom. While we, in cooperation with R.H. Brill, formerly with the Corning Museum of Glass, have begun to develop a significant database of glass samples found in Iran, our ability to link these samples to documented production centers remains limited, and access to analytical samples with known archaeological provenance remains critical.

3. Where does the glass evidence fit along the broad chronological continuum suggested for the site?

In the absence of directly comparable material, it is difficult to be very specific about the chronology of the Chale Ghar 1 beads. As mentioned above, the earliest glasses in Mesopotamia and Egypt, dating to the 2nd millennium BCE, were plant-ash soda-lime glasses of the same general type as those found at Chale Ghar 1, and such compositions have probably continued in some areas until today. As a result, simply determining the overall compositional group, while essential, is generally not adequate by itself to answer detailed questions. Increasing access to excellent trace element data is certainly a big help, but even then the picture may be complicated by the production of more than one type of glass at a single site, as at Veh Ardašīr. In addition, the known exchange of glass and glassmaking materials from one area to another can complicate the interpretation of trace element data. An additional important factor is that most of the known chemical analyses were done on vessel glass, which may be quite different from deeply coloured glasses used for making beads.

Another way to compare glass compositions, particularly when many elements are involved, is to use such multivariate statistical techniques as PCA and cluster analysis. In Fig. 3.2.2.5.2 we've compared the Chale Ghar 1 glasses with a selection of samples representing colourless and coloured glass from Nishapur, dating from the 8th to 10th centuries, as well as Sasanian glass from Veh Ardašīr. While the full mechanics of the PCA technique are beyond the scope of this article, in Fig. 3.2.2.5.2 we can see a general separation between the Islamic period glass from Nishapur and the Sasanian glass from Veh Ardašīr. This separation, also found with cluster analysis (not shown), is surprisingly good, although the clusters that were predominantly Sasanian also contained about 10% Islamic glass, and vice versa. Of the Chale Ghar 1 samples, CG1 4596d, 4416b, 4419f and 4582b group closely with the Sasanian glasses, while CG1 4189b, 1831a and 4483 are much closer to the Islamic samples. CG1 1872h is intermediate between the Islamic and Sasanian groups by both PCA and cluster analysis. Based on this analysis, we would say that it is more likely that CG1 4596d, 4416b, 4419f and 4582b date to the Sasanian period, and are thus

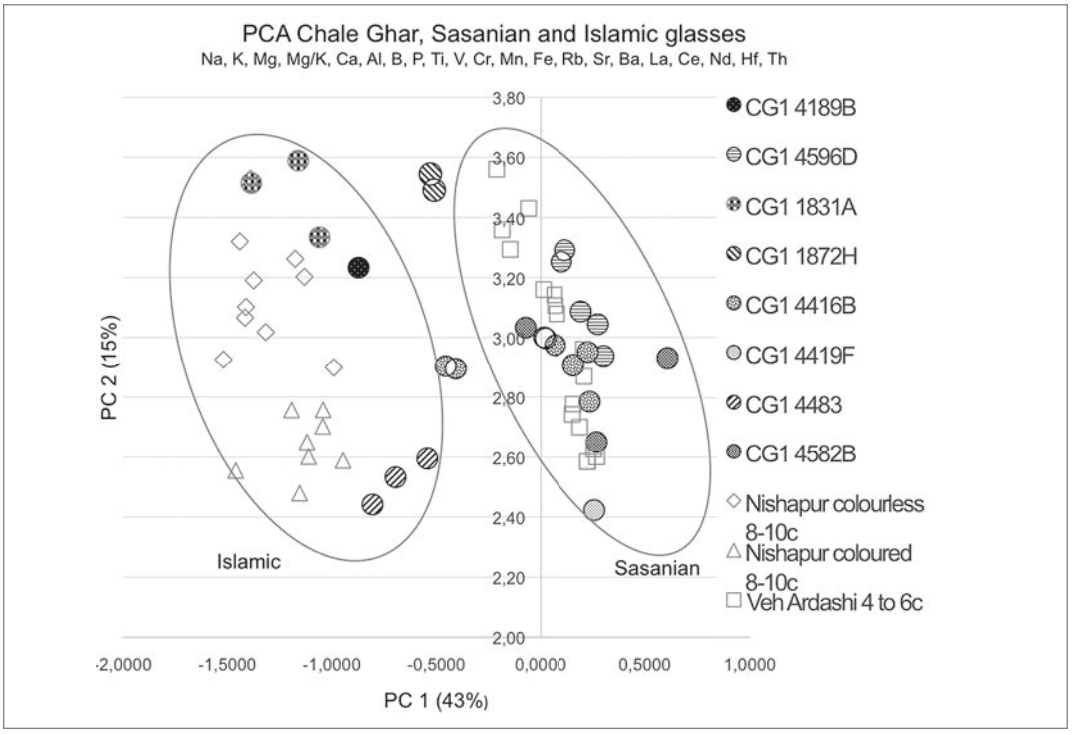


Fig. 3.2.2.5.2: PCA (Principal Component Analysis) for Chale Ghar 1, Sasanian (Veh Ardašīr) and Islamic (Nishapur) glasses. Principal Components 1 and 2 account for 58% of the total variation.

earlier than CG1 4189b, 1831a and 4483, more likely to be Islamic in date. In addition, we have run similar PCA and cluster analyses for a large group of almost 700 glass samples found from Egypt to Central Asia. Preliminary results suggest that the Chale Ghar 1 glasses are more similar to samples found in Iran and Iraq than to glasses most likely made either in Egypt or along the Mediterranean coast.

Our best answer to Question 3, combining both the technological and compositional evidence, would be that the Chale Ghar 1 beads span the Sasanian and Early Islamic periods, roughly from the 4th to the 10th century. This interpretation is consistent with site formation and other artefacts found at Chale Ghar 1.

3.2.2.6 Conclusions

The Chale Ghar 1 samples submitted for analysis show considerable variability in both forming technology and chemical composition. While our conclusions are limited by the paucity of comparative material, it is still possible to see how the careful study of glass evidence may permit a more complete understanding of the archaeological context at Chale Ghar 1. Further analyses, including trace elements, of Iranian glass, particularly that associated with known production areas, would add considerably to our ability to compare, contrast and interpret the observed technological and chemical compositional data.

3.2.3 Discussion of Lankton and Gratuze´s analysis and interpretation

Although Lankton and Gratuze could analyse only eight samples from Veshnaveh, they deduced important data about the chemical composition of Iranian bead glass and of their manufacturing techniques. Therefore their study is a first step towards the interpretation of Persian glass processing and its chronological development, as well as an approach of understanding how raw materials and goods were exchanged.

At this point the results and suggestions achieved through natural sciences will be compared with the archaeological analyses of this volume. This comparison shows how archaeological and natural scientific studies complement each other, but how they may also disagree in some points.

3.2.3.1 Technical Results

As already presented in the chapter of the overlay beads, bead no.1872h was made of a drawn colourless glass core and covered with greenish blue wound glass (pl. 6). This special technical attribute – the combination of drawing and winding in one bead – was confirmed by the examinations of Lankton and Gratuze. Due to a lack of references it remains uncertain whether this kind of bead is a specifically Iranian type or not.

The authors classify five beads belonging to the mosaic technique (Tab. 3.2.2.4.1) which in this study are placed in other categories:

- variously decorated (no. 1831a);
- stripe-/trail-decorated (nos. 4416b, 4582b, 4596d); and
- powder technique (no. 4483).

No. 1831a is considered to be a so-called pierced mosaic bead: It must be taken into consideration, that it is impossible to perforate hot glass – as described in Lankton and Gratuze's article – without the aid of a mould and without spoiling the decoration. Hence it can be assumed that this bead was made with the folding technique: a pre-manufactured stripe was folded around a conical rod. The latter would form the funnel shaped string hole, which is, according to the authors, linked to the perforation. The beads which are categorised as stripe- and trail-decorated beads are not real mosaic beads, although no. 4582b is probably made of overlaid mosaic canes. No. 4416b is decorated with horizontal and vertical stripes that do not extend to the perforation (pl. 9). Probably it was made of a basic bead and the decoration was applied on this core. The mosaic component was made of bundles of canes (Stern and Schlick-Nolte, 1994, p.54; Spaer, 2001, pp.48-49; Francis, 2001, p.94). Bead no. 4596d is obviously made of a pre-manufactured glass strip. Again, this method should not be described as a real mosaic technique and is instead in this study classified under the folding technique.

Lankton and Gratuze believe that the particular manufacturing technology found in bead no. 4483, where the mosaic canes penetrate the interior, was an Islamic one. In this case it is possible that the use of glass powder, in which the yellow and red canes were embedded, might have played a role.

3.2.3.2 Chemical Analysis of Glass

It might be possible to distinguish soda-lime glasses of different periods by analysing trace elements, as was done with the Veshnaveh beads (page 203-204 in this volume).[70] So far Near Eastern glasses have hardly been examined for trace elements, and most glasses that have been analysed, consist of vessel glass, which is mostly not coloured like the glass used in beads. Therefore we are facing a lack of references and Lankton and Gratuze's study is of great importance for comparisons in future analyses.

[70] An additional and particularly useful method is the scientific examination of isotopes (Degryse, et al., 2009). Certainly, this method, even when combined with analysis of trace elements, is not a panacea, but, as P. Degryse and his colleagues write, 'The virtually unexplored field of vitreous materials can provide a unique, interesting and challenging perspective.' With the specific information provided by the techniques of isotopic investigation, the origins of the glass may become clearer. Based on this data the archaeologist may develop models of how the glass trade and the ancient economy generally operated' (Degryse, et al., 2009).

J. Lankton and B. Gratuze date the analysed beads from Veshanveh from the 4th to the 10th century AD. This is surprising, because most of the artefacts from Chale Ghar 1 have been dated by parallel finds and stratigraphic analysis to the Arsacid and Sasanian periods. In addition, only a few specimens seem to date to the early Islamic period at all, and probably not much later than the Umayyad era (661–750 AD), as is suggested by a coin dated to this period found in one of the upper layers in the mine. Most samples that were analysed in London and Orléans, on the contrary, were unearthed in different layers below the one containing the Islamic coin. Therefore, these date rather earlier than the Umayyad period. Probably the dating chosen by Lankton and Gratuze results from a lack of pre-Islamic references.

3.2.3.3 Conclusion

The chemical analyses of J. Lankton and B. Gratuze illustrates that the beads from Chale Ghar 1 show a similarity to samples from Iran and Iraq. This might be an indication that these beads were purchased from regional markets and do not originate as far as the Mediterranean coast or Egypt. The diverse techniques and different compounds suggest that the beads originate from different places within the Mesopotamian region, which is an important insight and confirms the results of the comparison studies in this work. However, in Chale Ghar 1 imports from farther locations are proved. There are e.g. the amber beads (see next section) or glass beads of special techniques (see previous studies in this volume)

In this context, the coherence of Indo-Pacific beads with one bead is very intresting (no. 4419f, from Chale Ghar 1). It remains unresolved whether Persian glass was exported to southern Asia and the beads reimported back to Persia or the other way around. Probably the glass bead making technique was imported to South Asia during Arsacid and Sasanian time since even Roman coins were imported there in the frame of an expanded, almost global, trade (compare McLaughlin, 2010 and Miller, 1998).

3.3 Analysis of Metal from Veshnaveh

3.3.1 Introduction

In any archaeological excavation metal finds potentially have special meaning. The manufacturing technique used to make the objects can give details as to the chronology or the cultural background of the site (Moorey, 1988b, pp.23-32; Muscarella, 1988, pp.33-44; Schauensee, 1988, pp.45-62; Seidl, 1988, pp.169-76; Allan, 1979). Moreover, analysis of the metals and their comparison can bring further information about the location of prime deposits of metals: for example, the propor-

tions of gold or bronze alloys can establish their sources (Moorey, 1999, pp.216-217).

In Chale Ghar 1 and 2 numerous metal objects were excavated. Most of all bronze finger rings were unearthed, but also earrings, metal beads, metal pendants, bells, one arrow-head, sheets, coins and miscellaneous other finds. The objects were probably made of bronze, lead, silver and gold, and mostly belong to the Sasanian period, with some exceptions, namely: a few Arsacid objects; an arrow-head from Iron Age III;[71] an early Islamic coin; and a late Sasanian or early Islamic finger ring.

3.3.2 The Samples and their Identification

About 99 metal objects from Veshnaveh have been conserved and analysed by the Iranian Research Centre for the Conservation of Cultural Relics (RCCCR) to establish the material of which they were made (Ghazian and Ghasemi, 2011, pp.613-615). The conservators actually were able to identify some finger rings made of bronze (i.e. pl. 36, no. 1108) or silver (i.e. no. 4494; Ghazian and Ghasemi, 2011, p.614). Five finger rings, one earring, one strap end and one unidentified object were examined (tab. 3.3.2). The silver finger ring (no. 4494) was examined from a metallurgical point of view, and the result was that the ring and the ring plate were connected by soldering; for the main part the ring consists of silver. The eight bronze objects were hammered. On the basis of the analysis conducted and the typically green colour of the corrosion, it has been suggested that the other finger rings were also made of bronze or at least of a non-ferrous metal. Others were manufactured of iron and a few of silver. According to J. Allan (1979, pp.35-36) common Iranian copper ores are cuprite, malachite and azurite.

3.3.3 Technical Notes

In antiquity bronze was mostly cast, while gold and silver were forged in many cases (Henkel, 1913, pp.280-282; Moorey, 1985; pp.40-46). Due to the low ductility and brittleness of bronze, casting seems likely to have been the more practicable process for this metal. The regular shape of loop and ring plate of at least some of the finger rings from Veshnaveh points to this manufacturing technique. However, some rings have a rather irregular hoop and seem not to be cast, for example no. 4515 (pl. 31). Some rings are too corroded to make such observations – and that includes all the iron rings.

3.4 Analysis of Amber from Veshnaveh

3.4.1 The Samples

As outlined above, amber is a material that was not locally available in ancient Persia. The discoveries of the amber bead from Tappeh Marlik and its identification as Baltic amber (Beck and Muroga, 1972), and of the bag-shaped amber pendant from Veshnaveh that bears comparison with eastern European shapes, once more raises the central question of whence the material for the 62 amber beads from Veshnaveh came. In 2007 fourteen fragments of amber beads from Veshnaveh were analysed by E. Stout and C. W. Beck from the Amber Research Laboratory of the Vassar College, USA (cf. Bagherpour Kashani, Rustaei and Stöllner, 20011). According to Stout and Beck the samples were in very good condition, completely free of contaminants and only moderately weathered.

Tab. 3.3.2: Analysis of nine metal finds from Veshnaveh/Chale Ghar 1. According to M. Ghazian and M. Ghasemi (2011, p.614 tab.2).

Find Number	Feature	Object	Material	Technique	Results XRD
1018b	10012	Finger ring	Bronze	Hammering	Unknown
1096	10012	Strap end	Bronze	Unknown	Malachite, quartz
1108	10012	Finger ring	Bronze	Unknown	Malachite
1166a	10013/1	Undefinable object	Bronze	Moulding and cooling down	Unknown
1261	10012/2	Fragment of a ring	Bronze	Hammering	Unknown
1336a	10013	Finger ring	Bronze	Hammering	Malachite, quartz
1336b	10013	Finger ring	Bronze	Hammering	Malachite-tenorite
1336c	10013	Finger ring	Bronze	Hammering	Unknown
1347	10013	Earring	Bronze	Hammering	Unknown

[71] Chronology according to Chr. Piller (2008, p.241 fig.33).

3.4.2 The Method

The fragments were analysed in terms of their infrared spectra and showed an absorption between the wavenumbers 1300 to 1100 cm^{-1} with a maximum of 1161 $cm^{-1} \pm < 1\ cm^{-1}$ (tab. 3.4.2). This generates a broad shoulder, the so-called Baltic shoulder. Additionally, the samples from Veshnaveh obviously contain a exocyclic methylene group, which is a further characteristic of Baltic amber. The weak absorption band at 888± < $1cm^{-1}$ attests this methylene group.

3.4.3 The Result

There is no doubt that all fourteen samples are of Baltic amber, so-called succinite; it can be assumed that the remaining amber beads from Veshnaveh also consist of succinite.

3.5 Conclusion

Glass, metal and amber samples were examined under technical and chemical aspects; in this context, the trace elements in the glass were of particular interest. The content of thorium and zirconium showed specific affinities with Indo-Pacific glass, which is supported by technical parallels. This observation – a connection between Cambodian and Iranian glasses –, however, is only a hypothesis requiring further verification through future studies. The results of the chemical study contain further valuable information. Besides the aforementioned Th and Zr, the proportion of the compounds K_2O and MgO show similarities to other Near-Eastern glasses. A peculiarity is the high percentage of the element silver in some of the glasses from Veshnaveh, especially since the metal silver is evidentially abundant on the Iranian plateau; an observation which may prove useful in the future. For the time being, the chemical analysis of the glass beads raises more questions than it answers, but it forms an important basis for future studies on Iranian glass.

Other materials that were analysed are metal and amber: A range of artefacts from Veshnaveh was indeed made of bronze, and proved the manufacturing of some rings by hammering or moulding. The examination of the amber beads showed that they very clearly were made of Baltic amber, so-called succinite.

Tab. 3.4.2: The amber samples from Chale Ghar 1, their infrared spectra, succinite peaks and the absorption band due to the methylene group. According to C. W. Beck and E. Stout.

Find Number	Feature	Infrared Spectra, Wavenumbers (cm-1)	Succinite Peaks, Wavenumbers (cm-1)	Absorption band due to the exocyclic methylene group, Wavenumbers (cm-1)
1183a	10012/2	IR 8136	1160	888
1400a	10013	IR 8133	1161	888
1790d	10013/1	IR 8134	1159	888
1803	10013/1	IR 8135	1161	888
4062b	10013	IR 8137	1161	889
4333a	10012/5-6	IR 8138	1162	888
4468d	10013	IR 8139	1161	888
4494c	10019	IR 8140	1161	889
4494c14	10019	IR 8141	1162	888
4760c	10021	IR 8142	1161	888
6574a	10013	IR 8143	1161	889
6662	10013	IR 8144	1161	888
6664	10013	IR 8145	1161	888
6699c	10015	IR 8146	1160	888

4 Stratigraphy and Chronology of Chale Ghar 1 and 2

In the preceding chapter the jewellery finds from Veshnaveh were examined in a comparative analysis, and it was shown that they could be dated to the Arsacid, Sasanian and late Sasanian or early Islamic periods. In this chapter the results of the chronological analysis by a Geographic Information System (GIS) is described. Aided by the localisation of those jewellery finds that could be dated, an effort was made to narrow down certain areas or layers belonging to the Arsacid, Sasanian or early Islamic periods. The second stage (in a following chapter: Depositional Practices) was to consider changes in votive practice that can be seen by comparisons between the identified areas.

The three-dimensional coordinates of the finds were associated with the base data including the properties of the finds, and then injected as a shape file into the GIS program. There, each object is represented by a point within the coordinate system (map 1). As part of the analysis, queries can be performed to localise certain find groups and to understand the distribution of the finds and their geographical interrelationships. For example, queries of bronze and iron finds show that the two metals tend to appear in different layers. Thus, the GIS analysis allows new insights into chronology and depositional practice in Chale Ghar. The observations conducted in the course of excavation can be verified, while informations and considerations can be added. The features that were identified during the excavation as containing jewellery are (map 2): 10012/2, 10012/3, 10012/4, 10012/5, 10012/5-6, 10012/6, 10012, 10013/1, 10013 and 10014 in the main chamber of Chale Ghar 1; also 10018 and 10022 in the rear chamber; and in the entrance area features 10000, 10004, 10008, 10009 and 10050 contained characteristic finds. The jewellery layers in Chale Ghar 2 are 11057, 11058, 11097, 11098 and 11099. The jewellery was mixed with pottery, animal bones, charcoal and wood (mostly unworked).

The GIS analysis has been carried out for Chale Ghar 1 only, because Chale Ghar 2 yielded only few finds in a humid corner, and they did not merit a three-dimensional examination. Chale Ghar 1 can be divided into three areas: the entrance area, the main chamber and the rear chamber (map 1). In these three parts, concentrations of objects once belonging to cultic activity were discovered. The mine was accessible through a small hole, through which a person had to crawl to enter. An area in the north-eastern part of the mine had naturally been filled with water, probably from melting snow, to form a small pool – the main chamber. This pool was accessible only from its north-western side (map 1). Just before reaching the pool, an ascent leads to the rear chamber in the south-east, which was also filled with water. From there, the far eastern corner of the main chamber was attainable – indeed it was visible – through a small opening, which had been made during prehistoric mining activity to improve air supply, hence it is termed ‘the ventilation shaft’ (map 1).

4.1 Chronology of the Main Chamber of Chale Ghar 1

The use of mine 1 as a votive place has been given a chronological range of between 800 BC and the 8th century AD on the basis of ^{14}C-datings, taken from a charcoal sample at the bottom of feature 10013, and an Islamic coin find (pl. 4, no. 4456). The distribution of the ceramics already shows a tendency towards a chronological subdivision in the main chamber: only a few ceramics point to the early phase of the depositions, and also only a few ceramics indicate deposition activities during the Achaemenid period (Abar 2011). Arsacid pottery was found in the middle and north-western parts of the main chamber, with a few examples in the rear chamber, too, while Sasanian ceramics were located mostly in the north-western and south-western parts of the pool. Pottery, probably Islamic, was found in the outer north-western part at the edge of the pool in the main chamber (Abar, in prep.).

4.1.1 Arsacid to Sasanian: Feature 10013

4.1.1.1 The North-Western Area of 10013

Feature 10013 is the largest layer and covers almost the entire surface of the main chamber except for the outer north-western area (map 6). In the north-west this feature overlies the older feature 10015, which contains Bronze Age mining waste (Stöllner, 2011). 10013 – with its upper layers 10012/2 and 10012/3 – is the base feature in the main chamber, and seems to be the oldest jewellery layer. An Arsacid coin (pl. 4, no. 1348), bell pendants (no. 1734a; pl. 25, no. 1739), a mulberry-shaped and a collared gold-in-glass bead (pl. 7, nos. 1949o, 1752b), and a glass finger ring (pl. 27, no. 1903b) belonging to the same period, give a first indication of dating; these objects were uncovered in the middle of the pool in feature 10013.

For locating the Arsacid area several other finds are also significant: the blue cornerless-cube-shaped

glass and the blue conical glass pendants,[72] as well probably as some gold-in-glass beads, the dating of which may reasonably be pushed back as far as the later Arsacid period. The cornerless-cube-shaped beads appear in the north-western area of 10013, but do not extend to the outer south-western area (map 3). A similar observation can be made about the gold-in-glass beads, which are distributed in the middle and north-western parts of the pool. However, six gold-in-glass beads were found in more recent features in the outer north-western area.

A chronological discrepancy apparently emerges as one moves across from the middle to the north-western area of 10013, because the first Sasanian offerings were deposited in the latter part of the feature (map 4).

It is noteworthy that one coin of the Sasanian king Hormizd II (1835i) was found in the south-western area of feature 10013. In this area also one decorated silver plaque (pl. 43, no. 4568d) and bird-decorated finger rings were unearthed, the former dating to the Sasanian period. Silver plaques were mostly located in the Sasanian, late Sasanian and early Islamic features. However, the Sasanian artefacts appear also to be scattered over the Arsacid areas, which makes distinguishing the chronological layers or areas difficult.

4.1.1.2 The South-Eastern Edge of 10013

At the south-eastern end of the main chamber mostly animal bone objects as well as simple cornelian and glass beads were found, with the exception of one gold-in-glass bead (no. 6267). Most remarkable is the accumulation of amber beads and the absence of blue glass beads. The latter appear in almost all other areas of the main chamber and in the rear chamber (fig. 4.1.1.2). It is mentionable that metal objects are scarce, except one bronze nail head (no. 6533b) and that a number of wooden artefacts and wooden vessels were found in the south-eastern corner. Wooden finds of this kind were also distributed along the eastern periphery of feature 10013 and the pool, together with a number of amber beads. The eastern periphery likewise hardly contained any metal finds.

There are several possible interpretations:

Either the south-eastern corner of feature 10013 reveals another phase of depositions, or it had once played a separate role regarding ritual practice or the objects simply drifted to these parts of the main chamber. The area was either supplied through the ventilation shaft from the rear chamber, or the worshippers had to walk through the pool over the older depositions to lay down the artefacts. Another possibility is that the beads had been thrown about eight or nine metres through the main chamber. A superficially attractive interpretation would be that this corner belonged to a very early period, dated before the pottery depositions in the centre of the pool, but this thesis had to be deemed implausible since most of the jewellery seems not to appear before the Arsacid period.

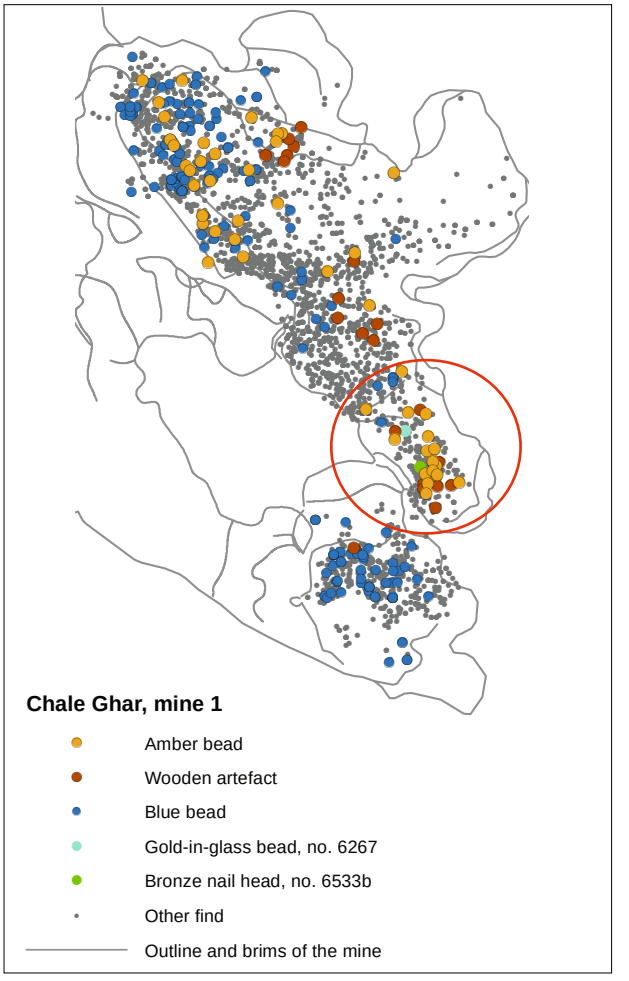


Fig. 4.1.1.2: Characteristic finds in the south-eastern area of feature 10013 (map: N. Bagherpour Kashani).

4.1.2 Sasanian to late Sasanian: Features 10012, 10013/1, 10012/2, 10012/3, and 10014

A greater number of Sasanian bronze finger rings with bird illustrations was found in the outer north-western part around the shallow edge of the pool in features 10012, 10012/6, 10013, 10013/1 as well as 10014 (fig. 4.1.2; no. 1572; pl. 29, no. 1793; pl. 28, no. 1814; pl. 31, no. 1824; pl. 30, no. 1828; nos. 4511, 4564f; pl. 29, no. 4597). They can give a first indication to the dating of these features.

[72] There is one blue cornerless-cube-shaped glass bead (no. 4318b) that differs in some aspects from the other cornerless-cube-shaped beads of Veshnaveh. It is larger, translucent and seems to have experienced a different kind of corrosion, which indicates a different composition of the glass. It may be that this bead orginates from another period than the other cornerless-cube-shaped beads from Veshnaveh. It probably belongs to the Islamic period due to its location in the early Islamic feature 10012/5-6.

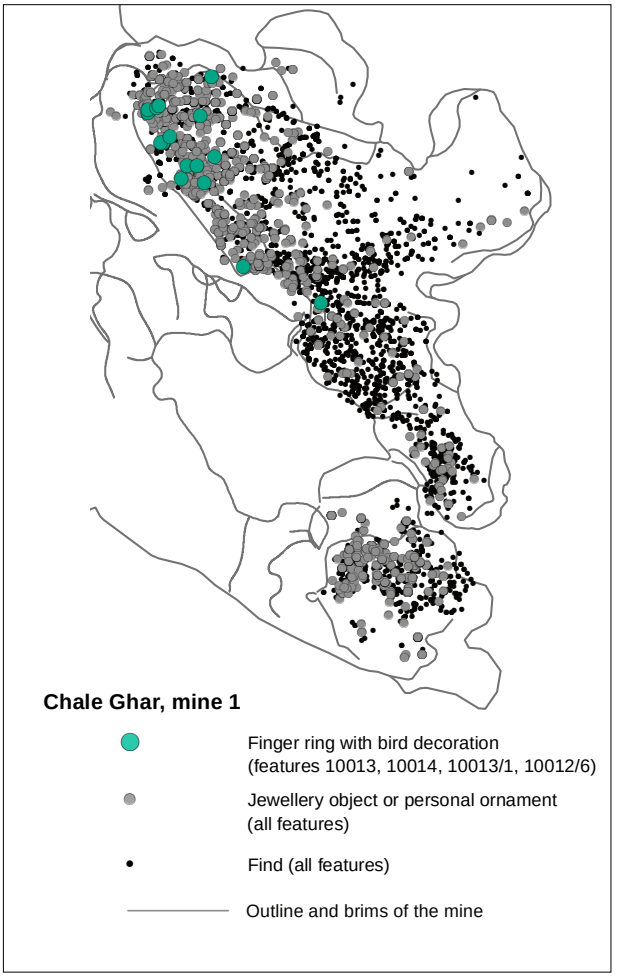


Fig. 4.1.2: Bronze finger rings with bird decoration. Detail of the north-western area of the main chamber (map: N. Bagherpour Kashani).

4.1.2.1 Interrelationship of Features 10013, 10014, 10013/1, 10012/2, 10012/2 and 10012 (Map 6)

To understand the interpretation of the features 10013, 10014, 10013/1, 10012/2, 10012/3 and 10012 it is important to consider their interrelationship, first of all: The Sasanian feature 10013/1 overlies feature 10013 in the western area of the pool; and furthermore features 10012/2 and 10012/3 cover these layers and touch each other. 10013/1, 10012/2 and 10012/3 may also be accounted as the upper layers of feature 10013, and therefore date later than 10013. On top of those, the larger Sasanian feature 10012 bestrides the middle and the western area of the pool. Feature 10014 is located along the north-eastern rock wall of the main chamber, above 10013, and partly below 10012/2 (map 7); and it touches feature 10013/1 at its eastern side. The finds of Sasanian coins in features 10013/1 and 10014 may indicate that 10014 is of a slightly earlier date than 10013/1.

4.1.2.2 Feature 10013/1

The most significant find in feature 10013/1 is a coin of Shapur II (309–79 AD) (pl. 4, no. 1217c), which gives a first indication of the dating of this feature. There are noteworthy parallels between features 10013/1 and 10012/6. The latter is dated to the late Sasanian and early Islamic periods by a coin and a decorated silver sheet. Both features contain similar types of jewellery artefacts: firstly, finger rings of the same shape and type, notably the rings with offset rectangular bezels: no. 1815 in feature 10013/1; and nos. 4446, 4457b in feature 10012/6. A similar observation could be made for the finger rings with broadening hoops: no. 1793 in feature 10013/1 (pl. 29); and nos. 4338, 4340, 4516a (pl. 29), 4519 in feature 10012/6. Another parallel between the two features can be found in the hexagonal green glass beads that were discovered in both features (pl. 5, nos. 1171a, 1776a; nos. 1831e, 4317, 4335a), except for one in the north-western area of feature 10013 (pl. 5, no. 4571b).

Iron earrings and decorated silver sheets were mostly found in the Sasanian and early Islamic features 10012/6, 10012/5–6, 10012/5 (features 10012/6, 10012/5: no. 4407; pl. 43, no. 4408a; pl. 43, no. 4409a; pl. 45, no. 4424a; pl. 44, no. 4526; pl. 43, no. 4454), and also in 10013/1. This assemblage may confirm the dating of this feature to the Sasanian/late Sasanian period.

4.1.2.3 Features 10012/2 and 10012/3

Features 10012/2 and 10012/3 did not contain any significant finds, but due to their location above features 10013 and 10013/1 they may be dated to the Sasanian period at least.

4.1.2.4 Feature 10012

Besides the Sasanian bird-decorated finger rings, one late Sasanian/early Islamic ring with a conical centre, and a late Sasanian/early Islamic etched cornelian bead with tendril decorations were unearthed in feature 10012 (pl. 32, no. 1227; pl. 34, no. 1091; pl. 17, no. 1577). One bag-shaped amber pendant that could be dated to the Arsacid period was found in feature 10012 (pl. 26, no. 1107), however.

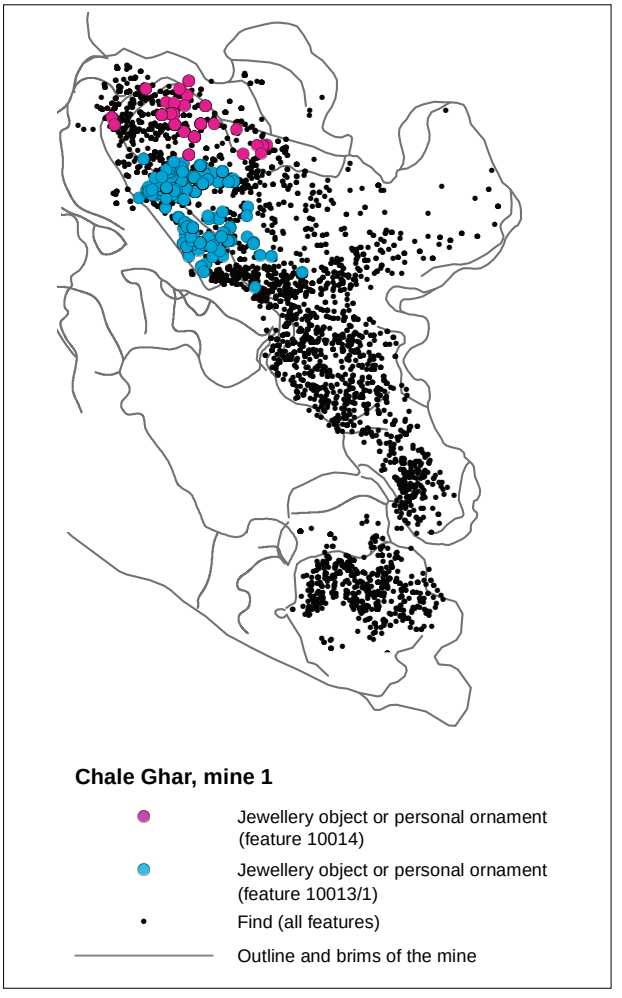


Fig. 4.1.2.5: Relation of features 10013/1 and 10014 (map: N. Bagherpour Kashani).

4.1.2.5 Feature 10014

Feature 10014, located adjacent to 10013/1 (map 7; fig. 4.1.2.5), contained a coin of the reign of Bahram II (276–93 AD) (pl. 4, no. 1639). This feature seems to belong to the Sasanian period due to the coin find and other indications, including a Sasanian decorated finger ring (no. 4564f), a chessboard-patterned bead (no. 4582c), a rectangular spacer bead of lapis lazuli (pl. 18, no. 4584c), and some iron rings. Chessboard beads of the same kind were also unearthed in the late Sasanian/early Islamic feature 10012/6 as well as in the entrance area (no. 4517e; pl. 10, no. 6885). Lapis lazuli, such as that found in the spacer bead in 10014, and iron mostly appear in the later periods of the depositions in the mine. However, a Arsacid globular glass vessel (pl. 46, no. 4553a) was also found in the same feature; might it be a heirloom?

4.1.3 Late Sasanian/Early Islamic Period: Features 10012/6, 10012/5-6, 10012/5, and 10012/4

The situation changes and becomes easier to interpret in the outer north-western corner of the main chamber. Here we are dealing with the late Sasanian and early Islamic features 10012/6, 10012/5-6, 10012/5, 10012/4, of which 10012/6 is the lowest, and 10012/4 the uppermost (map 8).

4.1.3.1 Feature 10012/6

A first indication for a dating is the Umayyad coin that was found in feature 10012/6 (map 5); furthermore, there are Sasanian bird-decorated finger rings (no. 4511; pl. 31, nos. 4513, 4515; pl. 29, no. 4516a; no. 4519; pl. 30, no. 4521), etched cornelian beads of Sasanian date (no. 4341b; pl. 15, no. 4345; pl. 16, 4480), and a silver sheet decorated with a cultic scene (pl. 43, no. 4454), which probably dates to the late Sasanian period. This assemblage indicates that feature 10012/6 was formed during the late Sasanian and early Islamic periods.

It is noteworthy that in the same feature a fragmented bead (pl. 11, no. 4483) was found, which was dated to the 9th–12th centuries AD in the analysis of J. Lankton and B. Gratuze (see subsection 3.10.2.2). This rather late dating seems implausible, as has already been discussed in the chemical analyses chapter (3.10); a dating to the late Sasanian and/or early Islamic periods would be reasonable for this bead.

4.1.3.2 Features 10012/5-6 and 10012/5

Features 10012/5-6 and 10012/5 are located above layer 10012/6, and should therefore be assigned a more recent date (map 8). It is noteworthy that in 10012/5-6 and 10012/5 more iron than bronze objects were uncovered, and some silver objects, no gold, but two lapis lazuli beads. Such an assembly seems to represent the preferred donations during the early Islamic period.

4.1.3.3 Feature 10012/4

The uppermost feature in this western area 10012/4 is a small layer that contained two outstanding objects: a silver bead with granular appearance (pl. 13, no. 4296c), and a bronze finger ring with a white-blue eye inlay (pl. 37, no. 4182a). This layer may reflect the last phase of deposition in the main chamber.

4.2 Chronology of the Rear Chamber of Chale Ghar 1

4.2.1 Arsacid to Sasanian: Features 10018, 10022

The rear chamber mainly consists of feature 10022 and has a surface layer, which was named 10018. Some artefacts that were excavated in the rear chamber (feature 10022) resemble the Arsacid group in the north-western area of the pool in the main chamber: cornerless-cube-shaped beads and blue conical pendants were unearthed there (map 3). One bag-shaped glass pendant (pl. 23, no. 6044) may also confirm activity in the rear chamber during the Arsacid period.

Another observations links the rear chamber with the north-western area of the main chamber: the yellow glass beads found in feature 10022 (fig. 4.2.1). These appear in the features 10012, 10012/4, 10012/5, 10013/1, 10014, and 10013 in the north-western part of the pool in the main chamber, but also some yellow beads were found in the entrance area (features 10008, 10050). Beads of this kind were obviously dedicated during a certain phase, probably mostly in the Sasanian period. Gold was found in this area (features 10018, 10022), while bronze – in the shape of finger rings – and iron artefacts remained scarce.

It seems that, like the main chamber, the rear chamber was visited from the Arsacid period, and Sasanian offerings were deposited both between earlier layers and above them. No clear evidence survives of activity in the rear chamber during the early Islamic period.

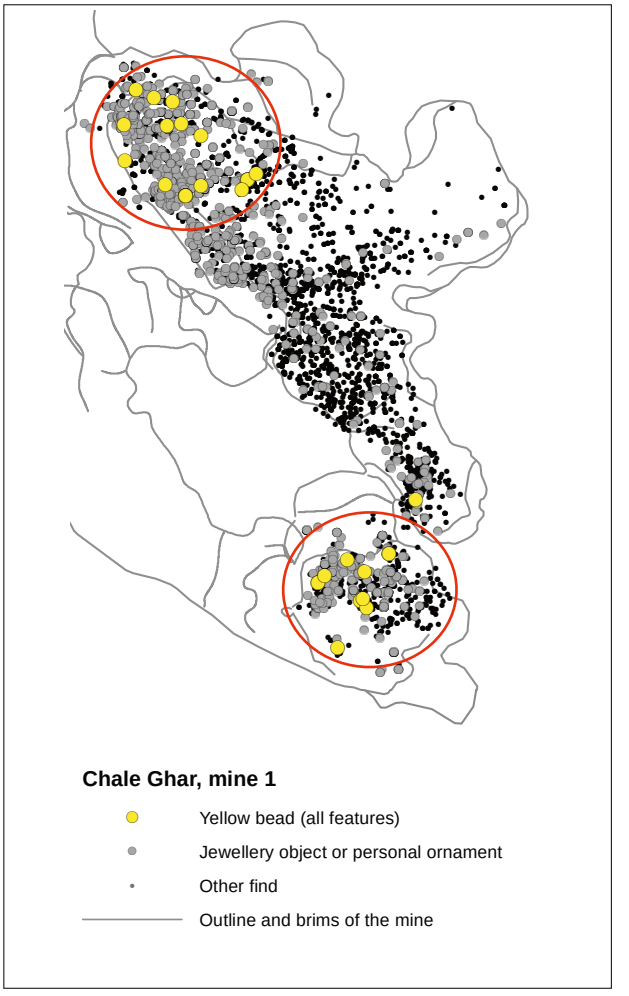


Fig. 4.2.1: Yellow glass beads in the north-western area of the main chamber and in the rear chamber (map: N. Bagherpour Kashani).

4.3 Chronology of the Entrance Area of Chale Ghar 1

4.3.1 Early Islamic: Features 10000, 10004, 10008, 10009, and 100050

The depositions in the entrance area can be divided into two parts: a front part and a rear part, with stray finds in between (map 9). The rear part consisted of animal bones, ceramic sherds, iron finger rings, simple glass beads and shell beads (feature 10050). The finds in the front part were composed similarly, but with fewer iron objects, more shell beads, and some nacre beads (features 10000, 10004, 10007, 10008, 10009). No datable finds were discovered, but the appearance of iron and the almost total absence of other metals allow us to compare the features in the entrance area with the Islamic features in the main chamber (fig. 4.3.1 a). However, charcoal from feature 10007 and 10050, dated to Iron Age III in a ^{14}C analysis, indicates that during an early phase objects were already being brought into the entrance area. It is noteworthy that shell, cowrie and nacre were found almost exclusively in the entrance area of Chale Ghar 1 (fig. 4.3.1 b). This attribute links the entrance area to the finds in Chale Char 2, which is located above mine 1.

4.4 Chronology of Chale Ghar 2

4.4.1 Early Islamic: Features 11057, 11058, 11097, 11098, and 11099

For Chale Ghar 2 no GIS analysis was carried out. There the assemblage of finds showed that this mine must have belonged to the later phases of the site's use for votive purposes, if not to the end of votive activity. The discoveries were mainly ceramic sherds, animal bones, charcoal and iron objects; but a few glass and cornelian beads were also found, as well as shell beads and cowrie shells. Outstanding among the finds is the fragment of a dark green glass bowl.

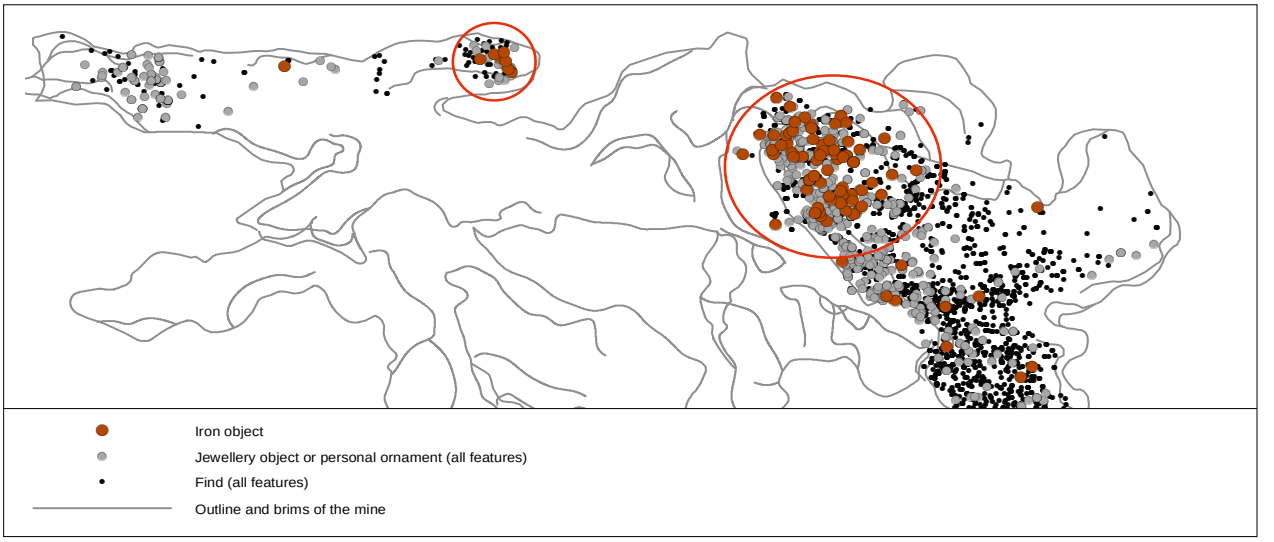


Fig. 4.3.1 a: Chale Ghar, mine 1. Iron objects of the Sasanian to the early Islamic periods in the main chamber and the entrance area (map: N. Bagherpour Kashani).

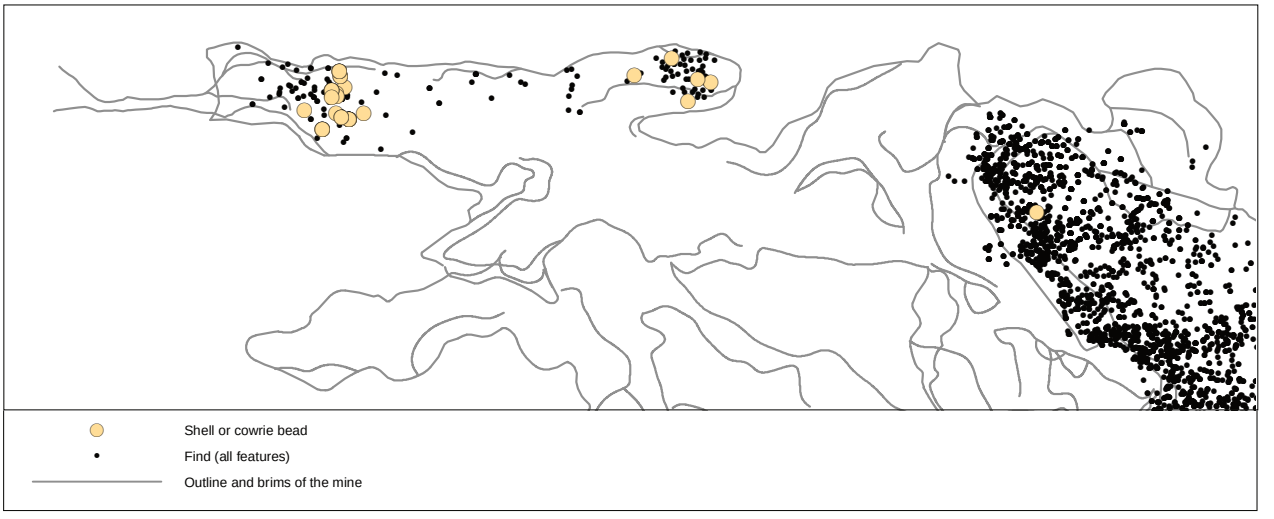


Fig. 4.3.1 b: Shell and cowry beads in Chale Ghar 1. Detail of the entrance area (map: N. Bagherpour Kashani).

4.5 Conclusion

Examination of the jewellery finds showed that Chale Ghar 1 was used continuously from the Arsacid to the early Islamic periods for jewellery offerings. Suggested datings of the features are listed in the table 4.5 below. It seems that deposition of jewellery started during the Arsacid period in feature 10013 in the centre of the pool, which remained permanently filled with water (Stöllner, et al., 2004a, p.249).

Later depositions were located in the north-western area of feature 10013, and may belong to the late Arsacid and the Sasanian periods. At that time, the rear chamber had already been visited, too (feature 10022). The question of how to date the south-eastern corner of the main chamber (feature 10013) must remain open. There an accumulation of amber beads and wooden artefacts was uncovered, but no other characteristic objects. This area most certainly was not used before the Arsacid period.

The major part of the rear chamber (features 10018, 10022), the north-western area of 10013 and feature 10014 presumably were filled with objects during the Sasanian period. However, any hypothesis regarding a clear separation of the Arsacid from the Sasanian areas in feature

Table 4.5: Suggested datings of the features in Chale Ghar 1.

Date	Feature	Area	Stratigraphic relation
Arsacid, Sasanian	10013	Chale Ghar 1, main chamber, centre	Below 10013/1, 10012/2, 10012/3, 10012, above 10015
Arsacid, Sasanian	10013	Chale Ghar 1, main chamber, south-east	No other layer below or above
Arsacid, Sasanian	10022	Chale Ghar 1, rear chamber	Below 10018
Sasanian	10018	Chale Ghar 1, rear chamber	Above 10022
Sasanian	10013	Chale Ghar 1, main chamber, north-west	Below 10013/1, 10012/2, 10012/3, 10012, above 10015
Sasanian	10014	Chale Ghar 1, main chamber, north-west	Below 10012/2, above 10013
Sasanian, late Sasanian	10013/1 (upper layer of 10013)	Chale Ghar 1, main chamber, north-west	Below 10012, above 10013
Sasanian, late Sasanian	10012/2 (upper layer of 10013)	Chale Ghar 1, main chamber, centre	Below 10012, above 10013 and 10013/1
Sasanian, late Sasanian	10012/3 (upper layer of 10013)	Chale Ghar 1, main chamber, centre	Below 10012, above 10013 and 10013/1
Sasanian, late Sasanian	10012	Chale Ghar 1, main chamber, centre and north-west	Above 10013, 10013/1, 10012/2, 10012/3
Late Sasanian, early Islamic	10012/6	Chale Ghar 1, main chamber, outer north-west	Below 10012/5-6, 10012/5, 10012/4, above 10015
Early Islamic	10012/5-6	Chale Ghar 1, main chamber, outer north-west	Below 10012/5, above 10012/6
Early Islamic	10012/5	Chale Ghar 1, main chamber, outer north-west	Below 10012/4, above 10012/2 and 10012/6
Early Islamic	10012/4	Chale Ghar 1, main chamber, outer north-west	Above 10012/5
Early Islamic	10000, 10004, 10008, 10009	Chale Ghar 1, entrance area, north-west (front)	10000 above 10004; 10004 above 10008; 10008 above 10009.
Early Islamic and Iron Age III	100050	Chale Ghar 1, entrance area, north-east (back)	Above 10051 (feature not mentioned in the jewellery context)
Early Islamic	11057, 11058, 11097, 11098, 11099	Chale Ghar 2, south-east	11057 = stray finds; 11058 above 11097; 11097 above 11098; 11098 above 11099.

10013 must be termed unproven until more studies on Sasanian small finds have been carried out. Original jewellery from the Sasanian period is scarcely known (Musche 1988, p.289), so we are faced by a lack of references.

The jewellery and coin finds indicate that features 10013/1 and 10012 were also formed during the Sasanian period, and parts of them might belong to the late Sasanian 'subera'. This observation lets us conclude that the features 10012/2 and 10012/3, which cover 10013/1, may be assigned to a later period, too.

In the outer north-western corner of the water pool in the main chamber, features 10012/6, 10012/5–6, 10012/5 and 10012/4 are located. Feature 10012/6 was most probably formed during the late Sasanian and early Islamic periods. The most significant finds are an Umayyad coin, Sasanian finger rings and a Sasanian decorated silver sheet. 10012/5–6, 10012/5 and 10012/4 are located above this feature and contain jewellery that differs from the earlier finds; therefore these features may be dated to the early Islamic period.

The jewellery finds of the entrance area of Chale Ghar 1, and of mine Chale Ghar 2 seem also to belong to the early Islamic period and may indicate the decline and end of ritual activity at Chale Ghar.

5 Cultural and Religious Interpretation of Chale Ghar 1 and 2

5.1 Considerations on the Exchange of Goods at Veshnaveh

The examination of the objects that were found in Chale Ghar 1 and 2 showed that the artefacts consist of very different materials and were also manufactured in various ways. Manifold types of objects were deposited in the mines, such as glass and stone and amber beads made with different techniques, finger rings, earrings and sheets of bronze, silver and gold as well as miscellaneous other finds, for example one spherical glass vessel, or spacer beads made of stone and gold. This very diversity indicates that many of the objects were not of local production, but were brought from different places or regions within or outside Iran. There is only insufficient data about glass, stone or metal sources in Iran, but speculations will be made in the following:

5.1.1 Glass

The numerous glass beads that were found at Veshnaveh are very different in appearance, even the simple monochrome glass beads differ from each other in details. It is unlikely that all these glass beads were made at Veshnaveh, because usually beads made in one workshop, at one place or by a single craftsman may be expected to be similar to each other or to show similar attributes. However, the qualities and properties of the beads from the mines and their chronological analysis with the GIS indicate that they were manufactured in many different workshops, distinct from each other in chronology and geography. It seems unlikely to suppose that the mountains of Veshnaveh should have supported a centre of glass bead production to provide the local population with beads. However, it may be possible that craftsmen from different regions were travelling to Veshnaveh, or that there were simple production facilities in the nearby village, at least for the basic beads. In the 5th and 6th centuries AD, and probably earlier, the Sasanian Empire was in possession of a prosperous glass industry (Stern, 2001, p.331). This, along with frequent glass bead finds at different archaeological sites in Iran of different periods (Egami, et al., 1965; 1966; McGovern, et al., 1991; Kambaksh Fard, 1998), indicates that the beads from Veshnaveh presumably were made of Persian glass, but were not produced locally.

A number of mosaic and other variously decorated beads stand out among the collection of glass beads. Their workmanship is of high quality. One bead is elaborately decorated with mosaic flowers (pl. 10, no. 1472), another shows a multi-coloured bird (pl. 10, no. 6885). The bead decorated with a sun motive (pl. 9, no. 4451) and the black-and-white bead (pl. 9, no. 4475a) are also worthy of special attention. These beads quite certainly were exchange goods and not of local production, even though this cannot be proved entirely.

Two remarkable objects are the spherical glass vessel (pl. 46, no. 4553a) and the blue glass gem (pl. 27, no. 1505), both from Chale Ghar 1. The former has a shape that resembles unguentaria found in the Eastern Roman provinces.[73] The gem shows a figural image of a Hellenistic or Roman warrior. The glass vessel and the gem were clearly not produced in the region around Veshnaveh, but probably imported from the Eastern Roman provinces.

5.1.2 Metal

The exploitation of mines in modern times, textual sources and traces of ancient deposits indicate, that Iran was sufficiently equipped with sources of ores to provide material for local handicrafts. This observation is supported by the metal artefacts that were found at Veshnaveh, like the finger rings and earrings, beads made of bronze or other non-ferrous metals and alloys, lead or silver. Some spacer beads, chain links, appliqués and metal sheets were even made of gold.

It is notable that Chale Ghar 1 and 2 had been used as copper mines already since the 3rd millennium BC (Stöllner, et al., 2004; 2011, pp.536-537, 543-552), but like other mines in that region were no longer in use at the time they were chosen as a place to deposit artefacts. There are many indications of ancient and recent mining activity in Iran; these are described by numerous scientists: Allan, 1979, p.34; Chmyriov, et al., 1973; Derakshani, 2000, pp. 35, 36, 42-43; Dunlop, 1957; Helwing, 2009, pp.210-211; Garner, 2014, p.26; Kory and Steiniger, 2001, pp.254-255; Moorey, 1999, p.217; Nezafati, et al., 2009, p.224; Stöllner, et al., 2004, pp.478-493; 2011, p.537; Wulff, 1966, pp.13-16. The considerations on metal sources in Iran and elsewhere show that Iran probably possessed sufficient natural resources of copper and tin to alloy bronze and that Iran owned silver and gold mines to some extent. This may be an indication that the metal artefacts from Veshnaveh are of Iranian origin.

[73] See Table 2.8.1.3 b in this volume.

5.1.3 Stone

Certain raw materials could obviously not have been obtained from local sources, for instance, amber, lapis lazuli and cowry shells. Turquoise was available in Iran, but still hundreds of kilometres away from Veshnaveh. However, cornelian can perhaps be traced to the region around Veshnaveh. All following considerations are highly speculative, but may open an interesting discussion.

5.1.3.1 Cornelian

Cornelian beads were found in large numbers in both Chale Ghar 1 and 2. This stone, orange to red in colour, is mined in many parts of the world. It appears as a covering layer of rocks or as the back filling of vugs. In many cases, the cornelian is detached from the original stone and is found in secondary deposits as detrital minerals or alluvial pebbles. Today, the ressource is found in Northern Africa, Japan, Australia, Siberia and Brazil. Stones of good quality are said to come from India until this day (Carnap-Bornheim and Weisgerber, 2000, p.285).[74] In Antiquity, cornelian was obtained from India as well as from Egypt, the Southern and Western Arabian Peninsula, South-western Afghanistan, Southern Uzbekistan and Azerbaijan. The Achaemenids are said to have imported cornelian from the Sogdiana, Bactria (Glau, 2004, p.167).

Iranian sources lie in Sistan, in the Helmand basin and on the Bushehr Peninsula (Beale, 1973, pp.136-137; Whitehouse, 1975, pp.119–123; Stöllner, 2005, p.465; De Waele and Haerinck, 2006, p.32). P. R. S. Moorey (1999, p.97) states that cornelian, in the form of alluvial pebbles is reported to be coming from Iran, across the central plateau and in the Elburz mountains. It is probable that cornelian was obtained from these local mines and was processed on Persian territory, as finds from three Sasanian/Islamic sites show (Simpson, 2003, p.65): In Nishapur, Siraf and Rishahr, debris of the manufacturing process of cornelian was discovered (Francis, 1988; 1989, p.26; Whitehouse, 1975). J. Simpson (2003, p.65), however, does not exclude the remanufacturing of imported cornelian as a possibility. According to Th. Stöllner (2005, p.465), cornelian, chalcedony, agate and sardonyx originate also from Egypt and the Sinai peninsula.

Probably, cornelian was available either far from Veshnaveh in the far East and South of Iran, or only as pebbles in the central plateau and the Elburz mountains. Small pebbles may have been put primarily to local or regional use. They were only useful for small beads. This might apply to the beads from Veshnaveh, since they are rather small and the stone is of poor quality. Additionally, aside from a few exceptions, most of them have the same rough finish. However, the specific source of the Veshnaveh cornelian is difficult to pinpoint.

[74] Even in Germany, cornelian monoliths were found quite recently (Mägdefrau, 1957).

Beside cornelian, garnet beads appear in large numbers at Veshnaveh. Garnet is a term encompassing different varieties of that stone, for example almandine, pyrope or grossular. Sources of these stones are located in India, Pakistan, Sri Lanka and a few deposits in Egypt (Tallon, 1995, p.38; Kessler, 2001, p.124). Iran itself clearly did not harbour garnet sources. However, because the garnet beads resemble the cornelian beads in shapes, sizes and workmanship, they too may have been produced locally, while the raw material was imported.

5.1.3.2 Turquoise and Lapis Lazuli

Turquoise was available in Nishapur, Iran, as well as in Sinai and the desert of Kysyl Kum (Schindler, 1984; Tallon, 1995, p.33; Weisgerber, 2004), but it is unknown when exactly these mines were exploited and whether the turquoise from Veshnaveh was obtained from one of these sources.

Another blue stone that was found in the mines is lapis lazuli and only a few beads made of this stone were discovered there. The best-known source of lapis lazuli is located in the Afghan region of Badakhshan (Brown, 1991, p.7; Casanova, 1992, p.49), but it seems that there were also lapis lazuli sources available in Iran, as the historian and geographer Ḥamd Allah al-Ḳazwīnī had claimed (Houtsma, et al., 1927; Stöllner, 2005, p.463). In the 14th century, he wrote of the existence of lapis lazuli mines in Iran (Stöllner, 2005, p.463). According to S. C. Brown (1991, p.12), lapis lazuli was mined in and traded from the Kashan area. Other deposits are located in the Pamir Mountains, the Lake Baikal region and the Urals (Klengel, 1979, p.29; Herrmann, 1968, pp.22-29; Casanova, 1992, p.49). M. Casanova (1992) analysed the trace elements of lapis lazuli that was found in Shahr-i Sokhta, a 3rd millennium BC site in south-eastern Iran where an area of lapis lazuli workshops was discovered (Brown, 1991, p.7), and compared the chemical results to several samples of lapis lazuli deposits. Her examinations show that the Shahr-i Sokhta samples are mainly linked to the Sar-i Sang mine in Badakhshan, to mines in the Pamir and to the so-called Chagai Hills deposits, in Northern Pakistan (Baluchistan). These similarities may be based upon the fact that the Sar-i Sang/Badakhshan and the Pamir sources belong to the same geomorphological area. So far, mainly the Badakhshan mines have been assumed as sources for lapis lazuli (Röllig, 1980-1983, p.489), but the analyses of M. Casanova reveal that lapis lazuli may also have been imported to Iran from other deposits, with the Chagai Hills in Northern Pakistan as the most possible source. Even though a geological survey was carried out, no lapis lazuli sources have been discovered in Iran yet (Herrmann, 1968, pp.27-28). However, a number of sites from the early 3rd millennium BC yielded lapis lazuli workshops. Besides Shahr-i Sokhta, these are Tappeh Hissar, Susa, Shahdad and Tal-i Malyan (Helwing, 2004, p.160).

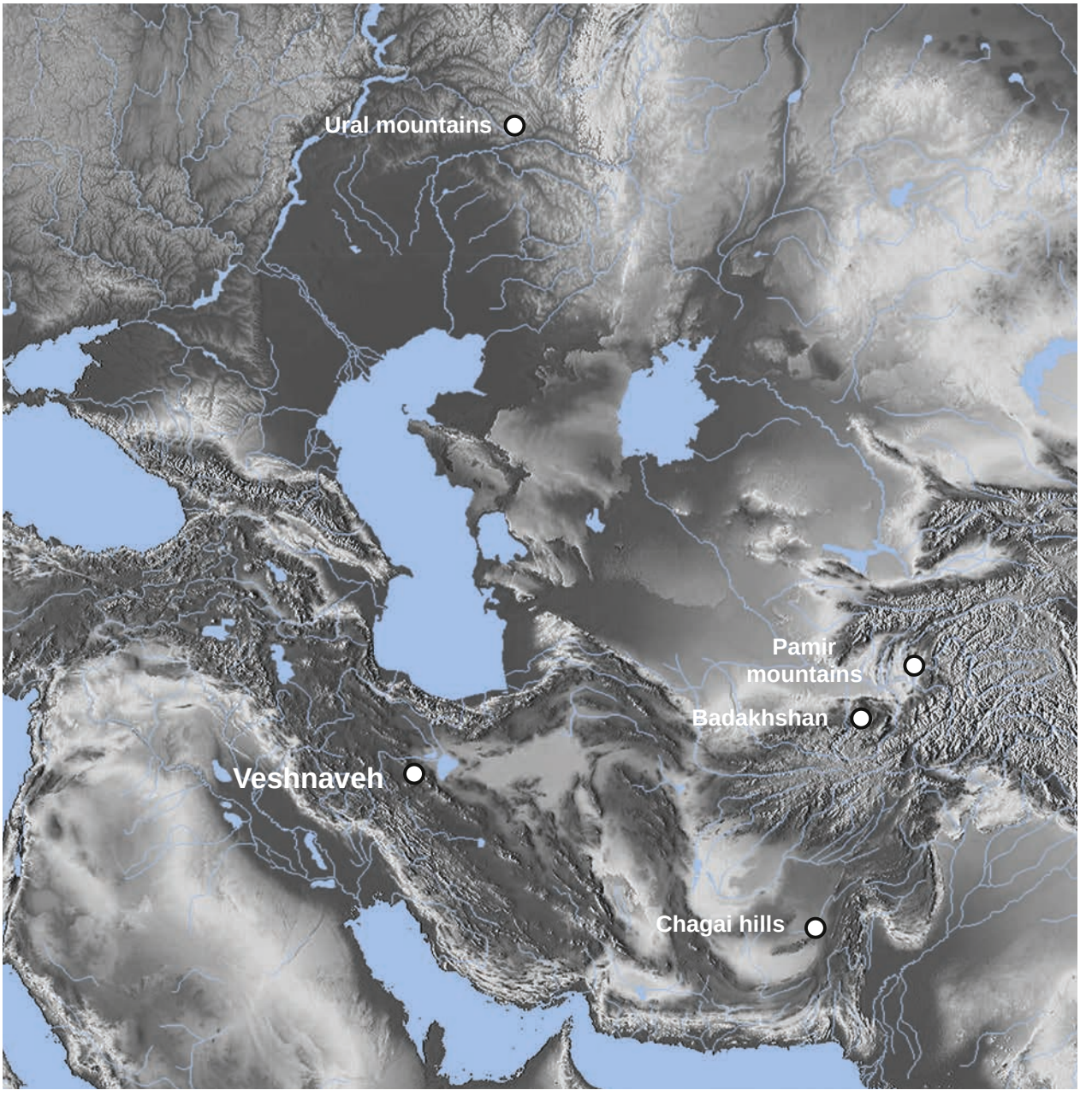


Fig. 5.1: Map of lapis lazuli sources in Badakhshan, the Pamir mountains, the Chagai Hills in northern Pakistan and in the Ural, based on information given in literature (source: https://maps-for-free.com).

5.1.4 Origin of the Amber and Cowry Objects

Particularly one bag-shaped amber pendant attracts much attention (pl. 26, no. 1107). It was brought from Eastern Europe or the Black Sea Littoral to Iran. The shape of this pendant is characteristic for European amber pendants, and in the Black Sea region, this shape appears in other materials such as glass or stone. Additionally, the chemical analysis revealed that 14 amber samples from Veshnaveh originate from the Baltic, and the remaining amber beads may also be supposed to have been imported from there. The question whether the raw material or already completed beads were transported to Iran must remain open, but there are indications that several of the triangular and probably the ovaloid beads were manufactured in the Near East (see Bagherpour Kashani, Roustaei and Stöllner, 2011).

Besides amber, there are other natural materials that are regarded as exchange goods. As mentioned above, cowry shells were not available in the mountainous region of Veshnaveh and seem not to have come from the Caspian Sea. According to B. Musche (1992, p.41), monetaria moneta (cowry) shells came from the Persian Gulf and were traded in Oman as well as in the Indus valley. These shells were used as votive offerings, grave gifts and of course as jewellery.

5.1.5 Origins of Miscellaneous Objects

There are more objects made with special skill and craftsmanship. They stand out among the other finds from Veshnaveh due to their quality and unique appearance: The spacer bead, no. 1617, is a gold-covered bead with two oval garnet or ruby stone inlays. Very similar spacer beads are known from other places in Iran. This bead was clearly of a common type and was either imitated or produced by one certain workshop.

Similar suggestions may be made with regard to the gold sheet with a plant illustration (pl. 43, no. 4581f). It is decorated with more care than the other sheets and seems to be cut from a larger piece.

5.2 Trade Routes in Iran – a Note

H. Klengel (1979, p. 8) writes that it is often debatable whether goods were exchanged by professional traders or between tribes or settlements. In this respect, it remains unclear whether the imported materials and objects from Veshnaveh were traded directly from their place of origin or via several markets or staging posts. However, as long as the manufacturing workshops of e.g. glass beads are not localised, it will be impossible to reconstruct ancient roads, which served for the trade of these goods. There is still a need of research on this matter and so following considerations will remain notional for the time being.

At Veshnaveh, we are dealing with mostly Arsacid and Sasanian jewellery artefacts, but also with such from the early Islamic period. For this period, trade connections may strongly be supposed to have existed (Kory and Steiniger, 2002, p.253, p. 257). All the goods that came from the East in order to be shipped from the Levant had to pass through Iran anyway. M. E. Aubet (2013, p.106) writes: ”For some time now it has been demonstrated that the materials of which many artefacts are made are better indicators than style or decoration when determining the place of origin. A complete exchange circuit or the movement of merchandise can be reconstructed if the provenance or source of the imported materials is identified.” According to A. De Waele and E. Haerinck (2006, p.32), lapis lazuli was traded along so-called ‘lapis lazuli routes’ (see also Tallon, 1995, p.13). The northern route runs along Damghan/ Tape Hissar, Hamadan and the Diyala region (fig. 5.2). This passage is not far from Veshnaveh, but bounded by mountainous terrain. The southern route passed Shahr-i Sokhta, the Lut desert, Shahdad, Fars and Khuzestan (fig. 5.2; Niharika, 1993, p.7; De Waele and Harinck, 2006, p.32). Shahr-i Sokhta was a site of the 3rd millennium BC where a lapis lazuli workshop dated to the middle of the 3rd millennium BC was found (Klengel, 1979, pp.24-25).

Both routes may have been trade ‘roads’ not only for lapis lazuli but also for other goods. Whether the inhabitants of Veshnaveh participated in these routes remains unclear. It is probable that they brought agricultural products for sale to central markets. There they could have obtained goods coming from different regions to Iran. One of these important centres of long-distance exchange probably was Rayy, which is actually about 150 km – as the crow flies – away from Veshnaveh (fig. 5.2). As R. W. Kory and D. Steiniger write (2001, p.261), this place is unfortunately not mentioned in textual sources until the 9th century AD (Lombard, 1992, p.48). However, one passage in the work of the Greek geographical author Isidore of Charax, who probably lived in the second half of the 1st century BC, describes a city called Rhaga as one of the greatest cities in Media (Schoff, 1914, pp. 7 §7; 29). The editor and translator of Isidore’s text, H. Schoff, identifies Rhaga with Rayy and mentions the 1st century AD Roman politician and author Arrian of Nicomedia, who claimed that Rhaga was for a long time an important trade centre (Schoff, 1914, p.29). One may assume there had been a smaller market that was closer to Veshnaveh than Rayy, however. There are indications of old trade routes coming from the East and from the North through Rayy and passed by or through Ghom (Abar, in prep.); also caravan routes through the Ghom basin to Kashan are known (Fragner, 1990).The city of Ghom is located about 80 km to the north-east of Veshnaveh.

Besides the East-West routes, we must assume that there was a South-North trade route through Iran as well (fig. 5.2). One may pass Veshnaveh 20 km to the east coming from Isfahan and Kashan (Abar, in prep.; Siroux, 1949, fig.99). Obviously, cowry shells were transported from the Persian Gulf to places such as Veshnaveh. Another commodity to have been traded from the Persian Gulf to distant destinations probably was garnet (or almandin). This stone was not available in Iran and probably came to the Persian Gulf from India or Ceylon/Sri Lanka (Kessler, 2001, p.119). As early as the early 3rd and the 2nd millennium BC, maritime trade was practised in the Persian Gulf. According to H. Klengel (1979, pp.34-36), Bahrain was one of the trading stations. Finds along the coastal strip of Makran and Maka indicate that they were both bases for the shipping trade and had connections to the Indus civilisation.

The important trade routes in the Near East, on land and at sea, seem to have existed in the Near East for a long time. The Achaemenid great kings also exercised control over the Persian Gulf and the Red Sea (fig. 5.2; Kory and Steiniger, 2001, p.257). According to H. Schoff (1914, p.19), the Arsacid trade routes are the same as the routes of the Medes and Assyrians. Unfortunately, no textual sources about Arsacid maritime trade are known, but it is conceivable that maritime trade was practised, especially on the large rivers and canals (Schippmann, 1980, p.91; Kory and Steiniger, 2001, p.257). The Sasanians controlled the Persian Gulf, at least the western part of it towards the Indian Ocean (Piancentini, 1992, p.136).

During several periods, the Persian empires tried to maintain good connections to India and China (Bivar,

1970). This is indicated by trading centres along the Persian Gulf, which are mostly mentioned in Arabic sources (Kory and Steiniger, 2001, p.257). The only coastal city on the Iranian side of the Persian Gulf that was excavated, however, is Siraf (Whitehouse, 1968; 1969; 1970; 1971a; 1972; 1974; Piancentini, 1992). Its role during the Sasanian time is still unclear, but it was an important trading centre some time during the early Islamic period (Potter, 2005, pp. 35, 39). Probably another Arsacid-Sasanian sea port may have existed on the Bushehr peninsula where Arsacid, Sasanian and Indian pottery was found, and a harbour town called Rew-Ardashir, which cannot be located, is mentioned in textual sources (Kory and Steiniger, 2001, p.258). An example of a coastal city on the Arabian coast of the Perisan Gulf is Kush/Ras al-Khaimah. Finds there and at several examined sites along the Arabian coast indicate relationships between South-eastern Iran and the Arabian coast (Kennet, 2004; Haerinck, 2004, p.205). On the basis of this evidence, however minor, one can assume that there was a link between the coastal areas and that maritime trade was carried out in the Persian Gulf from both coasts. The cowry shells and probably the garnet beads that were found at Veshnaveh may have been such trade goods that came from or via the Persian Gulf to the area of Veshnaveh. Additionally, two finger rings with a spica motive (pl. 33, nos. 4311d, 4442a) have a counterpart from the Island of Khark in the Persian Gulf (pl. 39, no. 3011).

The amber finds from Veshnaveh attested to be European objects have also found their way to Iran probably along the Mediterranean Sea. There is evidence of a North-South amber route from the Baltic to the Mediterranean (Sprincz, 1993). From there, the amber was probably shipped to eastern destinations, across the Black sea or the Levant and traded onwards, on land, along the Caucasus or across Mesopotamia to Iran. Finds of Sasanian silver vessels in Eastern Europe, especially in Ukraine, testify a relationship between Persia and this region. However, it is not certain under which circumstances these objects came to Eastern Europe – as gifts, booty, currency or trade goods (Kory and Steiniger, 2001, p.261).

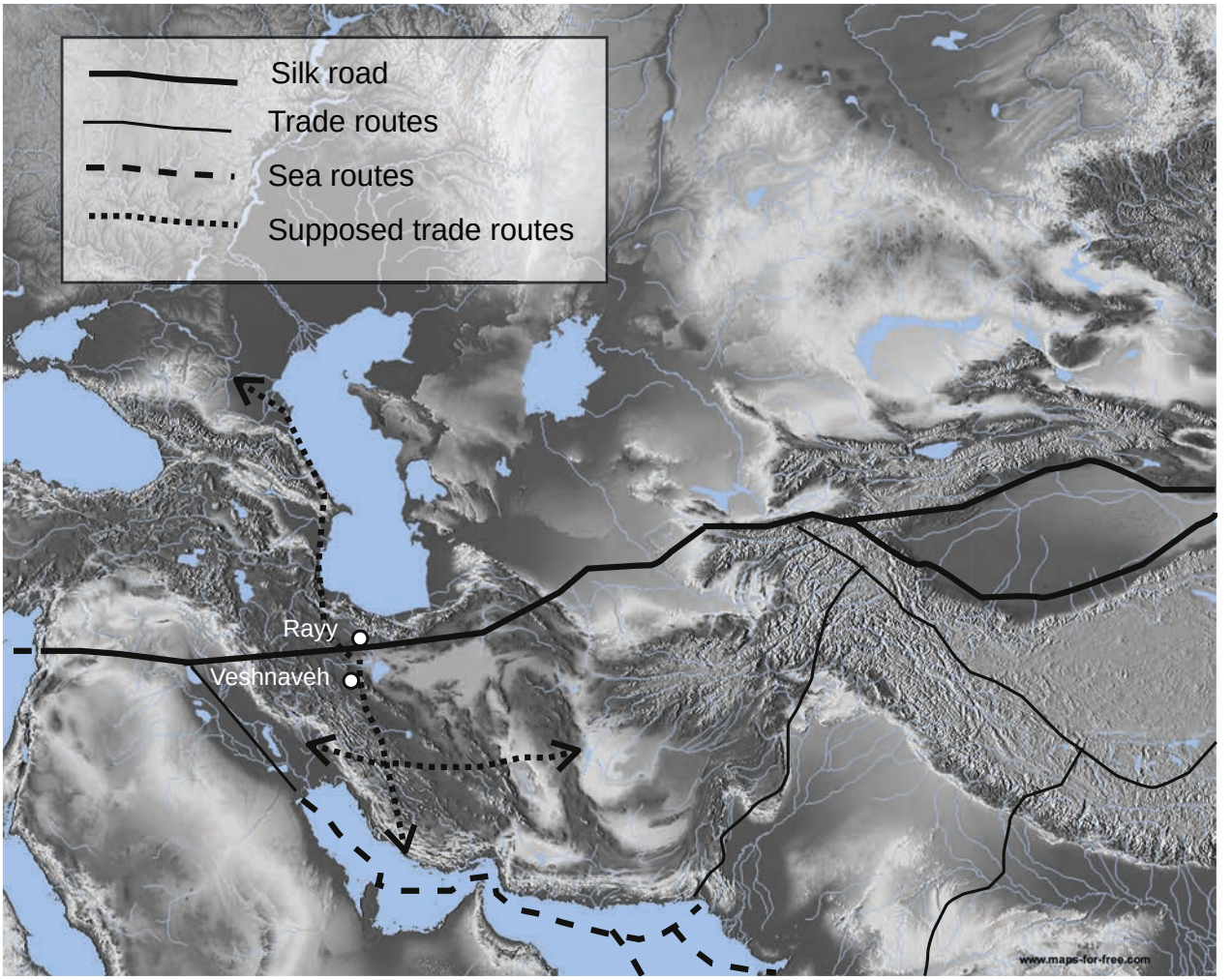


Fig. 5.2: Important trade routes through Iran, according to Kory and Steininger (2001, fig.1), with changes and supplements by N. Bagherpour Kashani.

5.2.1 Conclusion

During the Arsacid and Sasanian periods, an exchange of goods from eastern or western regions was obviously well established. The artefacts found at Veshnaveh show that the native people had access to local marketplaces, which in turn were connected to regional markets or even a trade route. However, the possibility of a production of simple artefacts on a small scale in the settlement itself should not be excluded.

A survey around Ghale Dez, Northeast of the modern Village of Veshnaveh, showed that the region was continuously inhabited from the 8th/7th century BC to the Islamic period. Chale Ghar 1 and 2 were probably visited by the inhabitants of these settlements. These people, a rural society, probably brought their local products to local markets for sale. There, they had the possibility to obtain artefacts and materials of the kinds found in Chale Ghar. A local exchange may be supposed for most of the glass and cornelian beads as well as for the metal. Iran has yielded numerous metal sources in ancient as well as in recent times. The finds of bronze, lead, silver and gold from Veshnaveh are likely to originate in Iran and may have been purchased from local or regional markets. To quote J. Allan (1979, p.101): "It has also been shown that, among the base metals, copper and lead were widely distributed naturally, and that as a result, although smelting sites were constantly moving, there was probably little long distance trading in these metals."

Amber, cowry, lapis lazuli, turquoise and other special objects, like the glass vessel, had to be obtained from markets connected to more than merely regional trade. At any rate, Veshnaveh must have been in at least sporadic contact with these places, probably via the local centres. Of course, other possibilities such as booty or gifts cannot be dismissed. It is astonishing that only few objects seem to originate from sources in the East, like turquoise and lapis lazuli. All the other 'exchange' objects probably came from southern or western destinations.

In conclusion, the diversity of the finds from Veshnaveh indicates that most of the objects were not produced locally. Among all these considerations, one must not lose sight of the fact that, over a long timespan, comparatively few objects were deposited in Chale Ghar 1 and 2. On this basis, one cannot assume a particularly busy trade to have been in operation throughout all periods in which the site was in use. Although we are facing a lack of sources, that means we do not know whether there had been a large or small exchange, it seems more likely that there was a sporadic exchange of goods.

5.3 The Symbolic Meaning of the Jewellery Artefacts from Veshnaveh

5.3.1 Introduction

In the course of this study, the particular attributes of Chale Ghar 1 and 2 have become clearer; the use of the former mines as a place to deposit various objects bestows upon them a special significance as a holy place. Worshippers visited the mines over a long period, about 1400 years. However, in proportion to this time span, relatively few artefacts were deposited. The question whether the place was involved in vigorous trade or whether it was in fact rather isolated cannot be answered. In the latter case, the objects would certainly have had a monetary value in addition to their symbolic character.

Anyhow, there was a reason why these artefacts were deposited in the pool in Chale Ghar 1 and in the narrow water hole in Chale Ghar 2. Their appearance, variety, material and their origin pose the question of the meaning of the objects that were found in the mines. Certain attributes must have made these artefacts special. They had either a common or an individual value, with a monetary or symbolic connotation or both. The objects of jewellery from Veshnaveh most probably were used as amulets and endowed with a particular meaning known either by the individual worshipper or by the whole community.

This presumptive meaning is discussed in the following paragraphs concerning the material, colour and appearance of the artefacts from Veshnaveh. For the purpose of interpretation, references are sought in ancient textural sources, comparable finds as well as in recent popular Islamic beliefs and practices. It would seem that these objects may be situated in a long tradition of vernacular religion, because written sources ranging from Pliny the Elder, a Roman scholar of the 1st century AD, to mediaeval authors seem basically to concur with recent ethnographic observations (Hoffmann-Krayer, 1927; Kriss and Kriss-Heinrich, 1962).

5.3.2 Amulets and Talismans – a Definition

In common use, the terms amulet and talisman tend to be interchangeable (Pfister, 1937, p.660). Closer examination indicates that the purpose of amulets is generally apotropaic – fending off evil – and offering protection from diseases (Renger, 1996, p.631; Eckstein and Waszink, 1950, pp.397-411). The talisman, by contrast, is supposed to bring luck. However, neither term can be defined conclusively, and most often, both are used to denote objects with the capacity to ward off evil or bring the wearer good luck. In the present study the term amulet is used to denote objects which can be endowed

with both properties, or which are loaded up with certain meanings that we cannot exactly comprehend anymore.

It appears that a large number of amulets and talismans, mainly of the Arsacid, Sasanian and also a few of the early Islamic period, were placed into the water of Chale Ghar 1 and 2. The amulets are distinguished by their material, colour or appearance. In many cases, material and shape are connected, for example the sound of bronze or silver in the shape of bells (Kriss and Kriss-Heinrich, 1962; p.154; Schatkin, 1978, p.156). A number of materials and objects were obtained from distant places or brought to the mountainous region around Veshnaveh from far away, like cowrie shells, amber, turquoise and lapis lazuli. Certain meanings of amulets might have been imported along with the materials (Garbe, 1882, pp.70-92), but the practice of using amulets must have been part of a local tradition and corresponding worldview.[75] Then again, the very foreignness of an imported object may suffice to infuse it with an amuletic meaning. J. Markley Todd (1985, p.299) claims that "amber in Near East texts emerges as a symbol of power. Worn by kings and priests, it remained a focus for intense meditation in the compelling and awesome vision of the chariot of the Lord".[76]

5.3.3 Amulets and Written Sources – a Note

As early as Assyrian cuneiform tablets, we can identify sources dealing with the meaning of stones used for *apotropaia* (Ebeling, 1928, p.121; KARI VI no.213, CT XIV). Later, Pliny the Elder considers the healing or apotropaic effects of different stones and metals in his *naturalis historia* (Pliny, 1984, XXXIII, 102-110; 1989, XXXIV, 117-122; 1994b, XXXVII, 30-192). Many such ideas have been adopted and preserved in some Islamic beliefs and traditions, and are still valid today, like many ancient symbols; for example eye beads or bird illustrations as apotropaic or lucky charms (Kriss and Kriss-Heinrich, 1962, p.17).

Concerning the meaning of the amulets, the medieval authors frequently refer to the ancient Greek philosophers Aristotles and Socrates, to Roman or Hellenistic authors such as Pliny and Plutarch, as well as to the Greek physician Galen. Islamic writers tried to confirm the information given by the ancients by citing *Hadiths* as authority. According to the *Hadiths*, Muhammad himself counselled the wearing of cornelians in ring bezels to the end of bringing blessings and good fortune to the wearer (Kriss and Kriss-Heinrich, 1962, p.38). The prophet Ali is supposed to have owned red agate from Yemen to protect himself (Donaldson, 1938, p.152).

[75] I would like to thank Ph. Kreyenbroek for his considerations.

[76] Unfortunately, she does neither quote the corresponding sources and nor specify the idea and geography of the Near East in her statement.

5.3.4 The Material of the Amulets

The material used for an amulet was not chosen randomly. The artefacts of jewellery from Veshnaveh were made of different materials, such as various metals, stones, organic materials and glass. These all have different meanings when used in a religious or cultic context, and the most important of them will be discussed in the following sections.

5.3.4.1 Metal

Gold and silver were the most precious metals used to manufacture jewellery. The value of gold stems above all from its rarity, in addition to which this metal is frequently associated with mythological events. The Zoroastrians were among the first to give a mythological account of a succession of metal ages, those of gold, silver, copper, brass, lead, steel and finally iron (Boyce, 1979, p.75; 1990, pp.91-92). Pliny names eight cures of involving gold, to be used mainly on lacerated injured persons and children (Pliny, 1984, XXXIII, 84). B. Musche (1992, p.58) writes that in many cultures metals, especially gold and silver, were believed to possess magical properties. It is likely that this was also true for certain Near Eastern cultures. Perhaps these were aware of the bactericidal effects of gold and silver, but also of the generally strengthening influence on the organism. Considering the Islamic magic and folklore in Iran, A. B. Donaldson (1938, pp.155-156) quotes Al-Ḳazwīnī, a 13th/14th century Persian scientist, who claimed that gold could cure afflictions as different as smallpox, bad breath, stomach pains, jaundice and dysentery in babies. In the latter case, golden rings had to be placed into water, which the child had then to drink. In Iranian popular belief, silver is thought to be magical as well, strengthening charms that were engraved in this metal (Donaldson, 1938, p.154).

In Chale Ghar 1, only a few gold and silver objects were found. Chale Ghar 2 contained no such precious materials at all. The gold objects are a plant-decorated sheet, jewellery as pendants, spacer beads or individual chain links and small fragments of thin gold sheets. The pieces of gold sheet and the chain links were probably deposited because of their material value only or/and *pars pro toto*. In the latter case, parts of a whole object represent an intact votive offering.

Silver objects from Chale Ghar 1 are represented by a few finger rings with symbols, and by decorated sheets, or objects resembling body parts or animals.

A possible role of bronze is merely hinted at in the extant literature. Bronze is supposed to have been preferred for certain cultic and magical rites, whereas iron was forbidden (Mundle, 1966, pp.479-480). Bronze amulets are known from ancient Greece (Schatkin, 1978, p.156), and in Islamic cultures copper – as one component of bronze – and brass have been inscribed with

magical formulae (Donaldson, 1938). Bronze amulets, at least, were certainly worn into the Christian era and in Christian regions (Mundle, 1966, 484). At Veshnaveh, mainly bronze finger rings with symbolic decorations, earrings and fragmented plaques were found in Chale Ghar 1 and 2.

It is worth noting that a number of iron finger rings and earrings were discovered in both mines. Iron may have been used by a rural population unable to afford more precious and costly materials, but it may also have been deposited on account of its special attributes. While iron was one of the seven holy creations in Zoroastrianism (Boyce, 1990, pp.48, 91-92), in Islamic and presumably in pre-Islamic cultures, iron finger rings were worn against demons and evil ghosts, specifically from the 'evil eye' (Donaldson, 1973, p.154; Eckstein and Waszink, 1950, pp.402-403; Schienerl, 1980, pp.493-494). According to W. Schienerl (1980, p.487), even in the sumptuously endowed tomb of the Egyptian pharaoh Tutankhamen, an iron amulet was found. However, this pharao lived at a time when iron was not yet widely established and still a scarcely used material. It should be noted, in this context, that iron was and still is worn in protection from the child-murdering demon Qarīna in modern-day Islamic cultures (Schienerl, 1980, p.492). Iron is mentioned in the Qur'an, and iron and rust have been used in folk medicine as agents to secure the affection of husbands (Donaldson, 1973, pp. 154, 204; Schienerl 1980, pp.488). Pliny, too, described the use of iron as a remedy (Pliny, 1989, XXXIV, 151). This concurrence once more shows how the popular beliefs of western and eastern cultures seemed to be linked, even over long periods of time.

5.3.4.2 Stone and Organic Materials

Women's Amulets

Many precious stones have been worn as amulets, and cornelian is one of the most important. This stone was preferred – alongside agate, garnet, chalcedony and onyx[77] – in the Sasanian period (Hermann, 1959, p.514). This accords with the finds at Veshnaveh, where many cornelian and garnet beads were discovered. Cornelian appears as a votive object as early as Mesopotamian foundation deposits, for ceremonial or magical reasons (Moorey, 1999, 98), and was used as amulet. Cornelian has been worn against the evil eye (Eckstein and Waszink, 1950, pp.402-403; Donaldson, 1973, p.152), but is also frequently mentioned as a styptic agent, and in this context was linked to the protection of women, especially before and after birth or to relieve the discomfort of menstruation (Kriss and Kriss-Heinrich, 1962, pp.39-40). Another 'women's' stone was the so-called milk stone. This term probably denotes any kind of white stone, e.g. white agate (Kriss and Kriss-Heinrich, 1962, p.39) or chalcedony, as found in small quantities at Veshnaveh. This stone was used by breast-feeding women to ensure sufficient lactation (Hildburgh, 1916, p.179; Kriss and Kriss-Heinrich 1962, p.39; Pliny, 1994b, XXXVII, 162).

Amber, counted here among the organic materials, seems predominantly to have been used by women and for children. The evidence of grave gifts may serve to reinforce such suggestions, notably the example of thousands of pre-Roman women's and children's graves in Italy (Causey and shephard, 2004, p.74 n.1). These burials were rich in worked amber objects. Pliny the Elder (Pliny, 1994b, XXXVII, 45; 51) discussed amber as being used especially by women and children to cure several afflictions (Eckstein and Waszink, 1950, pp.402-403). According to A. B. Donaldson (1973, p. 204), in recent belief amber is used to cure jaundice, to strengthen a weak heart and to induce sweating. In any case, amber is a special material to appear in Iran on account of its faraway origin, its attractive appearance, magnetic effect and its smell (Moorey, 1999, p.79). Amber beads and pendants were discovered in Chale Ghar 1 only.

Cowry shells, as found in the entrance area of Chale Ghar 1 and in Chale Ghar 2, were often thought to resemble female genitalia and therefore were regarded as fertility amulets (Kriss and Kriss-Heinrich, 1962, p.7). They are believed to be linked to the sex life of women, but were also used as currency (Musche, 1992, pp.12-13). However, the cowry is also known to ward off evil and to cure headaches. The shells were sewn onto children's garments or used to protect domestic animals (Donaldson, 1973, p.204).

5.3.4.3 Other Amulets

Very few rock crystal beads were found in Chale Ghar 1. According to M. Boyce (1979, p.41), this stone played a role in Zoroastrian belief as the stone of the sky and was linked to metal.[78] In popular Iranian Islamic belief, crystal is said to cure toothache (Donaldson, 1973, p.153), but according to M. Tosi (Tosi, 1980-83, p.247), crystal was rarely employed for amulets in ancient times.

Turquoise or blue stones, used as safeguards against the so-called 'evil eye', were widely distributed across the Islamic Near East (Kriss and Kriss-Heinrich, 1962, p.4; Herrmann, 1969, p.35). The blue of the turquoise was supposed to attract attention and thereby to keep harm from the owner of the stone. Only in Chale Ghar 1 were turquoise and lapis lazuli beads, of poor quality and in small numbers, found. More numerous are the blue glass beads, which probably served the same purpose as the blue stones (Seligmann, 1910, p.248).

[77] For notes on stones and the value of material and colour see: Warburton, 2019, pp.17-24.

[78] This idea, however, has recently been criticised by H. Koch (2002, p.17).

5.3.5 The Colour of Amulets – Considerations

M. A. Owoc (2002, p.131) was surely correct in stating:

> *"First, colour is often intimately involved in the material celebration and communication of change, time and identity among communities or in relation to particular individuals. Second, the importance, definition and strength of colour should be seen primarily as emerging from its use, rather than as given natural qualities. Third, because colour is always located within broader schemes of perception, it is only through some understanding of these that the rationale behind the use of colour may be appreciated."*

At Veshnaveh, colour seems to be an essential attribute in numerous finds, especially in glass beads. Certain colours, of course in various nuances, appear frequently. These colours are blue, yellow and green, while only few objects of red, black, white or other colours were discovered.[79] Special skill and knowledge was needed to produce and colour glass (Oppenhein, et al., 1970, p.32; Weber, 1983; Jaschke, 1997; Gaitzsch, 2003). Colour thus already played a particular role during manufacture and later in the selection of the finished object. The beads from Chale Ghar 1 and 2 were probably deposited within special circumstances, with care and, within the water, at specific places. These circumstances may indicate that the beads had a certain purpose and their colours had a specific meaning.

Some colours were most probably associated with having certain powers, e.g. protection from evil, bringing luck and health, or fertility. Today, in some Near Eastern regions 'apotropaic blue' is said to repel the so-called 'evil eye' (Kris and Kriss-Heinrich, 1962, p.4; Eckstein and Waszink, 1950; p.405). Such ethnological observations can help to interpret colours in a social and religious context (Einszler, 1889; Seligmann 1910; 1922; Unger, 1957-1971a, p. 24 §2), and parallels from ancient sources sometimes corroborate these conclusions (Unger 1957-1971a). One would not be mistaken in assuming the recent popular belief of certain Near Eastern and of western regions to be associated with ideas similar to those already held in ancient times (Kriss and Kriss-Heinrich, 1962, 17; Rosenthal, 1965; Gätje, 1968; Zahlhaas, 1995; Strohmeier, 1999). Therefore, Roman sources like Pliny the Elder perhaps can provide an indication as to the meaning of colour in Mesopotamian and Iranian cultures as well (Pliny, 1992).

Blue is thought to possess apotropaic powers, while green was probably linked to plants or nature (Hermann, 1969, p.369; Warburton, 2004, p. 128).[80] Today, green is the colour of luck, hope, peace and success.[81] In symbolizing plants and nature, however, green may also be related to fertility (of plants and humans). The green beads from Veshnaveh were deposited at what was presumably a holy place, therefore it may be assumed that they were believed to have a positive influence, as Ch. Schirrmacher (2000-2011) has outlined.

About the colour yellow only speculations can be made. It bears negative connotations as the colour of hate and envy in the conservative contemporary Iran (Schirrmacher, 2000-2011; and personal observation). However, one should try to highlight the positive attributes of the colour yellow, because it was found in such a context as Veshnaveh (cf. Owoc, 2002, p.131). Yellow, after all, may be connected to the metal gold; perhaps it was 'the gold of the poor people' which could cure disease (Unger, 1957-1971a. p.24-25 §3 Gelb; Donaldson, 1978, pp.155-156; Warburton, 2004, p.128).

Only a few red and black glass beads were unearthed at Veshnaveh. J. Simpson states that the colour red has not been attested in Sasanian glass (Simpson, 2003, 67). His observation may be strengthened by the assemblage of jewellery finds from Veshnaveh, which were mainly dated to the Arsacid and Sasanian periods. While barely any red glass beads were present, a large number of red cornelian beads were found at Veshnaveh, and they may serve as the representatives of the colour red in the present context.

The colour red, specifically the red stone cornelian, was thought to ward off evil and to possess healing powers, especially concerning blood diseases (Hildburgh, 1915, p.179; Ebeling, 1928, p.122; Kriss and Kriss-Heinrich, 1962, pp.39-40).

Black probably had a special meaning, or was of special value, since the colour black was not easy to produce. In transparent beads, other dyes had to be used in large quantities to achieve black (Stern and Schlick-Nolte, 1994, pp.20-21). Ochre colours found among the translucent glass beads may have been used to imitate amber beads.

In conclusion, the simple monochrome glass beads from Veshnaveh do not appear particularly expressive at first sight, because they are simply shaped. However, studying the colours, these beads reveal valuable information.

[79] Already second millennium glass from Tell Atchana/Alalakh was dominated by similiar colours (Dardeniz, 2019, p.16, p.26).

[80] According to Ph. Kreyenbroek the distinction between 'blue' and 'green' is particularly problematic in many Iranian languages (in 14th century poetry one still finds references to the *falak-e sabz* or 'green sky', in Kurdish, plants are often said to be 'blue' (*shin*); and the modern Persian word for 'blue', *ābi* or 'water-coloured', is probably a relatively late coinage). Similar namings apply for Mesopotamian connotation as Limmer writes: "However, Sumerian, Akkadian, and Egyptian combined the categories of green and blue, which corresponds to the Berkin and Kay´s linguistic evolutionary model (Landsberger, 1967; Baines, 1985, p.283; contra HALOT (s.v. yellow) which includes yellow for the Akkadian term)....It seems strange to suggest that in Mesopotamia and Egypt green and blue comprised one colour category, but that areas in between combined green with yellow." (Limmer, 2007, p.128). Nevertheless, green and blue will separately be discussed in this study.

[81] In Mesopotamia, the colour green had a negative connotation (Unger, 1957-1971a, p.25 §4 Grün; Herrmann, 1969, p.373).

The results of these considerations of colour are that the three main colours of the glass beads from Veshnaveh, blue, yellow and green, obviously had positive connotations: They were probably endowed with apotropaic (blue, red) and healing powers (yellow, red), and some may have been connected to positive concepts such as good fortune, success or fertility (green). Other colours like black and white have yet to be discussed. White may be linked to the so-called milk stone that was worn by breast-feeding women (Hildburgh, 1915, p.179; Kriss and Kriss-Heinrich, 1962, p.39; Pliny, 1994b, XXXVII, 162). Therefore, like the stone beads, the glass beads from Veshnaveh may have been used as amulets and deposited into the waters according to their colours' specific connotations.

5.3.6 Iconography and Shape of Amulets

Besides material and colour, objects were also worn or used as amulets by virtue of their appearance or decoration. Beads have a special status in magical contexts (Haevernick, 1968, p.120). Prayer beads, for instance, are known at least since the beginning of the Common Era, and in Islamic contexts are made of bone, glass, wood, nacre, amber or other materials (Teichner, 1997, pp.326-327). Amulets are, first of all, glass eye beads. At Veshnaveh, eye decorations also appear on one bronze ring and on a glass finger ring or on a silver sheet. Bird illustrations play a special role within the iconography of amulets. They are found on finger rings, on a mosaic glass bead and as a silver sheet cut into the shape of a bird. Other animal images with particular powers are griffins, stag or fish. Bell pendants and pomegranate-shaped golden pendants may be connected to ritual activities. Finger rings with spike decoration were probably also charged with certain connotations.

5.3.6.1 Eye Amulets

Eye Beads

There can be no doubt that the eye motif and the eye beads had a magical meaning (Ebeling, 1928, p.121; Wilpert und Zenker, 1950; pp.957-969; Dubin, 2007), and this may be true especially of the numerous eye beads that were found at Veshnaveh. In the Islamic world, eye beads or eye symbols are worn for protection from ill, especially the *evil eye*, until this day (Sode, 1995; Cingi and Cingi, 2007; cf. pl. 51, Egyptian hand amulet with eye decoration). Eye beads are known from the beginnings of glass production, and the bead as ornament was and is supposed to catch the first glance of a person and in that way protect and defend against harm from the *evil eye* (Dubin, 2007). The colour blue was produced by addition of copper minerals, but not only for this reason was it used frequently, for it had a special connotation, as L. S. Dubin explains: 'The early appeal of the colour may lie in the association of the colour blue with moisture. Blue was the colour of the sky and water, of prime importance in the arid lands where the evil eye emerged as a concept.' (Dubin, 2007, 'The Story'). Green eye beads were found at Veshnaveh as well, and one may suppose green to have had a different association from blue. In modern-day Jordan, for instance, dark green beads are used to give protection from bile diseases (Sode, 1995, p.56).

There is a strong relationship between women and the evil eye. Women, in particular pregnant and nursing women, as well as small children, are in need of special protection (Sode, 1995, p.55; Dubin, 2007, point 4). May, therefore, eye beads be specifically affiliated with the female sex?

Finger rings and a Metal Sheet with Eye Decoration

Glass rings were worn in everyday life as well as being dedicated to sanctuaries (Stern, 2001, p.357). One glass finger ring from Veshnaveh has a blue-white eye as a bezel (pl. 27, no. 1903b) and may have protected the owner against the evil eye, so it probably was dedicated into the mine for this purpose (Kriss and Kriss-Heinrich, 1962, pp.9-10). One bronze finger ring with two round patterns may depict an eye decoration with a similar apotropaic effect (pl. 35, no. 1807).

The silver sheet with an eye illustration (pl. 43, no. 1813) may have served a comparable purpose. Either it would have offered defence against evil powers, or it was dedicated out of a wish to cure afflictions of this particular part of the body.

5.3.6.2 Amulets in the Shape of Body Parts

In Greece, dedications of body parts to a healing god had become common by the fourth century BC. Tiny body parts of gold or *electrum*, dating from the late 8th to the middle of the 7th century BC, were found in the Artemision at Ephesus (Guettel Cole, 2007, p.434). Whereas in ancient Greece, body parts were dedicated "representing the part which the god had cured", at Veshnaveh the silver sheet in the shape of an eye and another in the shape of a hand seem to have served a different purpose (Dillon, 1997, p.169).

Eye

The silver eye plaque (pl. 43, no. 1813) has already been mentioned alongside the eye bead amulets and probably had an apotropaic meaning. The eye was and still is an important symbol in many cultures and ideologies. In Christian symbolism, the eye is the eye of God, and in some Near Eastern regions it has long been cherished as a special attribute of beauty. The Greeks considered the eye to be an allegory of preciousness. In mantic wisdom the watchful eye has an apotropaic meaning (Wilpert and Zenker, 1950, pp.961-963). In Near Eastern cultures, replicas of eyes had the prima-

ry function of warding off evil (Ebeling, 1928, p.121). A Zoroastrian text, by contrast, claims that a golden eye be sacrificed to Adur Gushnasp restores the sight (Boyce, 1979, p.124). This passage indicates that in Zoroastrian religion, at least from the middle Sasanian period onwards, replicas of body parts were sacrificed to the temple or to the deity to solicit healing.

Hand

Whoever was struck by the evil eye without being in possession of an amulet could defend himself with a bodily gesture, e.g. an outstretched finger (Kötting, 1954, p.479). This gesture may also have been simulated by the hand-shaped silver sheet found at Veshnaveh (pl. 43, no. 4408a). Unfortunately, the hand's forefinger is broken, and it is only assumed that this was an outstretched finger.

Examples of hands with an outstretched finger are preserved in the Museum of Berlin; they are made of artificial lapis lazuli. In this case, the effect was believed to stem from the colour blue as well as from the gesture (Ebeling, 1938). From Dura Europos in Syria, Babylon in Iraq and Hassani Mahale in Iran, pendants are known which have the shape of a hand making a *fica* gesture (Toll, 1946, pl.XLVI; L; Sono and Fukai, 1968, pl.LX-IV, 11; Wetzel, Schmidt and Mallwitz, 1957, pl.41b). Other probable hand pendants were found in Iranian Luristan (Musche, 1992, p.251, fig.15).

In Iranian Islamic belief, the hand serves as a reminder of the death of Abbas, whose hand was cut off in the battle of Kerbala (Donaldson, 1938, p.208) or as hand of Fatima. Hands often play a role in the composition of amulets as can be seen on a type of finger ring, that has frequently been worn in contemporary Iran. It is inlaid with an agate stone and has a hand decoration (pl. 51; personal observation). In ancient Egypt *fica* amulets were believed to strengthen virility and protect from evil (Müller-Winkler, 1987, p.183). In contemporary Islamic Egypt, hands are combined with eye ornaments as apotropaic amulets (personal observation; pl. 51, Egyptian hand amulett).

Phallus

One tiny glass object in the shape of a phallus was found in the entrance area of Chale Ghar 1 (pl. 46, no. 6560b2). It has no eyelet, so it was probably not worn as jewellery. It must have been made for the purpose of an offering. Amulets in shape of a penis are known to have existed as early as ancient Babylonia (Ebeling, 1928, p.121) and were supposed to bestow sexual potency upon their owner. In later periods, phallus amulets were supposed to fend off evil (Kötting, 1954, 478-479). Such phalluses seem to have been worn especially by children, either with other images or inside a bulla (Eckstein und Waszink, 1950, p.401). The phallus amulet from Veshnaveh either had an apotropaic meaning or was produced and laid down to symbolise the wish for health, fertility or potency (Müller-Winkler, 1987, pp.183; 190).

5.3.6.3 Animal Amulets

Birds

The reason why the rings from Veshnaveh are classified by their decoration is that they can best be dated on the basis of iconography and the cultural and religious content of the ornament (see chapter about the metal finger rings).

There is only scarce information about the significance of rings in the Arsacid and Sasanian periods, leaving us to draw such inferences as we can from ancient Rome and from Islamic cultures. Generally, rings seem to have had an amuletic meaning and were dedicated to deities, especially in the Roman age (Chadour-Sampson, 1997, p.14), which largely coincides with the Arsacid period. We know that, in ancient Rome, rings were emblems of individual identity, and signet rings were the preserve of individuals of high status. Finger rings included in graves, however, often were produced specifically for that purpose: magic symbols were supposed to fend off harm even after death (Zahlhaas, 1985, pp.10-11; Chadour-Sampson, 1997, p.14; Henkel, 1913, pp.340). Their decoration suggests that the rings from Veshnaveh most probably were dedicated to ward off misery and to bring luck.

The motif most frequently found in Chale Ghar I was that of the bird. It was found on finger rings and on other types of jewellery. One particularly beautiful mosaic bead (pl. 10, no. 6885) with a colourful bird illustration and a silver sheet cut in the shape of a bird or rooster (pl. 43, no. 4409a) surely had a meaning similar to the finger rings decorated with bird motifs.

Birds have long been endowed with a special significance, in ancient times as well as in contemporary Iran.[82] They are a positive symbol, may possess apotropaic attributes and may also be associated with fertility in humans and crops (Janata, 1984, pp.32-33; 41; Spiess, 1969, p.10). On ancient textiles birds are depicted with a nimbus, which in Zoroastrian symbolism denotes a superior creature (Musée Cernuschi, 2006, p.176, no.126). Additionally, birds have been known to represent the male sex – and fish the female (Janata, 1984, p.42). They are often depicted together or as a hybrid creature (Roes, 1945; Janata, 1984, p.42 fig.27).

Some of the rings from Veshnaveh may depict cranes, whose habitat is in the plains, for instance the tundra or steppe. It is remarkable that the animal motifs dedicated there include animals not usually found in the mountainous region of Veshnaveh. They may be copies of widespread Sasanian patterns, as seen on metalwork and textiles. Other bird illustrations are incised

[82] In a children's grave in Susa of the Uruk IV period, 3300-3100, a collier with a special pendant was found. It shows two birds, looking at each other. They are sitting on silver tubes and rock crystal beads (Stöllner, Slotta and Vatandoust, 2004, vol. 2, p.656 no.245). Press-models of birds made of non-ferrous metal are found in Takht-e Suleiman/Iran of the Islamic period (Stöllner, Slotta and Vatandoust, 2004, vol. 2, p.765 nos.463a and b).

very roughly and cannot be identified, but it seems that different kinds of birds are depicted.

Since the Islamic period, it is known that different species of bird are accorded different meanings. For example, pigeons are thought to be 'the birds of the prophet'. Other sacred animals are crows, storks, hoopoes, nightingales and the mythical bird *si murgh* (Donaldson, 1938, pp.163-167).

Bird amulets appear in many periods and regions (Stöllner, Slotta and Vatandoust, 2004, p.813 fig.550), for example a golden bird pendant from the Oxus treasure which was found together with other amulets (Musche, 1992, p.282 no.2 pl. CXII, 2).

Stag and Griffin

Only one finger ring was found to depict a griffin (pl. 32, no. 4523). The especially powerful symbolism of the griffin would appear to derive from its being a mythical creature. It is a symbol of divine power and is endowed with protective properties.

Another animal depicted on a bronze finger ring is the stag (pl. 32, no. 1227). This animal is known to have figured in Sumerian and Babylonian cults and was known as the attribute of and sacrifice to several Roman deities (Domagalski, 1991; Heimpel, 1972-1975). In the early dynastic royal cemetery of Ur, a stag amulet was discovered (Musche, 1992, p.74 fig.1). In the Sasanian period, the stag is known from seals, but its significance remains unclear.

Fish

One silver sheet, the sides folded in towards each end, forms the shape of a fish (pl. 44, no. 4526). The fish symbol has already been discussed above as the counterpart to the bird symbol. According to A. Janata (1984, p.42), it was an amulet representing the female sex. Fish play a role in Zoroastrian ritual (Karanija) and metal fish amulets or specimens made of clay are available in Near Eastern Bazaars until this day (Kriss and Kriss-Heinrich, 1962, p.30; Stöllner, Slotta and Vatandoust, 2004, p.815 no.555).

In antiquity, the fish motif was popular for profane uses as well as in the religious context of burials. It is an old and widespread Mesopotamian 'symbol of the fertility brought about by the heaven-sent water' and it is an offering to the gods on figurative depictions (Engemann, 1969, p.467; Van Buren, 1945, p.133; 1948; p.105; Unger, 1957-1971b, p.67). In Mesopotamian art, fish are often depicted outside of their natural habitat, which indicates that the fish, represented in such a way, had a mystical meaning and was regarded as symbol of life (Van Buren, 1948, p.102).[83]

In Islamic popular belief, fish are worn in different forms and shapes (Kriss and Kriss-Heinrich, 1962, p.30). As mentioned above, in contemporary Egyptian bazaars and in Afghanistan, small metal fish are sold as jewellery or amulets, as well as in Turkey as glass pendants (Kriss and Kriss-Heinrich, 1962, p.30; Bauer and Janata, 1974, p.40 fig.30b-c; Sode, 2007, p.4). Fish are worn in Egyptian-Islamic belief against a demon of the water and the sea, and play a part in the so-called Zār cult (Kriss/Kriss-Heinrich 1962, 30, 152-153).

In contemporary Zoroastrian observance, 'cooked fish, motifs or replicas of fish are widely used for several auspicious occasions, especially those connected with marriage' (Karanjia). All in all, the silver fish from Veshnaveh most probably served as amulet endowed with beneficial powers.

5.3.6.4 Plant Amulets

Pomegranates

Several small golden replicas of pomegranates were unearthed in Chale Ghar 1 (pl. 24, nos. 1250, 1768a, 4666a; nos. 1583, 6372). The fruit thrives in the Near East and in Egypt, and has been cultivated there since at least 1600 BC (Reinhardt, 1911, p.93; Hünemörder, 1998, p.1203). Several regions have been suggested as the origin of pomegranates, among them Iran (Börker-Klähn 1957–1971, 617, § 3). In popular medicine, the plant has been used to ease birth or to stanch blood (Börker-Klähn, 1957-1971, p. 617 § 2. Botanisches; Engemann, 1983, p. 696). Pliny describes the fruit as curing diseases of the mouth, nose, ear and genitals as

[83] Early examples that prove the amuletic meaning of fish include a small metal fish amulet from the Early Dynastic royal cemetery in Ur (Musche 1992, 74, fig. 1). A more recent example is a glass bottle in shape of a fish from a tomb in Oman (Haerinck 2001, 52, AV 76, pl. 92, 19). This glass object must have been highly prized due to the fragility of the vessel and the fact that glassblowing had only been invented at the end of the first century BC. Assuming grave gifts always to have had a particular meaning, this glass bottle in shape of a fish must have been more than just a nice, expensive bottle. To include a fish shaped vessel in the burial may have been done with a special purpose in mind, that we unfortunately don´t know yet. The fish amulet from Veshnaveh has a small golden ring eyelet. This recalls Mesopotamian reliefs that show fish hung from strings for transport (Engemann 1969, 971). Fish amulets strung together were found in Uruk in the E-anna precinct (Van Buren 1948, 106; Heinrich 1936, 26, pl. 13, 1). Other occurrences of fish symbols include an Achaemenid stamp seal from Nippur with a fish symbol (Van Buren 1948, 121. no. 24; Legrain 1926, 330, pl. 35, 51 no. 802). Seals were used as personal signatures and were often decorated with mythological or religious illustrations (Hrouda 1991, 360, 377, 458). Further examples of fish in a religious or profane environment are the fish engraved in stone at the Sanctuary of Baite 3/Ustyurt of the 1st to 2nd centuries BC (Samashev et al. 2007, 192, 202, 203, 205) or in Sasanian silver bowls (Meyer 2009). Due to chronological and geographical differences, all the above-mentioned examples may not provide conclusive evidence of the meaning of the fish pendant from Veshnaveh, but they can give a direction.

well as ulcers. Additionally, it has been thought useful for the treatment of poor eyesight (Pliny, 1993, XXIII, 107).

The pomegranate is said to possess powers affecting life and fertility, but there is no textual or physical reference that actually speaks of such powers of the fruit, which may be a mere ornament in relief and jewellery art (Börker-Klähn, 1957-1971, p.626 §7). Sometimes the pomegranate has been mistaken for another fruit, like the quince or the poppy, in literature or in the visual arts (Engemann, 1983, pp.693-696).

Nonetheless, pomegranates played a role as cultic plants in several cultures, as in Syrian/Phoenician worship or in the Egyptian cult of the dead (Reinhardt, 1911, p.94; Granatapfelbaum, 1969). In modern-day Zoroastrian ritual, the leaves and grains of the fruit are used (Kotwald and Boyd, 1984; Panthaky, n.d.).

Pomegranates are known as grave gifts or votive offerings (Reinhardt, 1911, p.94; Börker-Klähn, 1957-1971, p.626 §7). For instance, the golden pomegranate pendants from Marlik and Susa were found in graves. The fruit has been attributed to goddesses like Astarte in the Near East and to Persephone, Hera, Athena and Aphrodite in the Mediterranean region (Reinhardt, 1911, pp.94-95; Engemann, 1983, p.692; Hünemörder, 1998, p.1203).

In conclusion, although it has not been possible to specify the exact meaning of the pomegranate symbol, the fruit was used in cultic contexts and seems to have had a medicinal purpose; at any rate, they were believed to have a beneficial effect on health. The golden pendants found in mine 1 at Veshnaveh may simply have served as jewellery and valuable offerings, but the possibility should be considered that they were surrogates for the fruit endowed with a deeper purpose, probably for health and perhaps especially in gynaecology.

Other plants

Plants had a special importance in ancient medicine. In his naturalis historia Pliny the Elder dedicated six books to plants, describing their healing properties at length. (Pliny XX-XXV). In western and eastern antiquity, plants and plant illustrations most probably played an important role as amulets. Plant decorations have been found on finger rings as well as on chin bands or *taeniæ*.[84]

Plant illustrations on Roman rings similar to those from Veshnaveh (pl. 33, nos. 1638a, 4311d, 4442a; no. 4453) have been described as palm fronds or laurel branches. Both were signs of the gods and of victory. The laurel also had a prophylactic amulet meaning in the Roman world (Chadour, 1994, p.55 nos.178-179).

In the recent Near East, mainly in Turkey and Egypt, spikes are bound together and hung up against the *evil eye* or to procure a good harvest (Kriss and Kriss-Heinrich, 1962, p.26). At Veshnaveh, four bronze finger rings with plant motifs were discovered (pl. 33, nos. 1638a, 4311d, 4442a; no. 4453) and two metal sheets – one gold, one silver– with illustrations of plants (pl. 43, nos. 4568d, 4581f). It seems plausible that they served as amulets endowed with the aforementioned significance.

[84] Chin bands were used to keep in place the lower jaws of corpses (Sariandi, 1985, p.24).

5.3.6.5 Other Amulets

Bells

Two conical bronze bells were discovered in Chale Ghar 1 (no. 1734a; pl. 25, no. 1739). Conical or truncated bells are said to have *reappeared* in Iran, Armenia, Mesopotamia and Egypt from the 9th/8th centuries BC onwards (Schatkin, 1978, p.148), though their origin remains unclear (Calmeyer, 1957-1971, p.430; Trumpf-Lyritzaki, 1981, p.164).

Metal bells have been interpreted as musical instruments (Schatkin, 1978, p.149), but they may also have served a further purpose as tools for banishing evil or demons (Trumpf-Lyritzaki 1981, 172–173). According to P. Calmeyer (Callmeyer, 1957-1971, p.431), bells seem to have a positive meaning throughout the Near East. He suggests that bells were used in medicinal invocations in order to bring about relief from a condition or the healing of it. They could also have been used in death cults, and he refers to the later meaning of bells in Christianity. The idiophones were presumably used in ceremonies, as finds from Assur suggest (Meissner, 1926, p.343). In connection with the so-called Zār cult in modern Egypt, small children are given amulets of small bells (Kriss and Kriss-Heinrich, 1962, p.154). In this case, as W. L. Hildburgh suggests, the healing power would derive from the metal silver, but may also be attributed to the sound of the bells (Hildburgh, 1916, fig.16). ‘As elsewhere the sound of bronze had apotropaic value for the Egyptian’ (Hopfner, 1921, p.II no.43; Schatkin, 1978, p.150).

Bells as votive offerings were found in the Heraion of Samos (Möbius, 1967) and in other Greek sanctuaries (Trumpf-Lyritzaki, 1981, p.175), as well as in a 4th-century AD rock-cut tomb at Tarshiha, in Palestine (Iliffe 1933, 9–10). Bells also appeared as grave gifts in a children’s grave in Tell Sheikh Hamad in Syria (Novák, Oettel und Witzel, 2000, p.220), and bells formed part of horse harnesses, as finds from Alishar in Turkey (Pjotrowski, 1969, p.15 fig.76), Tappeh Sialk in Iran (Ghirshman, 1939, p.56, p.834 pl. 27, 7), Ziwiyeh in Iran (Ghirshman, 1964, p.100) and Nimrud in Iraq show (Layard, 1853, pp.177; 191; Möbius, 1967, pl. 2, 5; 4, no.1.3; Trumpf-Lyritzaki, 1981, pp.166-167).

While most votive bells may have been not functional and aside from their use in animal harnesses or their use just as decoration, bells were used as cultic instruments in the Near East. Examples from Khurvin in Iran and Jewish rituals corroborate this suggestion (Van den Berghe, 1964, pp.21-23; Dölger, 1934, p. 240, pl.9-10). It is further known that in Greek and Roman ecstatic cults bells were used to make a noise that symbolised chaos. It was understood as the opposite of silence

and as representing distance from the gods. Bells play an important role in Dionysian mysteries, and later came to accompany that god's Roman counterpart, Bacchus (Trumpf-Lyriatzki, 1981, p.175). Today, "Zoroastrian believers are summoned by the ringing of a bell in the Atash Behram/Agiary, the Fire Temple, to perform Yasna (Gah worship) five times a day." (Five Daily Salawat, 2010).[85]

Cross

The cross is a very old and widespread symbol, as attested by a milestone with a cross/sola symbol from the sanctuary of Baite 3 on the Ustyurt plateau between the Caspian and Aral Seas (Samashev, et al., 2007, p.209). It was a common ornament in the Sasanian as well as in the Byzantine era and remained so in Islamic times (Zahlhaas, 1985, p.54; Allen 1982, p.68 no.56; Donaldson 1938, p.206). This dating corresponds with the classification of two bronze finger rings with cross decorations from Veshnaveh (pl. 34, nos. 1091, 1820). One of the rings could be dated to the late Sasanian/Early Islamic period (no. 1091). The meaning of the cross symbol in pre-Islamic religions, however, remains unclear for lack of reliable information.

Spiral

One spiral-decorated finger ring was found among the other amulets at Veshnaveh (pl. 36, no. 4339a). The spiral 'denotes love and permanence' in the Islamic faith (Donaldson, 1938, p.206). It is known as an ornament on jewellery from different regions and from the earliest times on, for example from Tappeh Hissar and from Lurestan in Iran from the end of the 8th and beginning of the 7th century BC, and later from Tappeh Nush-i Jan in the Median Empire (Musche, 1992, p.190, fig.8; p.258 no.2; pl. C102; Van den Berghe, 1968, figs.252-254; Marschall, 1907, nos.874; 1219). According to I. Fuhr, a religious or magical concept is always connected to these spirals, which may relate to fertility, protection against the *evil eye*, physical well-being or an idea of the afterlife (Fuhr-Jaeppelt, 1967, pp.61-62). Metal amulets with double spirals, whose function is to prevent diarrhoea in infants, are found in the modern-day Islamic world. In Egypt, pregnant women and children up to the age of seven would wear such amulets (Kriss and Kriss-Heinrich, 1962, p.45).

Perforated Bronze Plaque

One bronze sheet with perforations was found in Chale Ghar 1 (pl. 45, no. 1883a). It may recall perforated plaques or pendants of recent Islamic times offering protection from the *evil eye* (Kriss and Kriss-Heinrich, 1962, p.8). Although the bronze piece from Veshnaveh is not the analogue of such amulets, it may represent an alternative – a suggestion which, however, must remain hypothetical.

Figural Plaque

A silver plaque with a figural illustration is one of the most outstanding finds (pl. 43, no. 4454). The figure from Veshnaveh standing next to a plant may be depicted in performance of a ritual, as comparison with reliefs from Masdjid-e Suleiman and Achaemenid gold plaques from the so-called Oxus treasury would suggest (Curtis and Searight, 2003, p.221, n.5; Rose, 2011). On the Oxus plaques and on Sasanian seals, figures are shown holding flowers and plants. It has been suggested that these plants represent *barsom* or *haoma*, sacred twigs used in Zoroastrian rites (Kanga, 1989, p.1; Rose, 2011; Skjærvø, 2013, p.559). The shallow relief from the North-west stairs of Masdjid-e Suleiman shows a cultic scene with a nobleman or king pouring a fluid into a fire, which is displayed to his left, like the plant from Veshnaveh.

The arrangement of the sacred objects seems to have been of importance: On most of the Oxus plaques and on the reliefs from Masdjid-e Suleiman, the holy object or plant is either held or placed in the left hand or to the left of the acting person in a manner similar to the Veshnaveh illustration (Curtis and Searight, 2003, p.233). This observation corresponds with modern Zoroastrian ceremonies, where *barsom* is held in the left hand (Kanga, 1989, pp.826-827; Curtis and Searight, 2003, p.234).

To draw an inference from a relief from 5th-century BC Turkey, it is likely that the figure here represents a priest, but it could also depict an individual 'who wanted to be portrayed as pious' (Curtis and Searight, 2003, pp.203-205; Hinnells, 1985, pp.68-69; Moorey, 1988a, pl.45; Boyce, 1979, p.67).

At no point in Achaemenid, Seleucid, Arsacid or Sasanian times was Zoroastrianism accorded the rank of state religion, but it was encouraged under Sasanian rule. Since the silver plaque from Veshnaveh could be dated to the Arsacid-Sasanian period, the figure may represent a Zoroastrian.

J. Rose (2011) has already suggested that the figure on the Veshnaveh plaque is performing a ritual connected to plants and water. This is all the more remarkable in the light of the fact that all the offerings of Chale Ghar 1 were deposited into water. Although the provenance of the Oxus plates is uncertain, it is very likely that they came from a temple and 'may have had a votive significance' or been dedications, too (Curtis and Searight, 2003, p.239; Dalton, 1964, p.19).

Lunulae

Two blue lunula-shaped pendants from Chale Ghar 1 are hung with an eyelet upside down. Pendant no.

[85] Modern Zoroastrian rituals may vary, due to the fact that there is no single institution setting rules which could bind all the faith's adherents, as e.g. the Vatican does for the Roman Catholic Church. There are few sources giving accounts of differences in religious practice. The information above comes from a website dealing with Zoroastrianism. Though one may question the reliability of such information, it is remarkable to find any written information on the role of bells in modern Zoroastrianism at all.

1965g (pl. 24) has an eye decoration. No. 6084 (pl. 24) originally had a decoration of curved lines. The glass of this decor is so much corroded that its exact colour is no longer discernible. The magical power of the lunula shape might have been strengthened by their blue colour and their decoration of eyes and trails. Both colour and shape were believed have apotropaic powers.

Pars Pro Toto

Numerous ceramic shards seem to have been deposited *pars pro toto*, but a number of jewellery objects also attracts attention due to their fragmented state: For example, single chain links were deposited. They differ greatly from each other and do not appear to belong to a single necklace; they obviously were deposited individually, probably to represent a whole necklace. It was not possible to reconstruct a plausible necklace from the beads found, so they too may have substituted for a complete jewellery artefact. Some coins (nos. 6297b, 6318a1) seem to have been cut into pieces and were then offered. One of the best examples for the *pars pro toto* mode of making offerings is the decorated bone disc that was intentionally cut and broken, with only one half being dedicated into the water (pl. 50, no. 6079a4).

5.3.7 Conclusion

"It is possible that nearly all antique beads were used as amulets and talismans, and Sr. Pellucci of Perugia has strengthened this theory by showing that most modern amulets now in use around the Mediterranean, were derived from antique examples. These amulets were supposed to protect the wearer from evil influences, especially demons and phantasms of the dead." (Eisen, 1930, pp.21-22). This statement by G. Eisen corresponds with the observations made with regard to the amulets from Veshnaveh. It seems that the basic meaning of amulets was similar throughout numerous Near Eastern cultures and over the course of many centuries. Trade and the rediscovery of classical authors in the Middle Ages may have promoted the exchanges of popular belief.

First of all, amulets can be classified according to their material or colour. Certain stones or colours were said to possess certain healing or apotropaic powers. At Veshnaveh, mostly cornelian, garnet and amber were deposited, with blue, green and yellow being the preferred colours represented by glass beads, with red of cornelian.

Amulets also have specific shapes or special decorations, like eye beads or eye-decorated finger rings, and a metal sheet in shape of an eye from Veshnaveh. Eyes were endowed with an apotropaic meaning. By contrast, replicas of body parts, like the aforementioned eye plaque, silver hand and glass phallus, may have been deposited to solicit cures or in gratitude for them.

Animals and plants have important roles to play in the nature of amulets. First of all, birds symbolise good luck and possibly fertility. At Veshnaveh, they were found decorating finger rings, one mosaic glass bead, and as a silver sheet cut to the shape of a bird. Other animals of magical power that appear at Veshnaveh are the griffin, the stag and the fish.

Golden pomegranate pendants were unearthed in Chale Ghar 1 alongside other plant illustrations on finger rings and metal sheets; they may have been used in rituals or been connected to fertility.

Other amulets found at Veshnaveh are bells and cross- or spiral-decorated finger rings or lunula shaped glass pendants. A silver plaque with a figural decoration depicting a cultic activity reminiscent of Zoroastrian ritual is of special note.

Many of the amulets unearthed at Veshnaveh seem to correspond with ancient vernacular beliefs, elements of which survived into the Islamic period. Metal artefacts with decorations or beads made of stone, glass and other materials were endowed with an apotropaic meaning or with the wish for fertility or the healing of disease. Some amulets even suggest that women and children played a special role in the deposition of amulets, as will be discussed in the following chapter.

5.4 Chale Ghar 1 and 2 – a Sanctuary

5.4.1 Introduction

When Chale Ghar 1 was excavated, the amount of depositions appeared huge. About 5000 objects were identified as offerings. However, the number of finds, when set in relation to the total time of the mine's use, suggests that only a handful of items were dedicated each year from the Arsacid to the early Islamic period. This includes ceramics, animal bones, wood, charcoal and other finds. The items were deposited into water that clearly flooded the mines almost permanently. Do these circumstances proof that Chale Ghar was used as a sanctuary? It is always difficult to define a place as a holy or a religious space. The excavator of the Chale Ghar mines, Th. Stöllner, describes the mines as Sasanian votive place and as sanctuary (Stöllner and Mireskanderi, 2003; Stöllner, 2011, pp.13; 40). Still, the mines could have served different purposes, e.g. as a "favissa" as proposed by Bruno Overlaet (Overlaet, 2011), and was used as sanctuary later.[86]

Nonetheless the assemblage, the location and the water indicate that Chale Ghar was consistently used as a sanctuary rather than a storage space. Several considerations exemplified in the following may help to define Chale Ghar as a sanctuary:

First of all a sanctuary can be described as a place or an area marked by architectural or natural surroundings (Egelhaaf-Gaiser, 1998, p.254). Additionally a place

[86] A favissa is a place that is used to store and protect the votive offerings of an abandoned or vacated sanctuary.

might be identified as religious space because of repetitive action that is carried out there and because it is a remarkable place (Colpe, 1970, pp.29-31 n.30). These observations do apply to the features of Chale Ghar 1:

- The offerings are encircled by a man made mine,
- Repetitive depositions have taken place over hundreds of years,
- Chale Ghar 1 is special because of its appearance as a grotto that was permanently containing water.

In each case the forms of activity, i.e. rituals, and their connection to other details like space or performer of the ritual are of great interest concerning the definition of sanctity and religion of a place (cf. Messner, 2006, p.9).

Colpe writes: “Zwar trifft es zu, daß da, wo beständig geopfert wird, ein Heiligtum ist. Aber wenn hier von einem Opfer gesprochen wird, dann entweder wegen der Beständigkeit seiner Darbringung, welche ohne Ritualisierung nicht zu denken ist, oder weil es an einem Ort geschieht, der auf Grund eines anderen Kriterums als desjenigen der Darbringung als Heiligtum bestimmt werden muß.” (Colpe, 1970, p.19). Such a ritualisation has definitively occured in Chale Ghar. Some of the depositions were carefully covered with flat stones. This and the selection of objects leads to the assumption, that the mines were used for a special purpose. Many of the jewellery artefacts could be classified as amulets; animal bones as well as charcoal remains indicate that ritual activity took place in Chale Ghar 1 and 2. In the chapter ‘Depositional Practices’ the results of the GIS analysis of the features and the finds in Chale Ghar 1 are described and show that a special kind of ritualisation has definitely happened there.

The comparison of Chale Ghar with other sanctuaries in Iran shows, that they have similar attributes, as there are water, depositions left behind in a certain way and the assortment of deposited objects itself. Archaeological examples and the textual evidence, described in the following, strengthen the argument of Chale Ghar 1 being a sanctuary.[87]

5.4.2 Archaeological and Textual Evidence

5.4.2.1 The Assemblage from Veshnaveh Compared to Finds from Masdjid-e Suleiman, Bard-e Nechandeh and other Grave Offerings

It seems that Chale Ghar 1 and 2 were chosen as sanctuaries for at least two reasons: Because they had the appearance of a cave and because they contained water. Although the site is a unique discovery, it can be compared to other sanctuaries in Iran which are connected to water, caves, or hold comparable offerings:

The excavator, R. Ghirshman (1976, p.50), interprets the remains of Masdjid-e Suleiman and Barde Nechandeh as sanctuaries, even accounting the architectural remains of Bard-e Nechandeh as former temples of Anahita and Mithra (Haerinck, 1983, pp.4; 14; Schippmann, 1988). Both sanctuaries were still in use until the Sasanian period (Ghishman, 1976, pp.50, 55). Although it does not seem that these temples were connected to a water cult, the assemblage of their offerings may serve as evidence that Chale Ghar was a sanctuary as well. Simple finger rings and earrings, beads and metal sheets were found at both locations. Even a silver sheet with figural decoration that is comparable to the one from Veshnaveh, was discovered in Masdjid-e Suleiman (Ghirshman, 1976, pl. 79, GMIS 618).

Jewellery like that from Veshnaveh has also been found in other sacred contexts. Multiple reference finds for the Veshnaveh objects come from graves in Iran or the Black sea and Kuban region. The burials contained beads made of gagat, rock crystal, cornelian, glass, cowries, amber or chalcedony as well as bronze bells, metal sheets and other objects (Egami, Fukai and Masuda, 1965; 1966; Simonenko, Marčenko and Limberis, 2008, pl. 24,8; 126,3 and 7; 130). It is worth noting that no bracelets were discovered at Veshnaveh, while such jewellery has frequently been found in other graves.

The finds from Veshnaveh thus seem to represent an established assemblage of sacred offerings; however, their prior use in daily life cannot be excluded.

5.4.2.2 Chale Ghar 1 and 2 Compared to other Cave and Water Sanctuaries

Caves have always been used as sanctuaries, and this is also valid for Iran during the Zoroastrian period. One such cave was discovered at Niasar, located in a distance of 28 km from Kashan and therefore not far from Veshnaveh (Razmjou and Tafreshi, 1998-2011; Kreyenbroek, 2011). Next to a waterfall a system of caves is located, which was probably man-made in the Arsacid period. Ph. Kreyenbroek (2011) mentions this place in his article about caves and water in pre-Islamic religion, and for further comparisons of cave sanctuaries he names sites such as

[87] It is possible that other ancient copper mines in the surrounding area, which have not yet been examined, were also secondary used. Depositional activity would thus have been distributed across several locations. Another possibility is that objects were deposited quite rarely, on special occasions, and that worship and devotion were centred on prayer.

Lalish in northern Iraq and a cave in Charstin/Charsitun, which is located close to the northern Iraqi city of Duhok. Both sites were located close to waterfalls; access to the cave in Lalish was possible only through a narrow entrance similar to Chale Ghar 1 (Kreyenbroek, 2011). Another example of a cave sanctuary in Iran is the Caraftoo caves (pl. 52), which can be visited as a tourist attraction close to the town Divandarreh in the Iranian province of Kurdistan (Stein, 1940, p.339; v. Gall, 1978; Rezvani and Roustaei, 2007). The enormous and complex caves were formed naturally, but some chambers are clearly man-made and contain at least one Greek inscription. In the southern area of the cave a natural spring was found (v. Gall, 1978, p.92). The man-made chambers appear not to have been used as a living space; the Caraftoo caves seem to have been used for a religious purpose only. The inscription and its meaning are still discussed in this context (v. Gall, 1978, pp.91; 94-104).

One very famous cave is that of Shapur I, a short distance from the southern Iranian city of Bishapur. The cave is known especially for its larger-than-life statue of the Sasanian king. At the cave, a subterranean spring and its water was probably used for ritual purposes (Rose, 2011).

Though it is not a cave, the Sasanian sanctuary of Takht-e Suleiman in north-western Iran is another example of a religious site connected to a source of water (pl. 53). It was built around a geyser, which forms a lake, generating a mystical atmosphere. On account of subsequent Islamic building work, barely any remains of the Sasanian sanctuary are preserved (Huff, 2004), but gold and silver sheets with figural decorations were found, which can be compared to the figural sheet from Veshnaveh (Huff, 2011).

It seems that caves and water played an important role in the old Iranian religions. The tradition of natural sanctuaries was adopted in the Islamic period and continues in recent Zoroastrian religious practice. For instance, the Zoroastrian sanctuary Pir-e Sabz near the modern Iranian city of Yazd is a man-made grotto, where water drips into the prayer room (Rose, 2011; personal observation; pl. 54), and in the Islamic cave sanctuary of Bibi Shahrbanu located close to Ray, the worshippers, until this day, deposit offerings in the entrance area (Stöllner, 2011). Some Zoroastrian shrines were built at so-called qanates, subterranean water systems, or combined with water winches, used foe agricultural purposes (Langer, 2006, pp.230; 242 fig.13; 245 fig.17). Kriss and Kriss-Heinrich (1960, pp.21-22) write that sometimes the only visible attribute of a sanctuary is the presence of running water or a tree.

5.4.2.3 Water and Religion in Textual Evidence

The Roman scientist Pliny the Elder wrote an entire book about the medical benefits of water in the first century AD (Pliny, 1994a). Religious rituals that were performed in water or involved water were already discussed by Strabo, a Greek historian and geographer writing from the 1st century BC to 1st century AD. In his "Geography", Strabo describes how the so-called Persian magi performed libations and animal sacrifices close to naturally occurring water places (Kreyenbroek, 2011; Strabo, Geography 15.3.14; de Jong, 1997, p.126). However, they had to take care not to contaminate these sources of water with the blood of the sacrificed animals.

Aside from these examples, the discovery of Veshnaveh can be connected to a passage in the *Nerangestan*, which 'is also a multi-layered document, reflecting views of generations of Zoroastrian priestly teachers' (Kreyenbroek, 2004, p.319). This passage, written in 500–400 BC, probably summarises older, oral traditions (Kreyenbroek, 2004, pp. 317-319) and discusses the 'nourishment' of stagnant water with food (Kreyenbroek, 2011). Vessels found in Chale Ghar 1 suggest that libation rituals were performed there, and charcoal remains indicate that fire or burning was involved. In addition, animal bones and remains of fruits and nuts were found in the pool in Chale Ghar 1. The practice of the nourishing of the water seems to be at odds with the Sasanian Zoroastrian purity requirement forbidding the contamination of water. The find of Veshnaveh, however, proves that such offerings were indeed made to the water in the Zoroastrian religion (Kreyenbroek, 2011). It seems that in Chale Ghar 1 and 2, Zoroastrian rituals were performed which belonged to a popular rather than a priestly tradition. Such rituals might originate from the early phase of the Zoroastrian religion (see also Stöllner and Mireskanderi, 2003), as suggested by the dating of the passage in the *Nerangestan*. Yet the texts by the ancient historians and Zoroastrian priests do not mention the deposition of jewellery into water.

The custom of offering plants or food to the water, or to perform libation rituals, survives in contemporary Zoroastrian (Rose, 2011) as well as in Islamic practice, like the coins put or thrown into water at Nowruz, the Iranian new year. One ritual, the chak-o-dūleh ('pot of fate'), performed by Zoroastrian women in Iran, reflects the situation at Veshnaveh best and is explained by J. Rose (Rose, 2011):

"Dedicatory toreutic offerings to the waters still take place amongst Zoroastrian women in Iran during the midsummer festival of Tirgan. At this time, the chak-o-dūleh ('pot of fate') or moradūleh ('bead pot') ritual is performed by women, to dispel drought and disease and to bring good fortune and well-being. The women of the household place a small personal object of non-porous material, such as a bead, ring or bracelet into a ceramic jar (kūzeh), or large pot (dūleh), full of water. The water is covered with a cloth and placed under a myrtle or pomegranate tree for the night, where it 'cannot see the sky', creating a temporary cave-like or womb-like environment. The next afternoon, the women sit together, and a young unmarried girl gradually retrieves each object from the water, as the older women recite verses of poetry relating to the future of its owner." At Veshnaveh,

however, it does not seem that the objects were fished out of the water of the grotto again. The objects that were found in Chale Ghar 1 and 2 remained buried and unknown until their discovery by archaeologists. Still, there are clear parallels to the chak-o-dūleh ritual as there is water, a cave like environment as well as jewellery including especially beads and rings.

Although Zoroastrian rituals have undergone transformations over the centuries, and especially since the beginning of the 20th century (Mazdapour, 2004), the 'bead pot' ritual demonstrates the consistency of the fundamental ideas. This is also described by Firoza Punthakey Mistree, who belongs to a traditional Zoroastrian family in Pakistan and who remembers several rituals connected to water:[88]

"With regard to what I was taught as a child about water and the taking care of water.

I was brought up in a very traditional family, the Punthakey family of Karachi Sindh in present day Pakistan. As a family we took pride in the fact that we could trace our lineage back to over 30 generations of Navsari Priests from the Kaka Dhanpal clan of priests. Although my father and his father were not initiated into the priesthood, our way of life at home still carried vestiges of our priestly background. Religion played a very important part and apart from daily prayers visiting the Fire Temple and the practice of rituals, those rituals associated with death, were carried out meticulously. Apart from these we practiced a number of minor customs handed down over the generations.

Feast: Ava Ruz Ava Mah

We lived by the sea side port of Karachi, Pakistan and it was not unusual for us as a family to fold our hands and recite a prayer whenever we could visually see the sea as we passed by it. On Ava Ruz Ava Mah we took our traditional offerings of Dar ni pori (a pancake filled with sweet lentils) some grains of rice, a betel nut leaf with a stick of tumeric, a betel nut and a dry date. Crystal rock sugar and some flowers and a coconut as offerings to the sea. After performing the padyab-i kusti, the coconut was cracked and the water sprinkled in the sea and the coconut was flung into the sea. A small bottle filled with milk was emptied into the sea as nourishment and as a blessing for the sea. The rest of the things were also thrown into the sea. A piece of dar ni pori was broken and flung into the sea while the rest was eaten by the family members. After this the Srosh Baj and the Ava Nyaish was recited. Older family members prayed the Ava Yasht every day during the month of Ava. A large empty bottle with a long string attached to its neck was brought from home. Before leaving the sea shore we would fill this bottle with sea water from the incoming tide and take the bottle home and sprinkle the sea water on the threshold of each door in the house starting from the front entrance. All this was usually done before sunset as it was seen to be inappropriate to disturb the waters at night. A little cup of the same sea water was put on our prayer table to be blessed for the evening prayers recited by my father. Such "prayed over" water was also seen as holy and was not emptied into the basin the next day but was sprinkled in the flower bed or in the garden.

Journey

When any one of us returned back from a trip abroad we were asked to wait at the threshold of the front door and were not allowed to enter the home until the welcome Achoo Michoo was done. My mother would come with a round circular tray kept separate for such occasions along with a small bowl filled with rice grains a silver cup with water and an egg. First the egg would be rotated 7 times above my head and then thrown to the left of my feet. Then some rice would be emptied into the tray while keeping some rice in the bowl separately on a side table. The rice in the tray would be covered with water and the tray with the grains of rice swimming in water would then be rotated 7 times round my head and then cast to the left and right of my feet. This signaled the end of the ceremony and as I entered the house stepping in with my right foot always, my mother would shower me with the rest of the grains of rice to welcome me in. This was done every time any one of us returned home and we were asked to perform this ritual when my parents returned from a journey or even when a guest came to stay in our house from abroad.

In Iran I experienced something different. When we were leaving the village of Rehmatabad in Yazd for our long journey to Kermanshah our bus, driver Behram's mother took a hose pipe and sprayed the bus and particularly the wheels with water for a safe journey.

Crossing Water

When we were children every summer holidays we went to our lands in Sindh some 200 miles from Karachi to a village, named after my Great grandfather Framroze Edulji Punthakey, called Framabad in the town of Daur Nawabshah

[88] This description was forwarded to me by Ph. Kryenbroek in an E-mail from the 16th of February, 2012. I would like to thank him for this worthwhile information.

District. To reach it we went by train and it was always exciting when we approached the town of Sukkhur where the British had built a barrage and bridge over the great River Indus. Our train had to go over this old fashion bridge to cross the Indus. And we could see the Indus River flanking both sides of the train. In preparation for the crossing my mother would bring out a brown paper bag and from it fill our fists with grains of rice sugar crystals and flowers and as we crossed the Indus we had to throw everything in the waters while reciting an Ashem Vohu and then we were given one rupee coins to throw as gifts in to the Indus . We were roundly admonished if any of the coins hit the bridge and made a tingling noise as it meant that the mighty Indus may not have received its gift. My father would then say his prayers and we would all settle in for the rest of the journey. When we passed over the James Canal or the Framabad Canal (the British had built a network of canals to irrigate the desert of Sindh) we were only given coins to throw as a thanks giving to the waters. Even today it is not uncommon for us to cross the Bassein creek on the outskirts of Bombay and stop and throw a few coins and flowers into the sea.

Clothes

Every time I wear a new piece of clothing I have been taught to wet one end of the cloth before wearing it. If it is a Saree then the end bit which is first tucked into the petticoat is wetted a few grains of rice are put in it along with a coin and this end is knotted and then tucked in so as to get the blessings of Ava yazad. The rice and coin symbolizing prosperity and fertility.

Wedding

In the wedding ceremony as soon as it is over a young unmarried girl from the girls side takes a silver or copper bowl of water from a fire temple well to the bridegroom and he dips his hand in it and leaves in the water a silver or gold coin and gives the girl bringing the bowl of water a a gift of money or a piece of jewellery.

Children

When we were young and had to be bathed by our mother, at the end of the bath she would take a metal Karasya or vessel fill it with water and and rotatate it 3 times anti- clockwise over our heads while reciting "badhu alla bhalla mara baccha par thi duur thai jai" ie. May all the bad and unwanted influences be removed and flung far away from my child. With those words the water in the vessel was thrown into the gutter and all the evil influences were meant to have been caste away.

Defilement and Disturbment of Water

When we went swimming we were warned never to spit or urinate in the waters and were always told to be respectful of the waters as it was seen as the home of Ava Yazad. We were never allowed to disturb the waters at night and I remember that we were admonished when we went swimming in the sea at night. We were also never allowed to draw water from a well at night. Even today we often stop by a fire temple well to throw a coin in."

5.4.3 Conclusion

The discovery of Veshnaveh is unique because it is the first and only ancient cave sanctuary in Iran to reflect popular or rural religious traditions in connection with water. The textual sources and the examples of ancient and recent sanctuaries and rituals that were compared to Veshnaveh indicate that this site was connected to the Zoroastrian religion and was either dedicated to one of the Zoroastrian deities, possibly Anahita (Stöllner and Mireskanderi, 2003) or – as is possible in Zoroastrian religion – served as a holy place because of the water and its appearance without having a certain assignment.

The dating of Chale Ghar 1 and 2 shows that this sanctuary was already in use before the establishment of Zoroastrianism in central Iran from the 6th century onwards (Kreyenbroek, 2004, p.317). Very old vernacular rites were clearly performed in the mines and were preserved and adapted over the course of several religious periods, from the pre-Zoroastrian to the early Islamic era.

5.5 The visitors of Chale Ghar 1 and 2

5.5.1 Introduction

C. Colpe (1970, p.39) writes: "Die Frage, ob und welche Gemeinschaften hinter Opferpraktiken stehen, kann nur entschieden werden, wenn man nicht nur die Ritualisierung einer Darbringung feststellen kann, sondern auch größere Zusammenhänge der materiellen Kultur, aus der die dargebrachten Gegenstände oder Tiere stammen." That means that different circumstances and data have to come together to find out which community stands behind the depositional practices in Chale Ghar. In previous chapters the possible economic interchange in the region based on the finds in Chale Ghar was discussed and several materials and objects indicate low trade activities at least. Therefore remains of human settlements, permanent or seasonal, should be existant near by the sanctuary and their inhabitants can be considered as potential users of the sanctuary.

At Veshnaveh remains of settlements were discovered only few kilometres from the sanctuaries of Chale Ghar 1 and 2 in the course of an archaeological survey. The surveys revealed that the region was settled from the Iron Age III until the early Islamic period. Most probably, the inhabitants of these settlements were the donators to the mines Chale Ghar 1 and 2, the question remains who among them visited the ancient mines. Considering the assemblage of finds in Chale Ghar 1, which consisted largely of jewellery and ceramic sherds, it was probably a specific group of individuals who were involved, or the ritual was dedicated to a specific group.

5.5.2 Objects and Rituals

Some types of amulet found in Chale Ghar 1 indicate that women or children were the intended beneficiaries of their protective powers. Phalluses, bell pendants or spirals were worn primarily by children or women. A small strap end (pl. 49, no. 1096) may have belonged to a child. In addition, comparisons to recent Zoroastrian rituals (chak-o-dūleh) or Islamic sanctuaries like that of Bibi Sharbanu, which has mainly been visited by women, suggest that water was generally connected to a female cult. At a sanctuary in the Egyptian city of Bubastis, women walked around a wet stele that was surrounded by thousands of small ceramic sherds (Kriss/Kriss-Heinrich 1962, 17). These sherds were probably attributable to water and jug offerings. Similarly, at a sanctuary in the Lebanon, women would offer jugs to the 'mother of sherds' and break them into pieces when the vow was fulfilled (Kriss/Kriss-Heinrich 1960, 237). The sherd offerings may be compared to the many sherds found in Chale Ghar 1 and 2, although these may also be accounted as being *pars pro toto*.

5.5.3 Ring Size and Gender

Aside from the indications given by amulet types or recent cultic practice, considerations of the size of the deposited objects may give additional information. In this context, the finger rings play an important role and in the following, ring sizes will be discussed in relation to assume the wearer's gender:

An interesting study on ring size was carried out on the Roman finger rings found at Augst and Kaiseraugst/ Switzerland (Furger, 1990, pp.49-51). Based upon modern experience, measurements of rings matched up to the gender of the ring's likely wearer. A typical diameter of a male finger ring would be 1.91 cm and that of a female specimen about 1.75 cm, while in another study, F. Henkel (1913, XIII) would expect male rings to exceed 1.8 cm and children's rings to be under 1.4 cm in diameter. Those rings falling between the measurements would thus be female rings, as well as rings worn on the little finger.

At Veshnaveh, 58 finger rings were measured and only seven rings are under 1.4 cm (table 5.5.3. a), nine are larger than 1.8 cm in size (table. 5.5.3 b). The sizes of 42 rings fall between 1.4 and 1.8 cm (table 5.5.3 c). Following the claims made regarding the Roman rings from Augst and those of F. Henkel, one would assume that at Veshnaveh only a few finger rings were deposited by males (sizes above 1.8 cm). The majority of finger rings from Veshnaveh may have belonged to females (sizes between 1.4 and 1.8 cm); however sizes of below 1.5 cm appear to be very small indeed and may rather indicate girls' or children's jewellery. Very small rings with a size below 1.4 cm are likely to have belonged to children or to have been deposited for their benefit and may not be worn at all as they are so small. Among the possible children's rings are specimen with a missing inlay (pl. 37, no. 4445), a signet ring with a stag or deer decoration (pl. 32, no. 1227), a ring with an inscription (pl. 32, no. 1829) and one iron ring (no. 1066). Ring no. 1775a with open ends may also be an earring (pl. 38).

Future studies from other archaeological sites in Iran, cemeteries in particular, may permit further attention to the relation between finger rings and gender. Furthermore grave reliefs in Palmyra show that rings were worn on each finger (Zahlhaas, 1985, pp.12-13). This is another reason why it is so difficult to tell women's rings apart from children's. Regardless of these considerations,+ the fact that a large proportion of the measured

Tab. 5.5.3 a: Rings with inner diameter below 1.4 cm.

Inner Diameter	Find Number
0.9 cm	4457b
0.97 cm	7181d1
1.05 cm	4445
1.2 cm	1227
1.3 cm	1066
1.3 cm	1775a
1.3 cm	1829

Tab. 5.5.3 b: Rings with inner diameter above 1.8 cm.

Inner Diameter	Find Number
1.8 cm	1824
1.8 cm	4485a
1.8 cm	6064a
1.9-1.95 cm	4564f
1.9 cm	1815
1.9 cm	1828
1.95 cm	4340
2.0 cm	1793
2.05 cm	4672a

Tab. 5.5.3 c: Rings with inner diameter between 1.4 cm and 1.8 cm.

Inner Diameter	Find Number
1.4-1.45 cm	4240a
1.4 cm	4498
1.4 cm	1274
1.4 cm	4182a
1.4 cm	4804
1.43 cm	4513
1.45 cm	4516a
1.45 cm	1638a
1.45 cm	4442a
1.45 cm	4007
1.46 cm	1097
1.48 cm	4531
1.5 cm	1517
1.5 cm	4515
1.5 cm	4339a
1.5 cm	6562
1.5 cm	4341a
1.5 cm	4491a
1.5 cm	4478
1.5 cm	1110
1.53 cm	4311d
1.54 cm	1807
1.6 cm	4519
1.6 cm	4453
1.6 cm	4334
1.6 cm	1478
1.64 cm	1091
1.65 cm	4240a
1.65 cm	1108
1.7 cm	4597
1.7 cm	4523
1.7 cm	1820
1.7 cm	1131
1.7 cm	1826
1.7 cm	4446
1.7 cm	4477
1.7 cm	1834l
1.72 cm	4338
1.73 cm	1846
1.74 cm	1814
1.75 cm	4511
1.76 cm	4521

rings from Veshnaveh are even smaller than the average diameter of female rings, make it seem reasonable to state, that they were either women's or children's – maybe girls' – rings (Furger, 1990, p.51; Chardour-Sampson, 1997, p.13). In the case of the very small rings with diameters of 0.9 cm to 1.3 cm, the suggestion that they were exclusively children's rings seems plausible.

5.5.4 Conclusion

Apart from one arrowhead, no significant objects suggesting male activity in the sanctuary were found in Chale Ghar 1 and 2. Indeed, the evidence largely points to a women's or a girls' cult. The group or the individuals concerned would have felt the need for special protection and certain amulets as well as eye beads or finger rings may have been worn or dedicated by them. It seems that Chale Ghar was visited by women, girls and children, or that the offerings were made on their behalf. The depositions were probably linked to fertility or to ward off evil. However, the possibility that men, too, used to visit the mines in order to secure the favour or protection of the sanctuary's deity cannot be excluded.[89]

5.6 Depositional Practices

5.6.1 Introduction

One day, the people who lived in the region around Veshnaveh discovered a mine filled with water. Probably they had been looking for water during a dry period (Stöllner, 2011). It remains unclear whether the people knew that Chale Ghar 1 and 2 had been prehistoric copper mines. In any case, they worshipped these places as holy caves which had probably been connected to a goddess. From then on, people visited the mines time and again and it seems that the mines remained in the memory of the local inhabitants over the course of generations. In this context the main questions arising from the comparative analysis with a GIS analysis are: how were the jewellery finds distributed in the mines, and what changes are detectable in depositional practices during the long use of the mines as a cultic place?

The discovery and examination of Veshnaveh provides an opportunity to investigate the depositional practices in a rural natural sanctuary and to observe which offerings were preferred in which periods with the help of GIS analysis. In this section, an attempt is made to reproduce the deposition of the jewellery artefacts. In the tables, noteworthy individual finds are listed, which might be significant for the particular feature.

[89] Veshnaveh was a copper mining area containing many mines (Stöllner, et al., 2004a), so it is possible that other ancient mines were also used for offerings by men, women and children.

5.6.2 Jewellery Depositions – Arsacid to Sasanian

5.6.2.1 The Main Chamber, Centre and South-East

First indications for depositions in the main chamber and the entrance area of Chale Ghar 1 are a few ceramic objects; charcoal remains were dated to the Iron Age III by a ^{14}C analysis (Stöllner, 2011). One arrowhead was dated to the 7th century BC (pl. 47, no. 4492a). Because it was not found at the bottom of the depositions in feature 10013 it may be an heirloom and not belong to the earliest offerings. In the early phase it seems that no jewellery artefacts were deposited.

Some time later, in the early Arsacid period, vessels were deposited in the middle of the water pool in Chale Ghar 1, and upon this ceramic deposition, items of jewellery were distributed individually together with ceramic vessels and sherds, animal bones, charcoal, wood and other objects. To place the finds in the centre of the pool in the main chamber would have necessitated walking into the water or using tools.

It seems that, initially, only a few green and blue glass beads were offered (eye-decorated beads are counted among the blue beads, too). Cornelian beads appeared in larger numbers, but amber and garnet already had reached Veshnaveh, too (fig. 5.6.2.1 a). Only a few decorated glass beads were dedicated, for instance one blue bead with white stripes (pl. 8, no. 4960c), one black and white stone imitation bead (no. 4243b) and a stripe-decorated bead (no. 4692f). Gold-in-glass beads that can safely be dated to the Arsacid period are one mulberry-shaped and one collared bead (pl. 7, nos. 1949o, 1752b).

Toreutic offerings seem also to be scarce in the early phase of jewellery offerings, but simple bronze earrings were dedicated at that time (fig. 5.6.2.1 b). They were not deposited in pairs, but as individual items. Either they were laid down *pars pro toto*, or they reflected a fashion of wearing just one earring.

Only two silver objects are among the early depositions, one of which is a decorated cap or appliqué (pl. 48, no. 4468a). Golden votive gifts are found only in the form of fragmented pieces (pl. 49, nos. 1949p, 4692a), a cylindrical bead (pl. 12, no. 4270), a golden

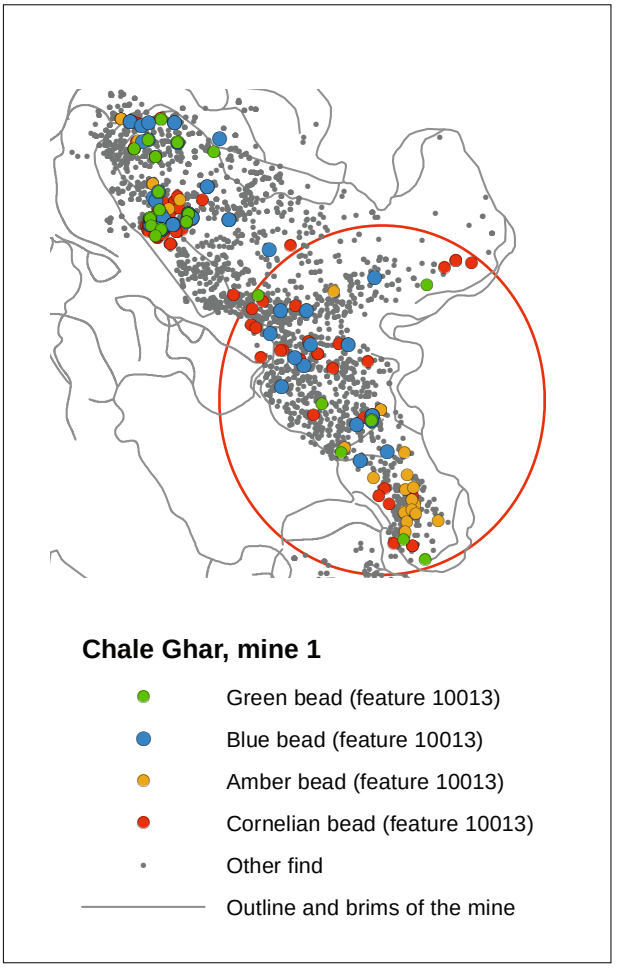


Fig. 5.6.2.1 a: Early bead deposits (map: N. Bagherpour Kashani).

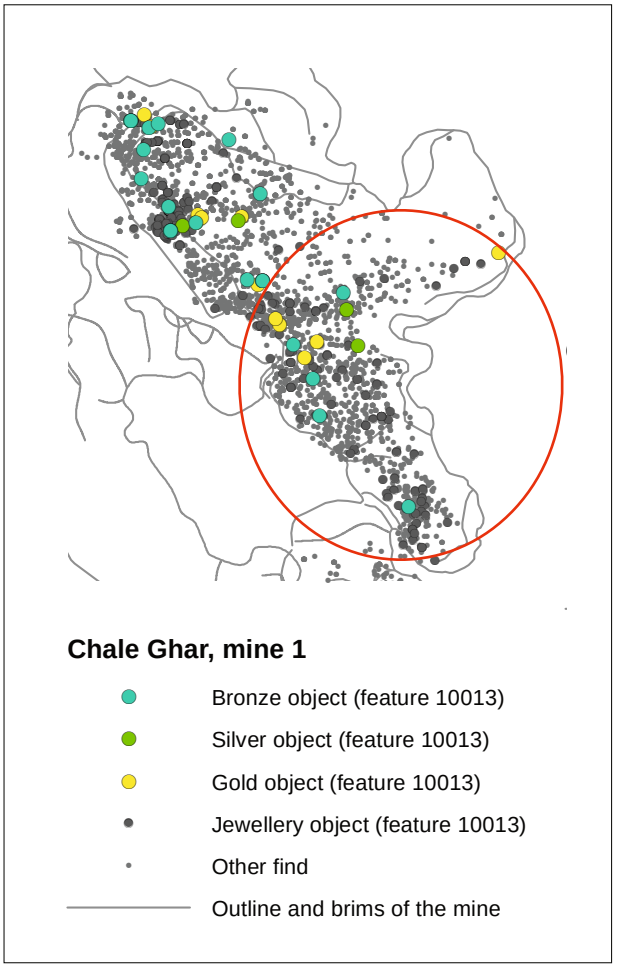


Fig. 5.6.2.1 b: Early deposits of bronze, silver and gold jewellery (map: N. Bagherpour Kashani).

setting with a white stone inlay (pl. 48, no. 1907b), a pendant made of gold wire (pl. 25, no. 1993b) and a ring-shaped granular bead with 10 spherules (pl. 13, no. 1349). Two bronze bell pendants are of particular note (no. 1734a; pl. 25, no. 1739); they may have been involved in ritual practices.

In the far south-eastern corner, a special situation could be observed. A number of amber beads were deposited there, but hardly any metal finds and blue glass beads of the kinds that appear in all other areas (fig. 5.6.2.1 c). Probably this south-eastern area was used for special purposes. It seems that the beads were placed into this corner through the ventilation shaft from the rear chamber. However, no amber beads have been found in the rear chamber.

All in all, the jewellery artefacts seem to have been laid down individually rather than in groups. Charcoal finds indicate that fire or burning also played a role in the rituals. Some glass fragments seem to have been exposed to heat and deformed as a result, for instance a fragment of a glass bead no. 4960c3 that was found in the south-eastern area of feature 10013.

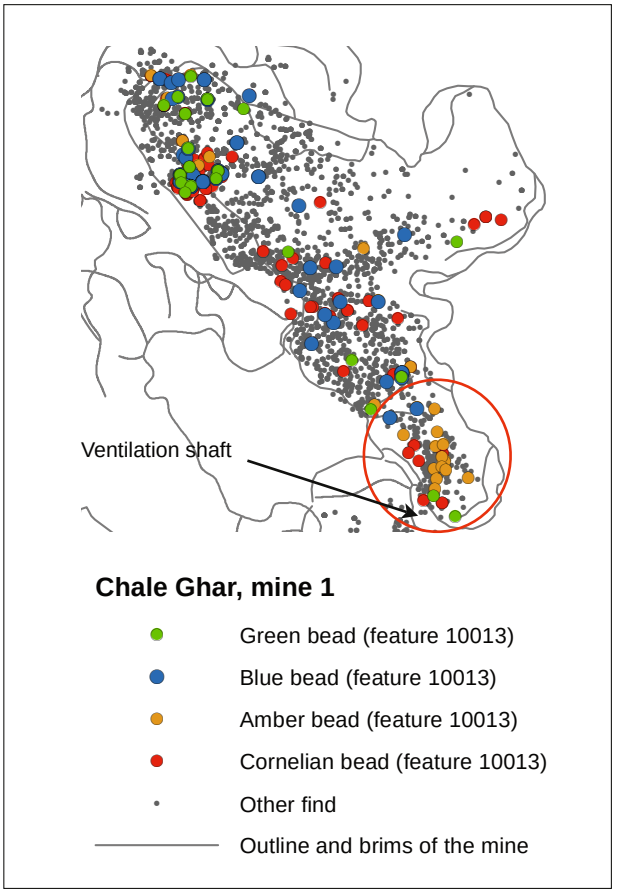


Fig. 5.6.2.1 c: Accumulation of the amber beads in the south-eastern corner of the main chamber (map: N. Bagherpour Kashani).

Tab. 5.6.2.1: Significant finds of feature 10013, centre and south-east.

Find number	Feature	Object	Plate
1348	10013, centre	Silver coin of Mithradates IV (c. 140 AD)	pl. 4
1349	10013, centre	Golden 'granular' bead with 10 spherules	pl. 13
1734a, 1739	10013, centre	Bronze bell pendants	pl. 25
1734b, 4062b	10013, centre	Lenticular and ovaloid amber beads	pl. 20
1752a	10013, centre	Collared gold-in-glass bead	pl. 6
1907b	10013, centre	Gold mounting with white glass inlay	pl. 48
4243b	10013, centre	Stone imitation glass bead	No illustr. in this study
4468a	10013, centre	Silver appliqué with decoration	pl. 48
4692f	10013, centre	Stripe decorated glass bead	No illustr. in this study
4841a, 6173, 6189, 6198, 6200d, 6520, 6535, 6543, 6544, 6660, 6662, 6770	10013, south-east	Amber beads of ovaloid, triangular, cornerless cube and disc shapes	pl. 20, 21, 26
4960c	10013, south-east	Blue glass bead with white stripe decoration	pl. 8
6195	10013, south-east	Triangular gagat pendant	pl. 26

5.6.2.2 The Main Chamber, North-West

While the early jewellery deposits tended to be made in the centre of the pool in Chale Ghar 1, in later periods, worshippers used the north-western parts of the water basin (fig. 5.6.2.2). There, at the periphery of the pool, they could stand and probably did not have to walk into the water (map 1). The jewellery was deposited on top of the older ceramic layers and over older jewellery.

With the larger number of jewellery artefacts, their variety also increased. In the late Arsacid, Sasanian and late Sasanian layers, more – and more diverse – amulets were placed in the water, for instance colourful decorated glass beads and pendants, amber beads and stone beads made of cornelian, garnet, gagat, rock crystal. They all may have represented a special wish or a gift of thanks for a request being granted (see section 4.3).

During the Sasanian period, it was clearly the custom to dedicate bronze finger rings to the water in Chale Ghar 1, and most of them are decorated with bird motifs. Birds are a sign of luck or may have symbolised the wish for fertility. Another indication for such a prayer may be a plant-decorated gold sheet (pl. 43, no. 4581f). Sometimes other extraordinary objects were dedicated, for example a small glass vessel (feature 10014) or a bag-shaped amber pendant (feature 10012). It is obvious that items were dedicated that had a special value to the owner.

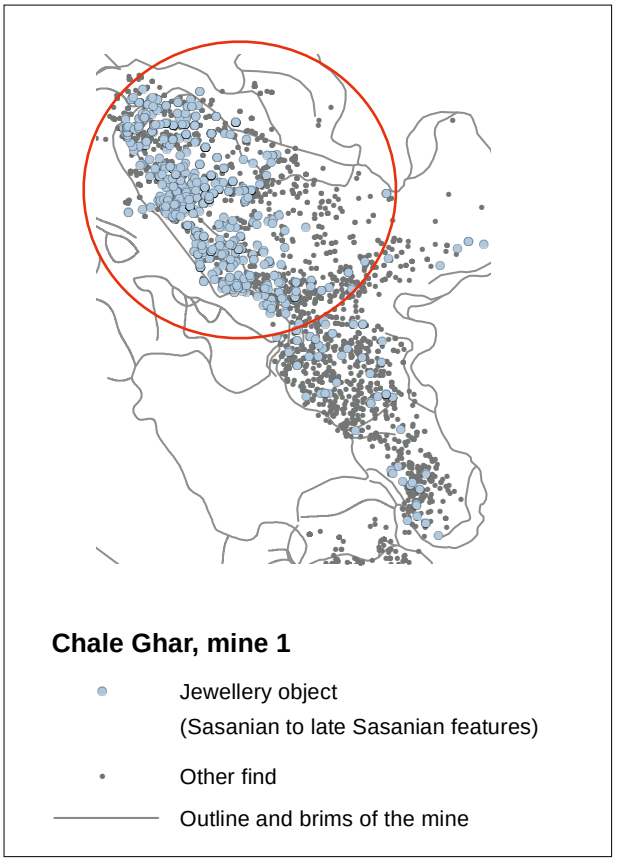


Fig. 5.6.2.2: Jewellery deposits of the Sasanian to late Sasanian period (map: N. Bagherpour Kashani).

Table 5.6.2.2 a: Significant finds of feature 10013, north-west.

Find number	Feature	Object	Plate
1851, 1883c13, 1964, 4476a3, 4494c14, 4571a, 4595a, 4668	10013, north-west	Amber beads of ovaloid, triangular, cylindrical and disc shape	pl. 21
1773	10013, north-west	Cornelian bead with zigzag and dot decoration	pl. 17
1835a	10013, north-west	Ovaloid gagat bead	No illustr. in this study
1835i	10013, north-west	Silver coin of Hormizd II (303-309 AD)	pl. 4
1941b, 1952b	10013, north-west	Fragments of one etched cornelian bead with cross decoration	pl. 16
1949o	10013, north-west	Gold-in-glass bead of mulberry shape	pl. 7
1948	10013, north-west	Cornelian bead with zigzag decoration	No illustr. in this study
1965g	10013, north-west	Blue lunula-shaped glass pendant	pl. 24
4568d	10013, north-west	Silver plaque with plant pattern	pl. 43
4666a	10013, north-west	Golden pomegranate pendant	pl. 24

Table 5.6.2.2 b: Significant finds of feature 10014.

Find number	Feature	Object	Plate
1639	10014	Silver coin of Bahram II (276-239 AD)	pl. 4
4453	10014	Bronze finger ring with plant decoration	No illustr. in this study
4547a	10014	Rhombic amber bead	No illustr. in this study
4553a	10014	Globular glass vessel	pl. 46
4563	10014	Golden chain link, band-shaped	pl. 48
4581f	10014	Golden plant decorated sheet	pl. 43
4584c	10014	Rectangular spacing bead of lapis lazuli	pl. 18

In conclusion, the change of the depositional practice in the late Arsacid and Sasanian period becomes clear with this change in the items found. This need not be interpreted as a sign of the population having grown wealthier. Instead, the transformation should be understood as being linked to a change in depositional customs. Besides an increase in quantity and variety of jewellery, another change can be observed: a smaller number of intact vessels were deposited, and a greater quantity of ceramic sherds instead. This may indicate that ceramic sherds represented the whole vessel *pars pro toto*.

5.6.2.3 The Rear Chamber

It appears that, at some point during the Arsacid period, worshippers started to bring offerings to the rear chamber in Chale Ghar 1 as well. The donors probably used the ascent to the remote area rather than walking over the depositions and through the water in the main chamber and threw the objects through the ventilation shaft into the rear chamber. One indication of this choice of access may be found in the concentration of some jewellery objects in the western part of the rear chamber the part averted from the shaft, for example yellow glass beads, golden objects or garnet beads (fig. 5.6.2.3 a).

In the rear chamber, as in the main chamber, depositions of jewellery increased during the late Arsacid and Sasanian periods, while ceramic offerings mostly consisted of sherds. Only few bronze or silver artefacts were brought to the remote rear chamber, but instead a number of golden artefacts (fig. 5.6.2.3 b). Glass and stone beads similar to the ones in the north-western area of the main chamber were deposited in the rear chamber, too. Especially yellow glass beads seem to link both areas to the Sasanian period (fig. 5.6.2.3 c). However, no true mosaic or other elaborately decorated beads were found in the rear chamber, only eye beads, stone imitation beads and other stripe-decorated beads.

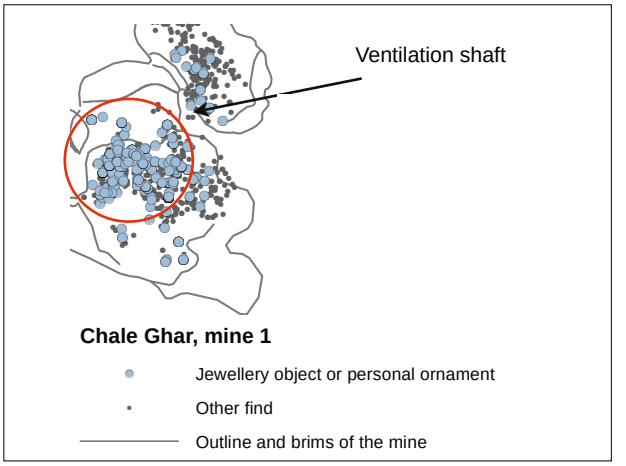


Fig. 5.6.2.3 a: Jewellery objects deposited from the western access into the rear chamber (map: N. Bagherpour Kashani).

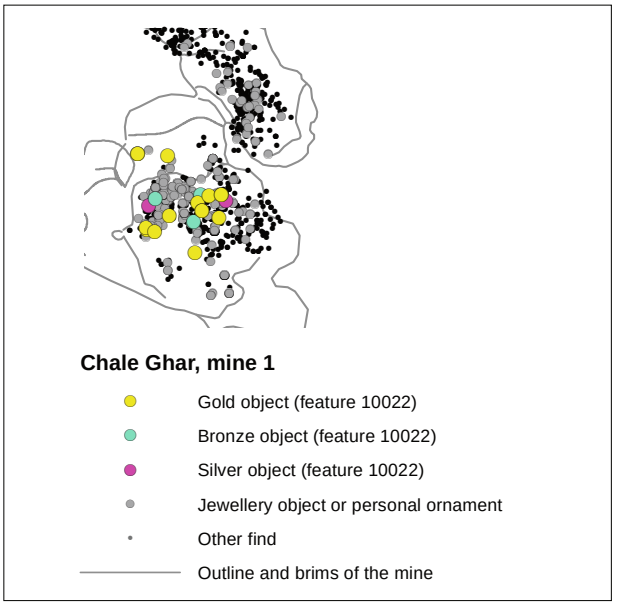


Fig. 5.6.2.3 b: Gold, bronze and silver jewellery of the rear chamber (map: N. Bagherpour Kashani).

Two biconical glass beads with transverse string holes were found only in feature 10022 of the rear chamber (no. 6089; pl. 5, no. 6129).

A number of gold artefacts, among them tiny individual golden chain links, were dedicated into the rear chamber, as well as almost all golden granular beads that were found in Chale Ghar 1. Generally, the selection of objects in the rear chamber seems to be of a rather delicate quality. Besides the chain links, a number of single glass eyes were unearthed there (table 5.6.2.3, nos. 1436 etc.). These differ from the eye beads that were found in Chale Ghar 1 and seem to have been laid down as individual objects. Probably they served *pars pro toto*. One find clearly proves that this manner of offering was practised in Chale Ghar 1: a decorated bone disc (pl. 50, no. 6079a4) was cut and broken into two halves, with one half was deposited in the rear chamber. It seems that the rear chamber played a special role within depositional practice and was probably visited for a different purpose or wish, or by a different group of worshippers. One consideration to the kind of use is made by Th. Stöllner. He suggest that the styling of hair was of importance in context of the ritually placed deposits in the rear chamber (Stöllner, Mireskanderi and Roustaei, 2022, p. 547).

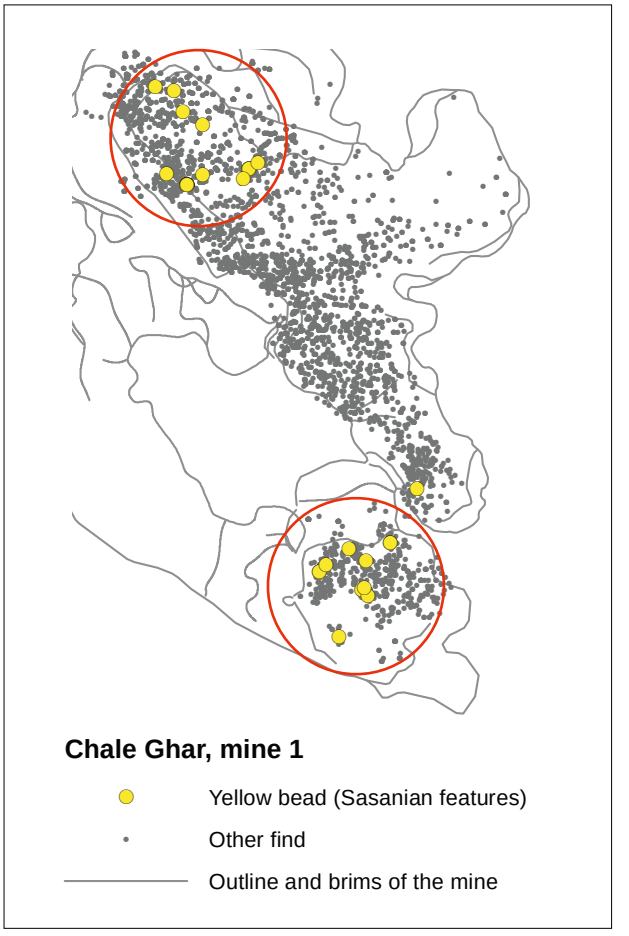


Fig. 5.6.2.3 c: Yellow glass beads of the Sasanian period in the north-western area of the main chamber and in the rear chamber (map: N. Bagherpour Kashani).

Table 5.6.2.3: Significant finds of features 10022, 10018.

Find number	Feature	Object	Plate
1430, 1431, 1440, 6076, 6078, 6088, 6219	10022, 10018	Golden chain links	No illustr. in this study
1436, 6043a1, 6098c2, 6151a10, 6120a1, 6135a4	10022, 10018	Single glass eyes	pl. 11
1589a, 4962c2, 6095a1, 6218c, 6357a, 6326, 6407a	10022, 10018	Golden granular beads	pl. 13
4954c3, 6095a3, 6401	10022	Three cuboid lead or silver beads	No illustr. in this study
6064a	10022	Bronze finger ring of special shape	pl. 35
6079a4	10022	Decorated bone disc	pl. 50
6084	10022	Blue lunula-shaped glass pendant	pl. 24
6089, 6129	10022	Blue biconical glass beads	pl. 6
6372	10022	Golden pomegranate-shaped pendant	No illustr. in this study
6389a1	10022	Bronze earring with cone ornament	pl. 42

5.6.3 Jewellery Depositions – Sasanian to late Sasanian Period

During the Sasanian period, glass and stone beads of different kinds, amber beads, etched cornelian beads and occasionally gold artefacts in shape of beads or pomegranate pendants were brought into the mine (fig. 5.6.3 a). In feature 10013/1, gold-in-glass beads were discovered together with a Sasanian coin of Shapur II (309–379 AD). Additionally, three gold-in-glass beads were located, remarkably enough, in more recent layers (map 6: 10012/6, 10012/5, 10012/4). St. J. Simpson has stated that gold-in-glass has not been reported from the Sasanian period (Simpson, 2003, p.67), but the discovery at Veshnaveh indicates that these beads, if they were not heirlooms, may also date from the Sasanian and the early Islamic periods (nos. 4294b, 4335b, 4356b).

Also of note are three fluted cornelian beads (nos. 1088, 1113; pl. 15, no. 1540) and hexagonal cornelian beads, which seem to appear mostly during the Sasanian period, but in small numbers were also scattered among the early deposits in the centre and the south-eastern area of the main chamber (fig. 5.6.3 b). Gagat (jet) beads are few for that period, but seem, in

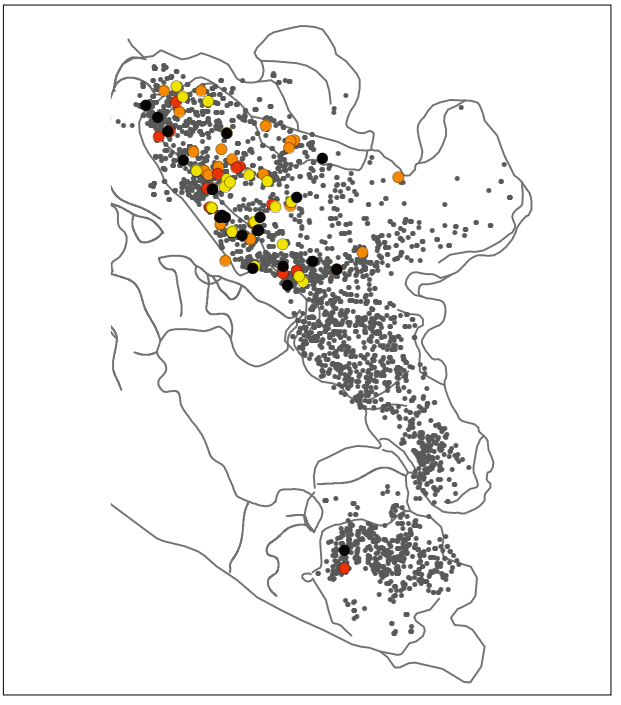


Fig. 5.6.3 a: Selected beads and pendants of the Sasanian to the late Sasanian period (map: N. Bagherpour Kashani).

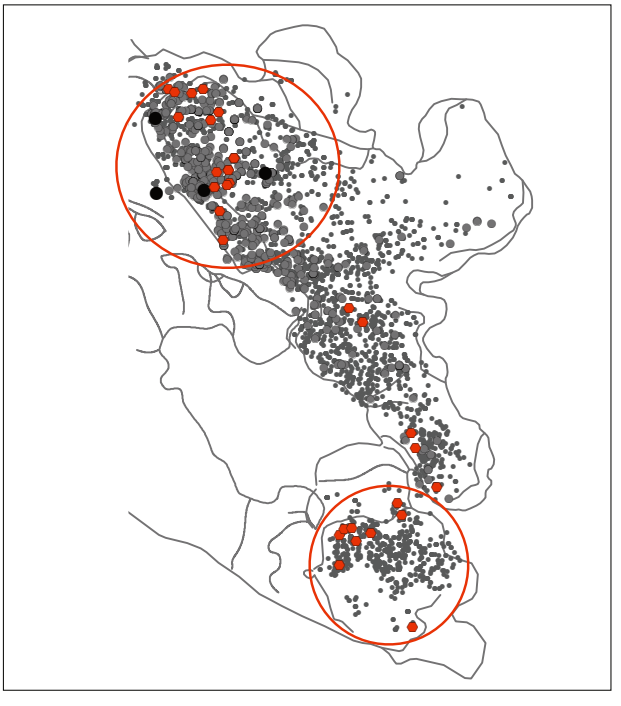


Fig. 5.6.3 b: Hexagonal cornelian beads and gagat beads of the Sasanian to late Sasanian periods (map: N. Bagherpour Kashani).

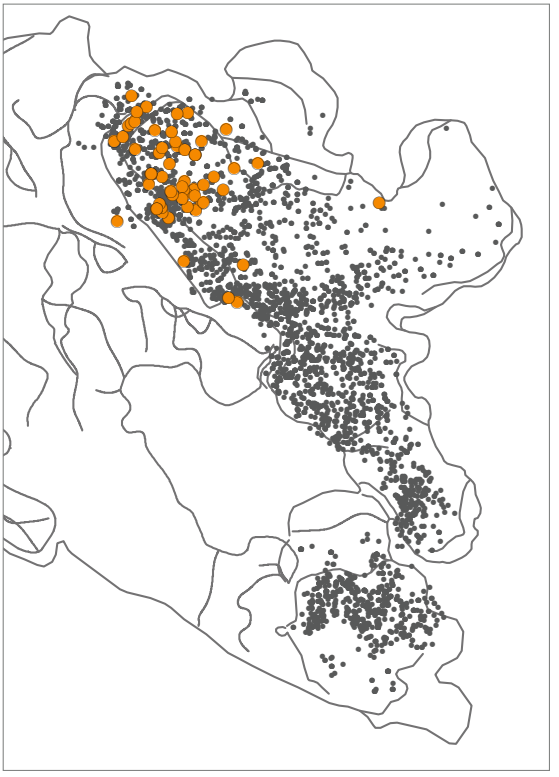


Fig. 5.6.3 c: Iron artefacts of the Sasanian to late Sasanian period (map: N. Bagherpour Kashani).

any case, rather to be a Sasanian phenomenon. Two finger rings with green glass inlays date from the Arsacid period in this study, but were found in the Sasanian features 10012 and 10013/1. These rings were probably heirlooms. However, the possibility cannot fully be excluded that they may also belong to the Sasanian period, but verification is difficult due for lack of reference finds. Apart from the already mentioned bird-decorated finger rings, plant decorated finger rings also played a role in the Sasanian period. They may represent a wish for fertility.

During the Sasanian period, iron rings seem to appear in addition to the already mentioned significant bronze finger rings (fig. 5.5.3 c).

Table 5.6.3 a: Significant finds of feature 10013/1.

Find number	Feature	Object	Plate
1131	10013	Bronze finger ring with green glass inlay.	pl. 36
1188, 1201, 1206e, 1219a, 1790d, 1791f	10013	Ovaloid amber beads	pl. 20
1195a	10013	Cylindrical gold bead with granule decoration	pl. 13
1206a, b	10013	Two melon-shaped gold beads	pl. 12
1206d	10013	Etched cornelian bead with decoration of half-circles	pl. 16
1212c	10013	Etched cornelian bead with white dots	pl. 16
1217c	10013	Silver coin of Shapur I (309-379 AD)	pl. 4
1227	10013	Bronze finger ring with stag motif	pl. 32
1679b	10013	Etched cornelian bead with zigzag decoration	pl. 17
1766a, 1775b	10013	Triangular amber beads	No illustr. in this study
1768a	10013	Golden pomegranate pendant	pl. 24
1778	10013	Etched cornelian bead with decoration of lines and dots	pl. 16
1790c	10013	Hexagonal garnet bead	pl. 18
1807	10013	Bronze finger ring with circle or eye decoration	pl. 35

Table 5.6.3 a: Significant finds of feature 10013/1.

Find number	Feature	Object	Plate
1809	10013	Bronze mounting with the appearance of a toothed wheel	pl. 49
1813	10013	Silver sheet in the shape of an eye	pl. 43
1820	10013	Bronze finger ring with cross decoration	pl. 34

Table 5.6.3 b: Significant finds of feature 10012/2.

Find number	Feature	Object	Plate
1115b, 1251	10012/2	Two ovaloid amber beads	pl. 48
1117	10012/2	Etched cornelian bead with zigzag decoration	pl. 16
1250	10012/2	Golden pomegranate pendants	pl. 24
1251	10012/2	Golden mounting with garnet inlay	pl. 48
1252	10012/2	Golden appliqué	No illustr. in this study
1285	10012/2	Ovaloid gagat bead	No illustr. in this study

Table 5.6.3 c: Significant finds of feature 10012/3.

Find number	Feature	Object	Plate
1617	10012/3	Gold decorated mounting with two ovaloid garnet inlays	pl. 48
1635	10012/3	Etched cornelian bead with stripe decoration	Pl 16
1638a	10012/3	Bronze finger ring with plant decoration	pl. 33

Table 5.6.3 d: Significant finds of feature 10012.

Find number	Feature	Object	Plate
1085	10012	Ring-shaped amber bead	No illustr. in this study
1091	10012	Bronze finger ring with conical bezel	pl. 34
1088, 1113, 1540	10012	Three fluted cornelian beads	pl. 15
1096	10012	Bronze strap end	pl. 49
1107	10012	Bag-shaped amber pendant	pl. 26
1108	10012	Bronze finger ring with green glass inlay	pl. 36
1577	10012	Etched cornelian bead with tendril decoration	pl. 17
1581, 1585a	10012	Two cylindrical gagat beads	No illustr. in this study
1583	10012	Golden pomegranate pendants	No illustr. in this study

5.6.4 Jewellery Depositions – Late Sasanian to Early Islamic Period

Worshippers continued to visit Chale Ghar 1 until late Sasanian and early Islamic times. They deposited amulets and other jewellery artefacts, mainly in the far north-western periphery of the pool in the main chamber (features 10012/6, 10012/5–6, 10012/5, 10012/4, map 8) and later in the entrance area of Chale Ghar 1 and in Chale Ghar 2 (map 9). Feature 10012/6 in the main chamber of Chale Ghar 1 could be dated to the late Sasanian and early Islamic period on the evidence of a votive sheet and a coin. Features 10012/5–6, 10012/5 and 10012/4, which are situated above this layer, should therefore be considered as belonging to later periods, specifically the early Islamic period.

During the late Sasanian and early Islamic periods, depositional habits and customs clearly changed. In that period, visitors to Chale Ghar increasingly deposited silver objects and iron rings, particularly in the early Islamic period, while bronze seems to appear less often (fig. 5.6.4). In features 10012/5–6 and 10012/5, hardly any more bronze objects were found. However, certain shapes of bronze finger rings seem to emerge in the late Sasanian and early Islamic period, like rings with triangular bezels (nos. 4341, 4419a, 4485a; pl. 31, no. 4513). Other noteworthy objects were introduced into the mine at this late stage, for instance lapis lazuli beads or elaborately decorated glass beads (pl. 10, no. 4311b; pl. 9, no. 4451; no. 4517e). Worshippers dedicated votive sheets, like a sheet with figural decoration (pl. 43, no. 4454) or a fish-shaped silver sheet (pl. 44, no. 4526). Fish-shaped metal amulets are still common in the today's Near East.

Further remarkable objects were found in the Islamic layers 10012/5–6, 10012/5 and 10012/4 – a hollow cylindrical silver box (pl. 49, no. 4416a), for instance. This object recalls the capsule-shaped lockets that contain verses from the Qur'an and are worn around the neck today. Such amulets are still worn in modern Iran and are said to protect the wearer, or to bring him luck (pl. 49, bottom right). Was the box from Veshnaveh made for a similar purpose?

A silver sheet cut into the shape of a hand (pl. 43, no. 4408a) may also resemble recent Islamic amulets, but should probably not be interpreted as already being connected to the hand of Fatima (Bürgel and Allemann, 1975, p.97). A silver sheet in the shape of a bird or a rooster found in feature 10012/5–6 may be regarded as a good luck charm. In the topmost layer of the main chamber 10012/4, a silver bead resembling the granular technique (pl. 13, no. 4296c) and a finger ring with an apotropaic white-and-blue eye inlay (pl. 37, no. 4182a) were found.

Fig. 5.6.4: Silver, bronze and iron objects of the late Sasanian to the early Islamic periods (map: N. Bagherpour Kashani).

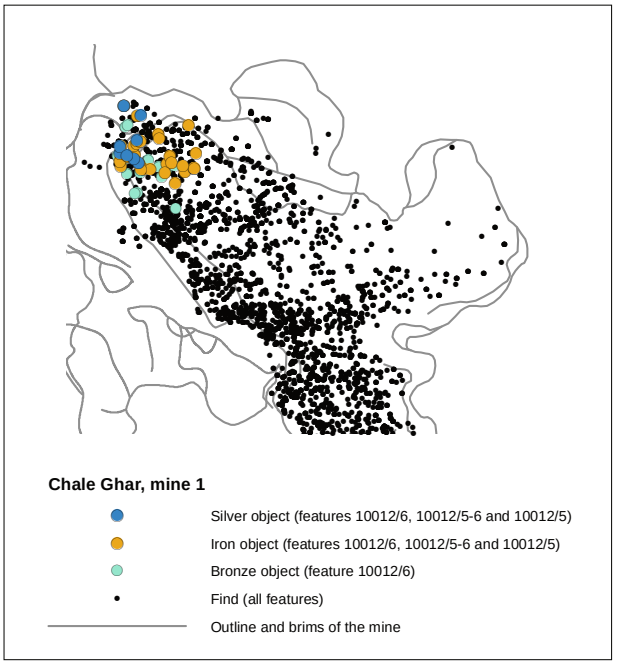


Table 5.6.4 a: Significant finds of feature 10012/6.

Find number	Feature	Object	Plate
4339a	10012/6	Bronze spiral-decorated finger ring	pl. 36
4341, 4485a, 4513	10012/6	Bronze finger rings with triangular bezels	pl. 31
4451	10012/6	Sun-decorated glass bead	pl. 9
4456	10012/6	Silver coin dated to the Umayyad period (661-759 AD)	pl. 4
4483	10012/6	Powder bead with red/yellow eye decoration	pl. 11

Table 5.6.4 a: Significant finds of feature 10012/6.

Find number	Feature	Object	Plate
4517c1, 2	10012/6	Two ovaloid lapis lazuli beads	No illustr. in this study
4517d	10012/6	Cornerless cube-shaped lapis lazuli bead	pl. 18
4523	10012/6	Bronze ring with griffin decoration	pl. 32
4526	10012/6	Silver sheet shaped and decorated like a fish	pl. 44
4450	10012/6	Rectangular bronze mounting with turquoise inlay	pl. 49
4454	10012/6	Silver sheet with figural illustration	pl. 43
4485b	10012/6	Bronze mounting with white glass inlay	pl. 49
4480	10012/6	Etched cornelian bead with cross decoration	pl. 16

Table 5.6.4 b: Significant finds of feature 10012/5-6.

Find number	Feature	Object	Plate
4318c	10012/5-6	Spacing bead of green glass	pl. 6
4333a	10012/5-6	Ovaloid amber bead	No illustr. in this study
4333d	10012/5-6	Ovaloid lapis lazuli bead	No illustr. in this study
4416a	10012/5-6	Cylindrical silver box	pl. 49
4442a	10012/5-6	Bronze finger ring with plant decoration	pl. 33

Table 5.6.4 c: Significant finds of feature 10012/5.

Find number	Feature	Object	Plate
4273	10012/5	Marbled green glass bead	pl. 9
4311b	10012/5	Eye glass bead with applied eyes	pl. 10
4311d	10012/5	Bronze finger ring with plant decoration	pl. 33
4403a	10012/5	Conus shell	pl. 23
4408a	10012/5	Silver sheet in shape of a hand	pl. 43
4409a	10012/5	Silver sheet in shape of a bird	pl. 43
4419a	10012/5	Bronze finger ring with triangular bezel	No illustr. in this study
4467a	10012/5	Ring-shaped lapis lazuli bead	No illustr. in this study

Table 5.6.4 d: Significant finds of feature 10012/4.

Find number	Feature	Object	Plate
4182a	10012/4	Bronze finger ring with white-blue eye inlay	pl. 37
4296c	10012/4	Silver bead of granular appearance	pl. 13

5.6.5 Jewellery Depositions – Early Islamic Period

Depositions in the entrance area and in Chale Ghar 2 may be supposed to have decreased in proportion to ritual activity. In both areas, alongside ceramics and animal bones, iron rings, cornelian and glass beads were deposited. These areas differ from the main and rear chamber of Chale Ghar 1 by containing one further category of jewellery: shell and cowry beads (fig. 5.6.5). These were found almost exclusively in the entrance area and in Chale Ghar 2. The only shell earring originates from feature 10050 in the entrance area of Chale Ghar 1.

The distribution of the deposits indicates that the objects were laid down in the front part of the entrance (mainly features 10004 and 10008), where most shell beads were found, or thrown into a north-eastern extension of the entrance (feature 10050). In between, only a few objects were found scattered.

Remarkable objects found in this area are nacre beads (pl. 22, no. 6882d; pl. 21, no. 6888a; no. 6913), the mosaic bead with a bird illustration (pl. 10, no. 6885) and the small, green glass phallus (pl. 46, no. 6560b2). An iron fragment, probably of a chain mail or jewellery artefact (pl. 50, no. 6928), was found in the area between the north-eastern extension and the front part of the entrance area. While no gold was found in the early Islamic layers in the main chamber, it is remarkable that one golden button (pl. 47, no. 6931) and a gold and turquoise pendant (pl. 24, no. 6919) were deposited in the entrance area. These objects may indicate that, in the entrance area, some kind of entrance ritual had been performed (Stöllner 2011) already before the early Islamic period.

The assemblage that was excavated in the entrance area of Chale Ghar 1 resembles that of Chale Ghar 2 where, additionally, iron rings, simple glass and cornelian beads were found, and shell beads as well as cowry beads. Other noteworthy objects in Chale Ghar 2 are a fragment of a green glass vessel (pl. 46, no. 7141) and an eye bead (pl. 10, no. 7002a).

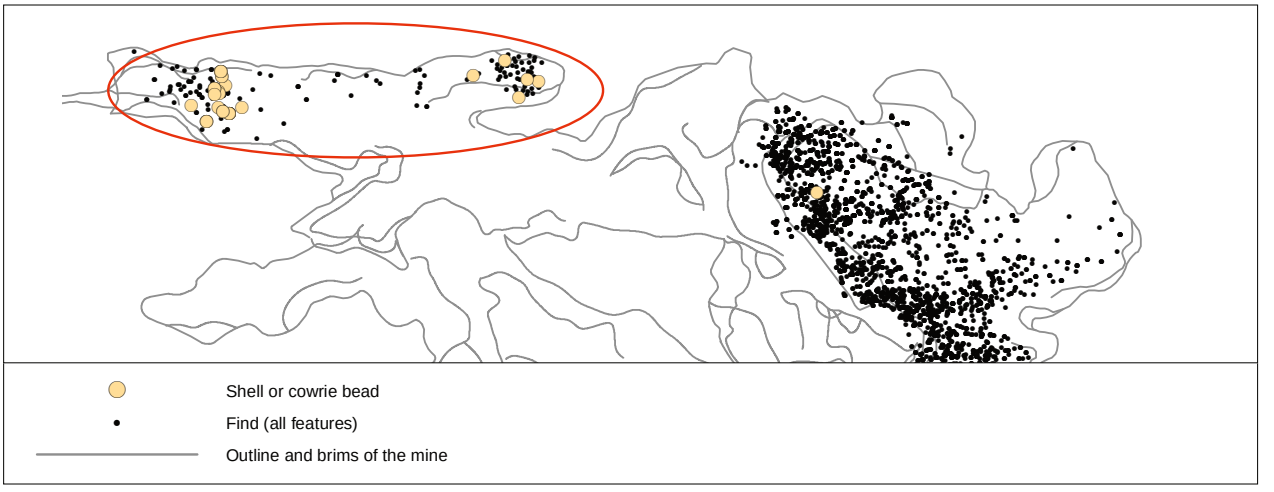


Fig. 5.6.5: Chale Ghar, mine 1. Shell and cowry beads of the early Islamic period (map: N. Bagherpour Kashani).

Table 5.6.5 a: Significant finds of features 10000, 10004, 10050.

Find number	Feature	Object	Plate
6840	10000	Bronze pendant in figural (?) shape	pl. 25
6919	10004	Gold/turquoise pendant	pl. 24
6560b2	10050	Glass phallus	pl. 46
6787d	10050	Shell earring	pl. 42
6892	10004	Golden chain link	pl. 48
6928	10004	Iron chain	pl. 50

Table 5.6.5 b: Significant finds of Chale Ghar 2.

Find number	Feature	Object	Plate
7002a	11057	Eye bead, iridescent surface	pl. 10
7141	11097	Rim fragment of a green glass vessel	pl. 46

5.6.6 Conclusion

5.6.6.1 Arsacid and Sasanian Periods

In the early Arsacid period, only few and quite simple jewellery objects were dedicated like monochrome glass beads or cornelian beads. During the late Arsacid/ Sasanian period, the number and variety of the jewellery objects increased. At that time, it became customary to bring bronze finger rings into the mines as well as blue, green and also some yellow glass beads as well as decorated beads. Tiny gold objects and glass objects are concentrated in the rear chamber and underscore the character of this area as a special place, probably used for a different ritual or visited by other people. Similarly, the south-eastern corner of the pool in the main chamber may have played a separate role due to its special assemblage of jewellery artefacts.

It is noteworthy that mainly blue, green and yellow glass beads and such of white glass or stone were deposited in Chale Ghar 1 and 2. Other colours are scarce. The colours represent certain powers and attributes, and were probably dedicated on account of their special connotations. While blue, green and white beads were deposited from the Arsacid to the early Islamic period, yellow beads seem to emerge at a point during the Sasanian period, and only in two areas: in the north-western area of the pool in the main chamber and in the rear chamber of Chale Ghar 1 (fig. 5.5.2.3 c). Amber beads and most other stone beads probably appear for the first time during the late Arsacid and Sasanian period. Only cornelian beads were offered during all periods.

5.6.6.2 Late Sasanian and Early Islamic Periods

In the late Sasanian and early Islamic period, iron and silver played a more important role (fig. 5.5.4); especially the decorated or cut silver plaques. The assemblage of different stone beads was supplemented with lapis lazuli.

The decrease in the depositional activity seems to manifest itself in the entrance area and in Chale Ghar 2, where almost all shell beads and cowries were discovered. The entrance of Chale Ghar 1 may additionally have been equipped with artefacts of the kind used in an entrance ritual, during earlier periods (Stöllner, 2011). A dating of this area remains imprecise due to a lack of datable finds.

6 Summary

6.1 The Discovery of the Sanctuary at Veshnaveh

It was a matter of particularly good fortune when the archaeological site Chale Ghar was discovered and excavated. Originally, alongside their Iranian colleagues, the team from the German Mining Museum planned to examine the prehistoric copper-mining area located close to the village of Veshnaveh in the mountains of central Iran. The first and largest mine which they intended to document was a mine of two chambers with the name Chale Ghar 1. Chale Ghar 1 had just one entrance, which was small and narrow, and accessible only by crawling. Inside the mine, in the main chamber, a basin, which had been hollowed out by copper-mining activities, had then filled with the water from melting snow; this water had to be pumped out of the mine to make excavation possible.

Not long after the beginning of the excavations, in the main chamber of Chale Ghar 1 objects were uncovered unrelated to prehistoric mining activities: among them were ceramics, animal bones, fruits and seeds, as well as jewellery and personal ornaments.[90] As the excavation progressed, more and more such items were documented that had remained well preserved under water for centuries. The finds that came to light from the main and the rear chambers were so numerous that in order to completely expose the complex in Chale Ghar 1 three further campaigns had to be undertaken; during the last one, a similar discovery to that in Chale Ghar 1 was made in Chale Ghar 2, the mine located above it: in a corner a depression filled with humid dirt, ceramics, bones and jewellery was excavated.

The assemblage and the way in which the objects had been disposed, support the assumption that the mines had probably served as a natural sanctuary. Aided by a ^{14}C examination of charcoal collected at the bottom of the depositional features, and by the discovery of an Umayyad coin, it is sensible to assume that the use of Chale Ghar 1 ran from c. 800 BC to the 8th century AD.

6.2 The Examination of the Sanctuary at Veshnaveh

So, Chale Ghar 1 was in use during a surprisingly long period of time, and to understand the exact processes of deposition in Chale Ghar 1 and 2, the finds have to be examined in order to answer a series of different questions. As the first stage of this study, a chronological classification of the jewellery is worked out. On this basis it is sorted out in what chronological and spatial sequence the jewellery objects were deposited in Chale Ghar 1 and 2.[91] To learn what kind of sanctuary existed at Veshnaveh, the results of the examination of the jewellery finds are considered in the context of other archaeological sites, ancient textual sources and knowledge about religion and popular belief. In this process of comparison an important role is played by the spatial environment in which the jewellery artefacts were deposited.

6.2.1 The Dating of the Jewellery Finds from Veshnaveh

Jewellery appears to have had a special importance within the depositions of Chale Ghar. What became apparent already during excavation was not merely the great diversity of the jewellery finds, but also elements of chronological and spatial separateness.

First of all, the jewellery artefacts were grouped, and then they were chronologically classified by comparison studies. Altogether eight groups were formed: after starting with the coins, a relatively detailed section describes the numerous and diverse beads; then follow pendants, inlays, a gem, finger rings, earrings and metal sheets; the remaining, very heterogeneous, finds are summarised in a final chapter.

6.2.1.1 Coins

Although present only in small numbers, coins serve as the prime criterion for dating the deposits in Chale Ghar 1: they come from the Arsacid, Sasanian and early Islamic periods. In Chale Ghar 2, by contrast, no datable coins were found.

6.2.1.2 Beads

Beads are of great interest both quantitatively – in that they appear very frequently – and also typologically, since they are so diverse. Apart from simple monochrome glass beads, there are gold-in-glass beads, mosaic glass beads, eye glass beads and beads of various other materials, primarily cornelian and garnet, but also amber and shell. In the context of the chronological examination of the beads the manufacturing techniques

[90] In what follows "jewellery" is used to cover both jewellery narrowly defined and personal ornaments more generally.

[91] The ceramics are described by A. Abar (in prep.).

used to produce them are also discussed. Obviously, the beads from Veshnaveh were manufactured by the use of such different techniques as winding, drawing, folding and overlay or gold-in-glass. These methods can give indications of the dating of certain find groups. One representative example is the class of gold-in-glass beads, which do not date before the 3rd century BC, as can be seen from technique of manufacture.

6.2.1.3 Pendants, Inlays and one Gem

Finds are termed pendants when they have off-centre string holes. They appear in smaller numbers than the beads, and, apart from the glass and the stone pendants – the latter being very few in number –, two categories of pendant stand out from the assemblage, the golden pomegranate-shaped pendants and the bronze bells.

A number of glass and stone inlays are discussed in a separate section: among them is a noteworthy gem of blue glass bearing the picture of by a Hellenistic or Roman warrior.

6.2.1.4 Rings

Apart from the pomegranate and other pendants, further metal finds from Chale Ghar 1 and 2 included the rings: heavily corroded iron rings, and part-decorated bronze or – in smaller number – silver finger rings. Illustrations of birds account for the greater part of these decorations. The earrings were of a rather simple nature, and were made of simple bronze hoops or wires.

6.2.1.5 Metal Sheets

A special find group consists of the decorated gold and silver sheets, among which is one with a figural illustration that will be discussed extensively: a probable explanation is that it is a cultic scene allegorised by a male figure wearing a short garment, standing next to a plant. Plants are also depicted on a golden and silver sheet. Apart from these items, silver sheets were excavated in the shapes of a fish, a hand and an eye, alongside undecorated and fragmented bronze, silver and gold sheets.

6.2.1.6 Miscellaneous Objects

Very different, but nonetheless noteworthy artefacts are subsumed under the heading ‘Miscellaneous objects’. First of all, a small globular glass vessel and the fragment of a small dark green glass bowl should be mentioned, especially since the latter is one of the few outstanding items from Chale Ghar 2. Other exceptional artefacts are a small phallus made of green glass, and a bronze arrow-head, the latter representing the only weapon within the depositions.

6.2.1.7 Chronological Classification of the Finds

For the chronological classification of the objects, the find groups are compared with other jewellery finds from Iran, the Near East and the Black Sea region – and in some cases with Roman artefacts, too. The result of these comparison studies is that most of the jewellery and personal ornaments from Chale Ghar 1 date to the Arsacid and Sasanian periods, and a few to the early Islamic era. Only the arrow-head lies far outside such chronological ranges: it dates to the 7th century BC, and seems to have been deposited as an heirloom.

6.2.2 The Origin of the Jewellery Finds from Veshnaveh

Because the jewellery artefacts found at Veshnaveh are very diverse and were manufactured using very different techniques, the question arises whether the objects had been manufactured locally or had arrived from elsewhere: so an investigation is undertaken in order to try to identify exchange of goods. At first the materials themselves are discussed, with chemical analysis being likely to provide the first guidance. However, some individual objects attest that exchanges of goods over long distances had taken place involving Veshnaveh.

6.2.2.1 Imported Materials at Veshnaveh

A number of glass samples from Chale Ghar 1 were examined chemically and technically by J. Lankton and B. Gratuze, respectively of UCL and IRAMAT. Their analysis indicated the probable existence of important relationships between the Indo-Pacific and Veshnaveh in central Iran. Connections to eastern Europe were confirmed by an infrared spectroscopy carried out on amber from the sanctuary by E. Stout and C. Beck of the Amber Research Laboratory at the Vassar College. This material was identified as being exclusively Baltic amber, so-called succinite.

Other natural materials like garnet, lapis lazuli or cowrie shells were also brought to Veshnaveh from far away, whereas there appears to have been an adequate supply of metals from the region itself.

6.2.2.2 Imported Artefacts at Veshnaveh

Singular finds such as the globular glass vessel (pl. 46, no. 4553a) and a glass gem (pl. 27, no. 1505) seem to have been imports, as do a number of mosaic glass beads that obviously required a great deal of effort to manufacture. Additionally, the different nuances of the colours of the glass beads indicate that these beads came from chronologically or geographically distinct workshops.

6.2.2.3 Trade at Veshnaveh

Examination of the jewellery that was found in Chale Ghar 1 and 2 leads to the conclusion that some objects or the raw material used to produce them arrived through trade connections. Arsacid and Sasanian trade routes are known, and they have remained in use through the arrival of Islam into modern times. One of these routes passes reasonably close to Veshnaveh.

A large number of jewellery objects were deposited into Chale Ghar 1, but they were distributed over such a long period of use that it is probable that only a few objects were laid down at any one time. There is not the evidence to suggest that a vibrant trade had established itself in the region; instead, it is likely that exchange of goods took place on an occasional basis.

6.2.3 Jewellery Finds from Veshnaveh and their Meaning

After the chronological framework has been specified, and the origins of the jewellery have been debated, next this study turns to examine the items of jewellery according to cultural and religious aspects of their possession and use.

The assemblage at Veshnaveh appears to have striking particularities, the complete absence of bracelets among so much jewellery being a prime example. The collection consists of selected objects that were deposited into water at a special place, and were then carefully part-covered with stones. A more extensive examination of the jewellery shows that the items not only belong to different categories and subcategories, but can also be divided into different types of amulets, which were said to have apotropaic or luck-bearing effects: for instance, some of the amulets may have been connected to fertility or to the healing of diseases.

6.2.3.1 Material and Colour of the Amulets from Veshnaveh

Firstly, the materials of the amulets were believed to play an important role in generating their effects, and this statement is particularly true of metal and stone. Colour had a special meaning: blue was believed to fend off evil, with green and yellow having positive effects, too. Besides the red found in the cornelian beads, these are the three colours that appeared most frequently in Chale Ghar 1 and 2.

6.2.3.2 Appearance of the Amulets from Veshnaveh

Blue is the colour of most of the eye beads that appear in Chale Ghar 1. Even today beads of this kind are said to be a means of warding off evil. Other apotropaic amulets from Veshnaveh are replicas of body parts, such as an eye and a hand with what appears to be the remains of an outstretched finger, which were found in the form of silver sheets. Also a small phallus made of glass was found in Chale Ghar 1. It is plausible that these amulets apart from their possible apotropaic meaning were dedicated with the wish to be healed from disease, or to offer thanks for such a wish being granted.

The recurring bird motif on bronze finger rings is connected to luck or fertility. The bronze bells and golden pomegranate pendants, which were both found in Chale Ghar 1, were also regarded as amulets, and probably even as symbol of cultic instrument. Apart from the most important amulet types summarised here, a range of other amulets are discussed with consideration being given to their material and their appearance.

6.2.4 Chale Ghar – a Sanctuary

The discovery of combinations of specifically chosen jewellery objects deposited in the water of an ancient copper mine leaves hardly any room for doubt that Chale Ghar 1 and 2 were sanctuaries.[92]

6.2.4.1 Comparison with Cave and Water Sanctuaries

The most important attribute of the sanctuaries Chale Ghar 1 and 2 is the water inside them. In particular, the assemblages, which as found were very similar to those in other Iranian sanctuaries or grave inventories, attest the sacred character of these two mines.

Although the discovery at Veshnaveh and the range of documentation existing for it are unique, other ancient cave sanctuaries such as those at Niasar, Caraftoo, Bishapur or at places in today's Iraq indicate that the site stood in a row of ancient Iranian cave sanctuaries. Water obviously played a special role, being foremost both in the physical structures and conceptions of Zoroastrianism. The most famous example is the Sasanian Takht-e Suleiman, where the sacred buildings were built around a geyser, which even today has the appearance of a mystical lake. In Pir-e Sabz, a Zoroastrian sanctuary, and one still in active use today, water drips from the rock into the cult room.

[92] Another possibility is that Chale Ghar had served as a favissa during ancient times (Overlaet, 2011), which however is disproved in this study (see chapter 5.4). A favissa is a kind of depot for evacuated offerings from an abandoned or overfull sanctuary.

6.2.4.2 Ancient Textual Sources Regarding Religious Practice

Historical descriptions and religious instructions likely to be relevant to practices performed in Chale Ghar 1 and 2 have passed down to us. Strabo, a Greek historian who wrote over the course of the 1st century BC and the 1st century AD, described how Persian magicians made offerings in the presence of water. But more important is a passage in the so-called *Narengestan*, an ancient Zoroastrian written source collected in turn from considerably older oral traditions. The *Narengestan* speaks of the “nourishing” of water. Such a ceremony of "nourishing" did not accord with established notions of the purity requirements of Zoroastrian religion, and so the meaning of this passage remained unclear until Veshnaveh was excavated. Animal bones, fruits, jewellery and vessels that were probably used for libation rituals indicate that in the case of Veshnaveh the water indeed was "nourished", or venerated with food and objects. It seems that at Veshnaveh either a much older Zoroastrian or – more probably, even – a pre-Zoroastrian cult had taken place amid the environment of a popular and rural community.

6.2.4.3 The Worshippers

Against the backdrop of information from previous studies, there arises the question of who deposited all these jewellery objects in the mines, or for whom they were offered. A survey, carried out at a distance of some kilometres from the sanctuary, showed that the region around Veshnaveh was settled from Iron Age III until the early Islamic period. It can be assumed that the people of these settlements knew about Chale Ghar, and that women and girls were among those to visit the sanctuary. Such female circles had special need of protection, and by tradition bore amulets. Moreover, the smallness of the finger rings supports the assumption that they were mostly worn by women or children.

Special indications as to the identity of the worshippers are given by comparisons with modern popular Zoroastrian and Islamic rituals, particularly ones always carried out by women and connected with water, and in some cases with jewellery, too. Zoroastrianism and popular beliefs in the Near East have been subjected to transformations, yet certain basic ideas are still valid today, as examination of the amulets from Veshnaveh shows. Therefore it is legitimate to compare practices in Chale Ghar 1 and 2 with more recent popular cults.

6.2.5 The Chronological Sequence in Chale Ghar 1 and 2

To understand the chronological and spatial order of the depositions in Chale Ghar 1 and 2, the jewellery finds were evaluated with the help of a Geographic Information System (GIS). Using the documentation established for the finds in the course of excavation, three dimensional measurements were given, whence it became possible to represent these coordinates graphically and to analyse the distribution and depth of certain finds or find groups.

The result of this examination is that jewellery was deposited for the first time in the Arsacid period in the middle of the pool in the main chamber of Chale Ghar 1. In the course of late Arsacid and Sasanian times these offerings increasingly moved to the north-western area of the pool. During this phase the rear chamber was also filled with objects. In the late Sasanian period in particular visitors laid their offerings down into the north-western periphery of the water pool, which meant also over older depositions. Until the early Islamic period, the cult at Veshnaveh continued to be cherished, as the finds in the outer north-western corner of the pool prove. The rear chamber in Chale Ghar 1 does not seem to have played a role during the early Islamic period. The entrance area and Chale Ghar 2 probably reflect the last phase of depositions in the Islamic epoch. However, already at an earlier stage ritual activity might have taken place in the entrance of Chale Ghar 1 as ^{14}C analysis shows.

6.2.6 Depositional Practice

With the help of the GIS analysis it was also possible to understand changes in depositional practice and the role of "fashion". After the early depositions consisting of ceramics, bones and other materials in the centre of the pool in Chale Ghar 1, the first jewellery offerings started in the Arsacid period. These were simple bronze earrings, glass and cornelian beads, as well as a few amber and garnet beads.

In the course of the Arsacid and the Sasanian periods the depositions became more manifold and colourful: other materials were dedicated, and also relatively new were elaborately manufactured glass beads, made with the gold-in-glass and mosaic techniques. Emblematic of the Sasanian phase are bronze finger rings, especially those with bird decorations.

The rear chamber was visited also in the Arsacid, and even more in the Sasanian periods; there the finds appear to be more delicate than those from the main chamber. Looking at any one item very often leaves an impression of a *pars pro toto*: for example, individually configured chain links, or a decorated bone disc, which had probably been meant as a token, and that then had been intentionally cut. It is possible that different rituals were taking place in the rear chamber, or that it was being visited by different groups of persons.

While the ritual activity in the rear chamber presumambly did not take place in later periods, the depositions continued in the main chamber until the early Islamic era. During the Sasanian and late Sasanian period it was a fashion to deposit bronze jewellery, such as the finger rings mentioned above. This custom changed

by the early Islamic period at the latest. Starting in the Sasanian period, more and more silver objects were brought into the sanctuary. However, iron rings, which are characteristic of late Sasanian and early Islamic offerings, were increasingly deposited. During this time no gold objects were dedicated.

Iron finds indicate that depositions happened as well in the entrance area and in the main chamber of Chale Ghar 1 during the later phases of activity in the mines, quite possibly even during the final phase. Also significant are the shell beads and cowries, which were found almost exclusively in these two areas.

6.3 Perspective

The physical evidence of the ancient natural sanctuary from Veshnaveh significantly broadens our understanding of ancient Iranian religion and is an excellent source for the analysis of small finds of the Arsacid, Sasanian and early Islamic periods.

Only a few comparable assemblages of this broad range from the Near East have been discovered and examined systematically. There are a few compilations which, however, do not place their material into a broader context, for example a study of bead jewellery of Late-Roman and Byzantine times from Jordan (Eger and Khalil, 2013) and a comprehensive catalogue of earlier jewellery from Iron Age II Levant (Golani, 2013). The promise of Veshnaveh is that documentation and analysis of, for example glass beads, together with appropriate references, may give indications of the origins of objects and the chronology of the location where they were found.

The Arsacid, Sasanian and early Islamic eras in Iran require more fundamental investigation, though the questions cannot be defined very clearly at the moment. The differentiation of periods and the transitions between them need to be examined thoroughly and should to be taken forward as far as the evidence allows. It follows, therefore, that the examination of the jewellery and personal ornaments found at Veshnaveh would provide a strong foundation for further detailed studies of the Arsacid period up to early Islamic periods in Iran.

The caves at Veshanveh – once copper mines and currently called Chale Ghar 1 and 2 – are situated in a long worldwide tradition of cave sanctuaries. Examples are known that range from the paleolithic to modern eras (see e.g. Kusch und Kusch, 2001; Lindstöm and Pilz, 2019, p.267). Water and cave sanctuaries are a special phenomenon in the ancient Near Eastern and Mediterranean world and have not yet been comprehensively categorised and related to each other. Manifold examples need manifold studies. There are projects that deal only, for example, with “water at ancient Greek sanctuaries” (v. Ehrenheim, Klingborg and Frejman, 2019), and also the sacred Christian caves that might be a continuation of the prior religious practice got an consideration of their own (Benz, 1974).

Certainly, watery caves are also known from Egypt, Delos, Pompeij, Crete and Spain (Kleibl, 2007, pp.1-6). The latter have several features in common with the Veshnaveh sanctuary: waters as an object of devotion, darkness, the appearance of an underground environment and narrow accesses. Most of the caves were visited by a local rural community, revealed through the modest offerings. Vessels and dishes for food point to ritual eating and drinking (Sporn, 2007, pp.61-62). Cultic activity in caves is often connected to fertility, healing and women concerns as well as oracles (Sporn, 2007, pp.58-60). There are sanctuaries connected to water in Baktria – todays Tadjikistan – such as a place called “the four wells”, where a ritual vessel for purification was discovered (Lindström, 2014, pp.120-124). Up to the present time, narrow entrances like those in Chale Gar 1 served to wipe away sins or diseases or assisted in issues of fertility or symbolised the ease of birth (Kusch, 2001, p.171). In Greek mythology caves symbolised the birth of gods as well as protection and inspiration (Sporn, 2007, pp.39-40).

At the well-known Hellenistic Oxus-temple the dedications apply to the river god and are characterized by Iranian-Bactrian as well as Greek traditions. By contrast, at Veshnaveh the archaeologists namely found votives of amber and colourful glass that came from distant regions and prove a material connection to other cultures. Whether there had also been distant religious or cultural points of reference comparable to those from the Oxus-temple is not yet clear. The rural environment, however, suggests a rather local activity, though with the overarching influence of the ruling dynasties.

Then there is the question of how and why the sanctuary at Veshnaveh developed within pre-Islamic and Zoroastrian belief and whether it can be considered alongside Zoroastrian sites of later dates (Kreyenbroek, 2011). The popularity of the Zoroastrian sanctuaries seems to have increased in Arsacid times and to have grown further in the Sasanian period, an era for which we have the most evidence. This development also seems to be reflected in the donations at Veshnaveh, which increase in number and variety from the centuries AD. It seem that the remote mountainous region around the caves in central Iran was not isolated, but partook of a tendency of religious worship in juxtaposition with mystical landscapes, water and caves. As M. P. Canepa (2013, p.85) writes: “...these ‘Avestan’ sites of memory emerged at locales with no previous Achaemenid monumental activity, but which benefited from beautiful and dramatic natural features.“

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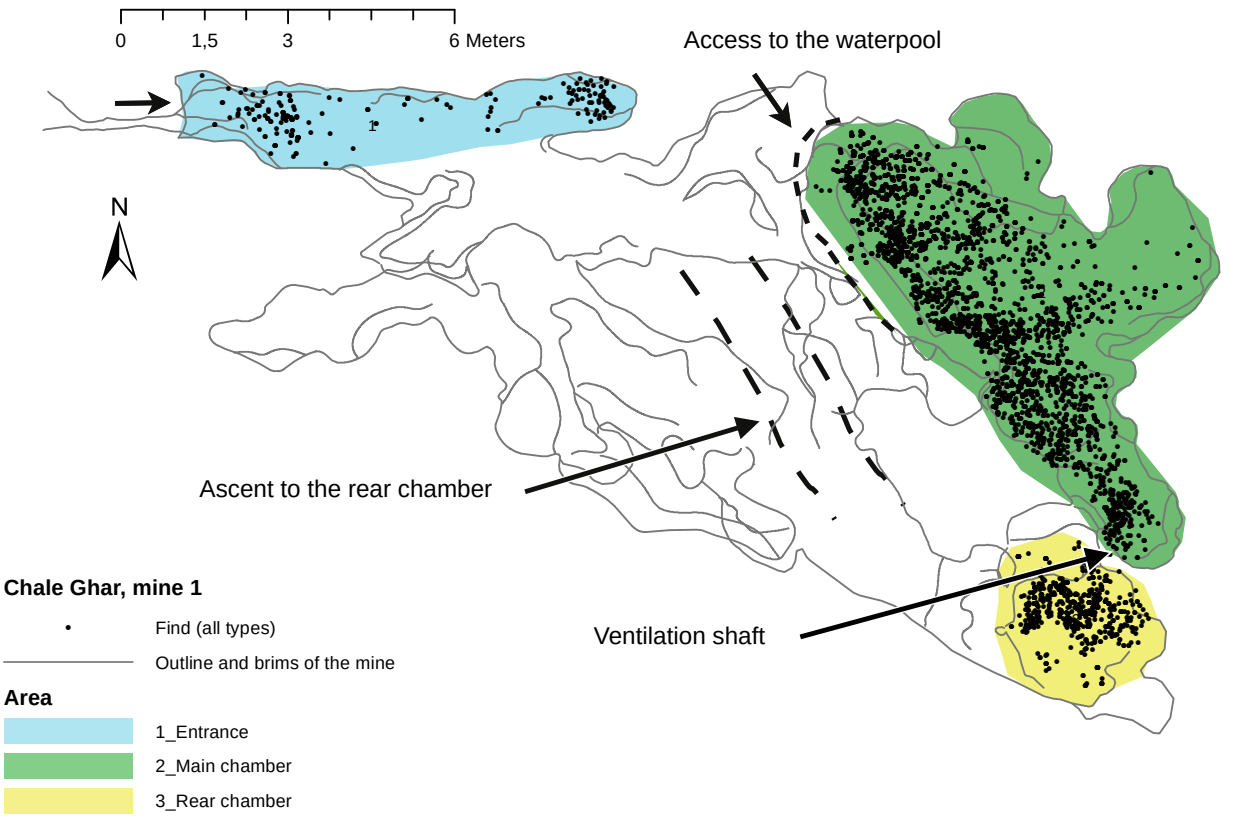
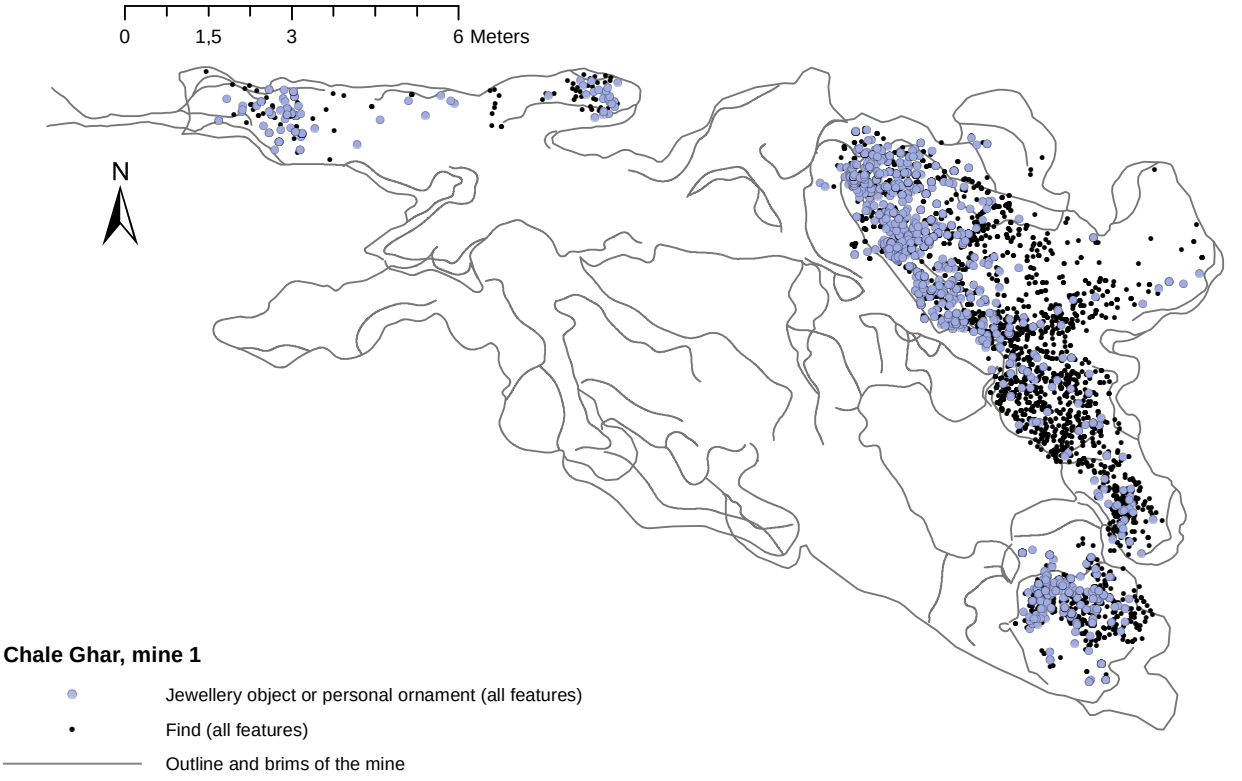
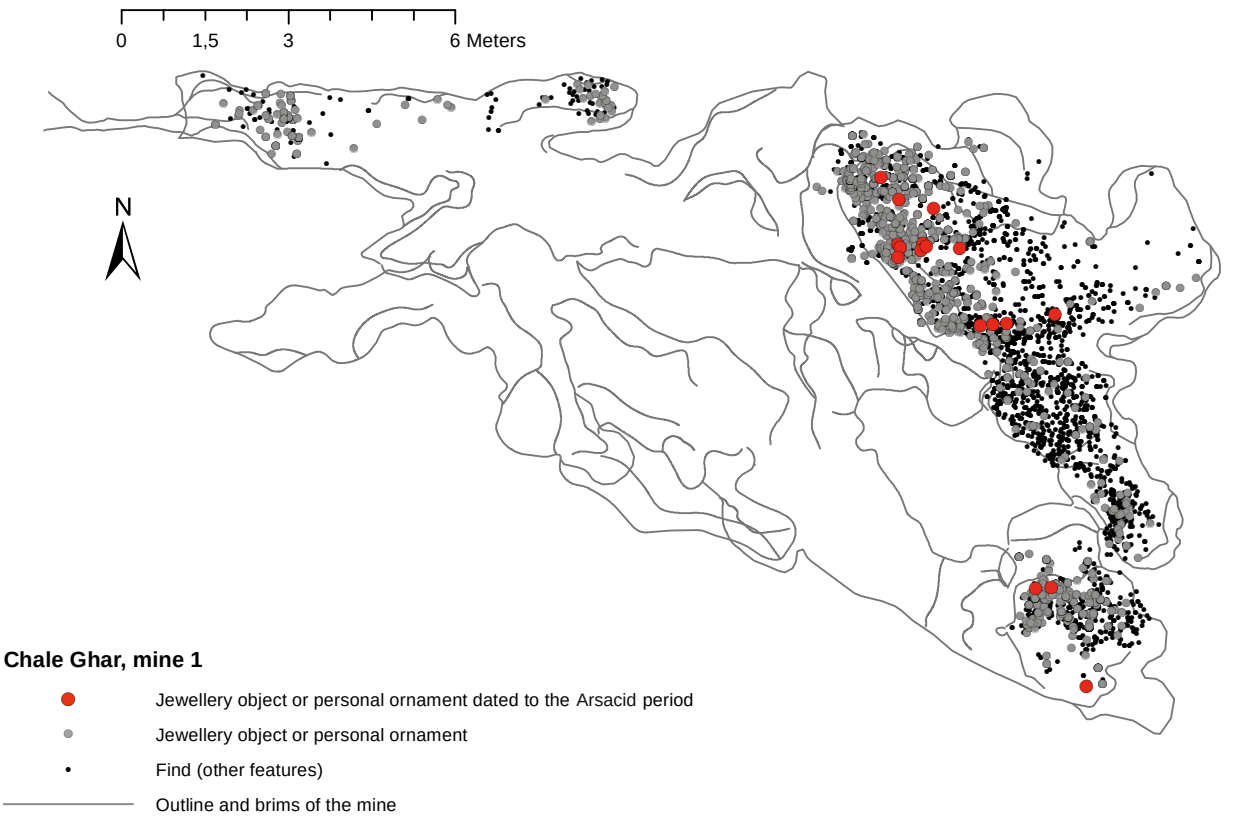
Maps



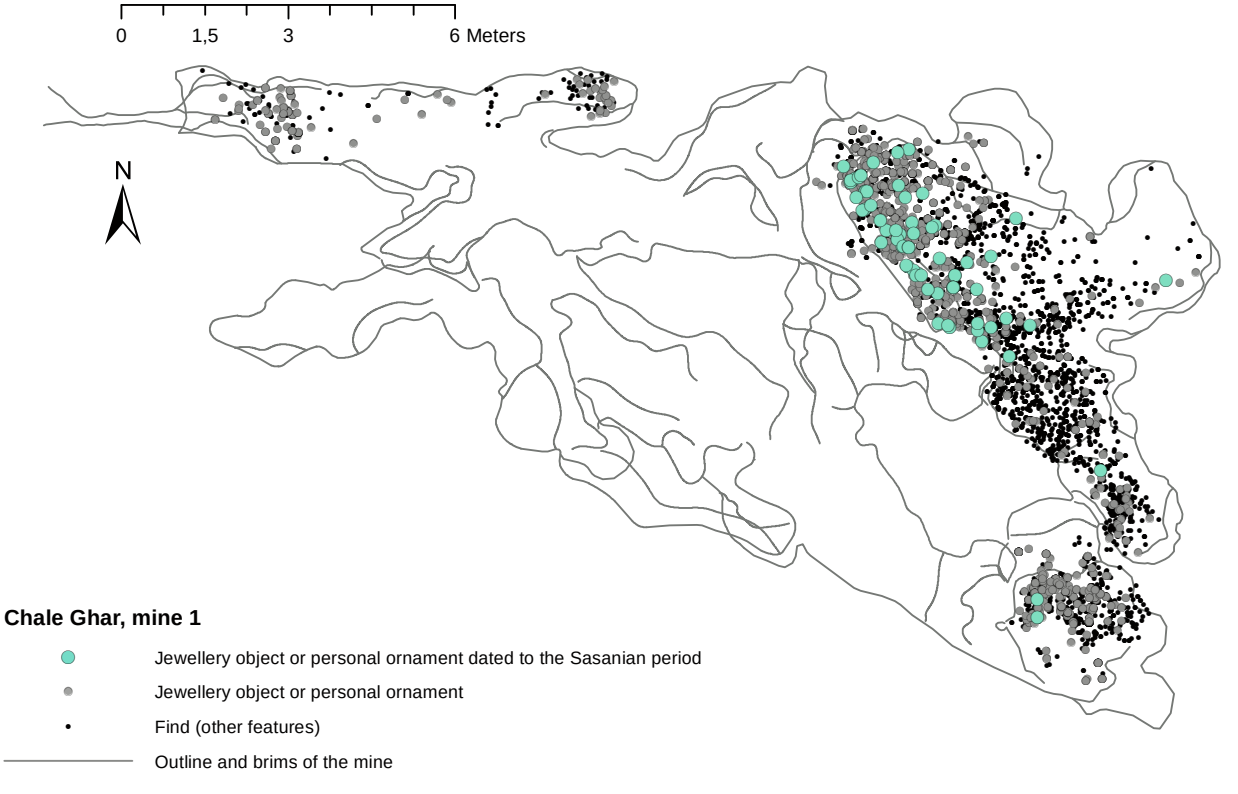
Map 1: Areas of Chale Ghar 1 and the distribution of the finds in all features (N. Bagherpour Kashani).



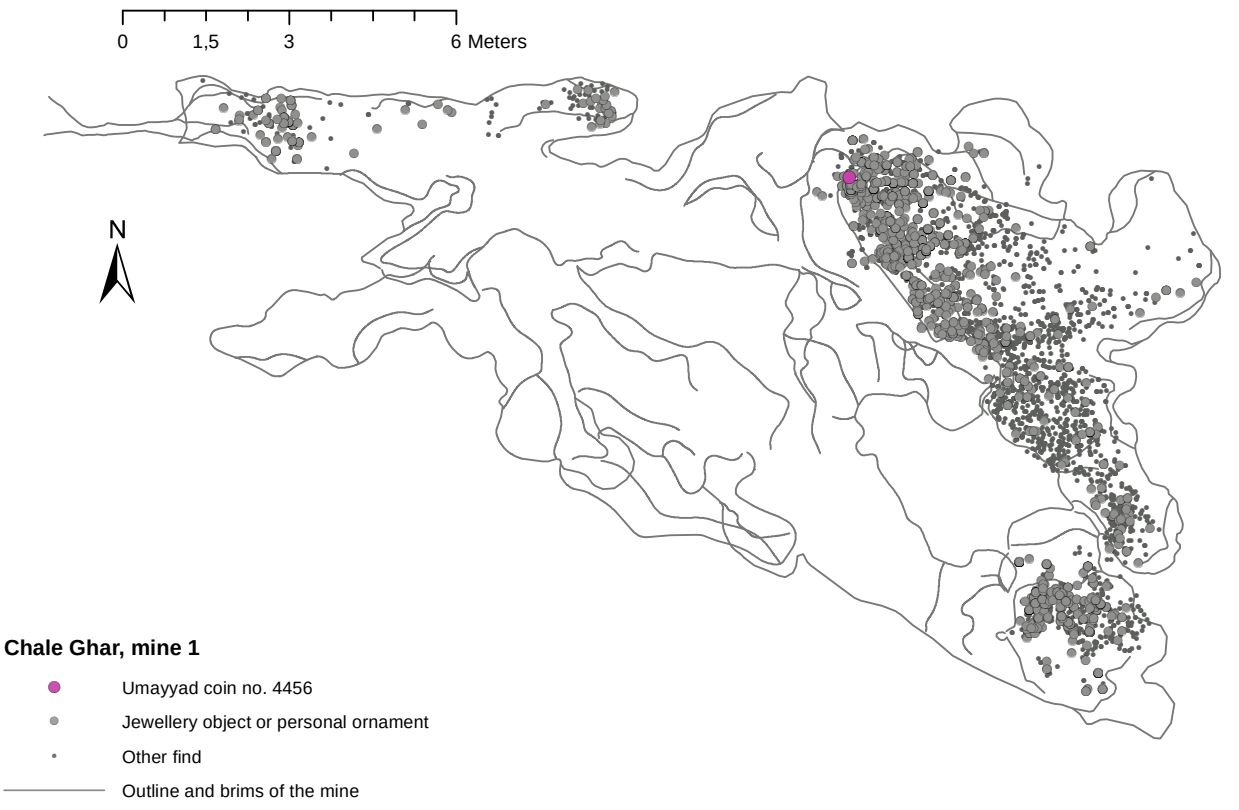
Map 2: Distribution of the jewellery finds and personal ornaments in all features (N. Bagherpour Kashani).



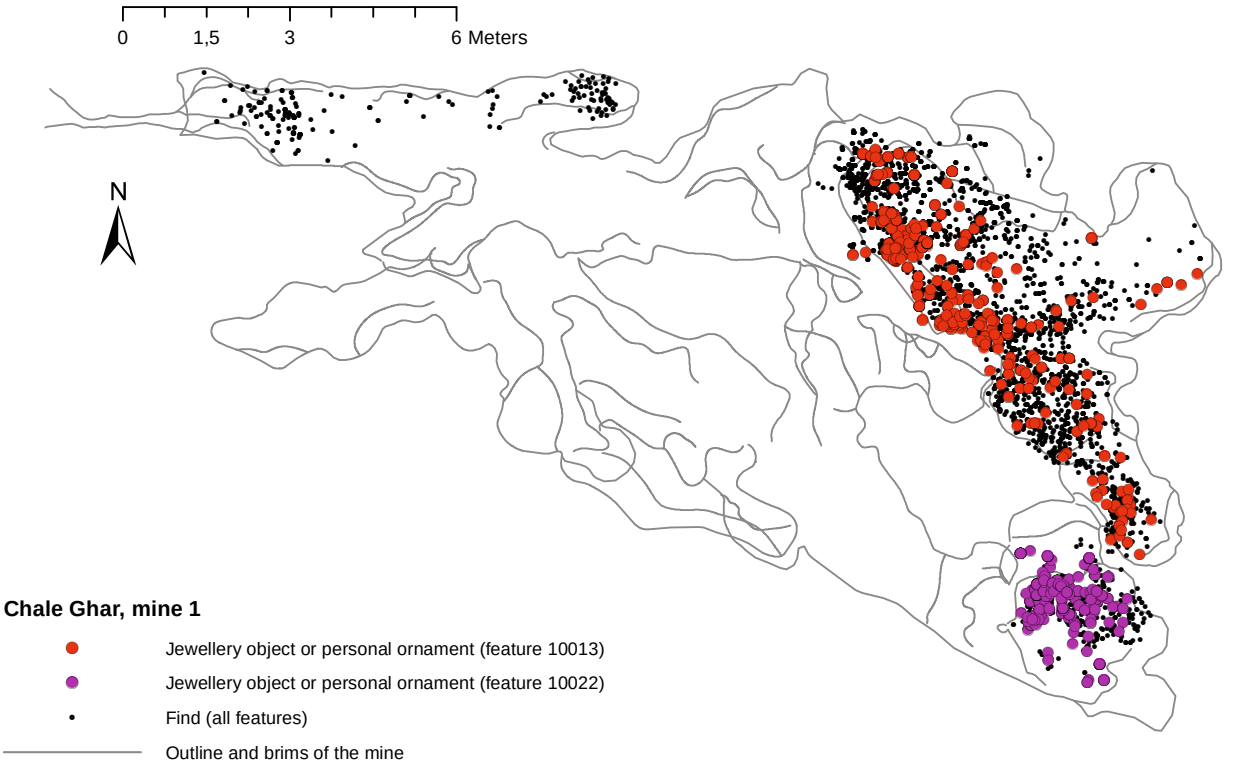
Map 3: Jewellery objects and personal ornaments ornaments dated to the Arsacid/late Arsacid period (N. Bagherpour Kashani).



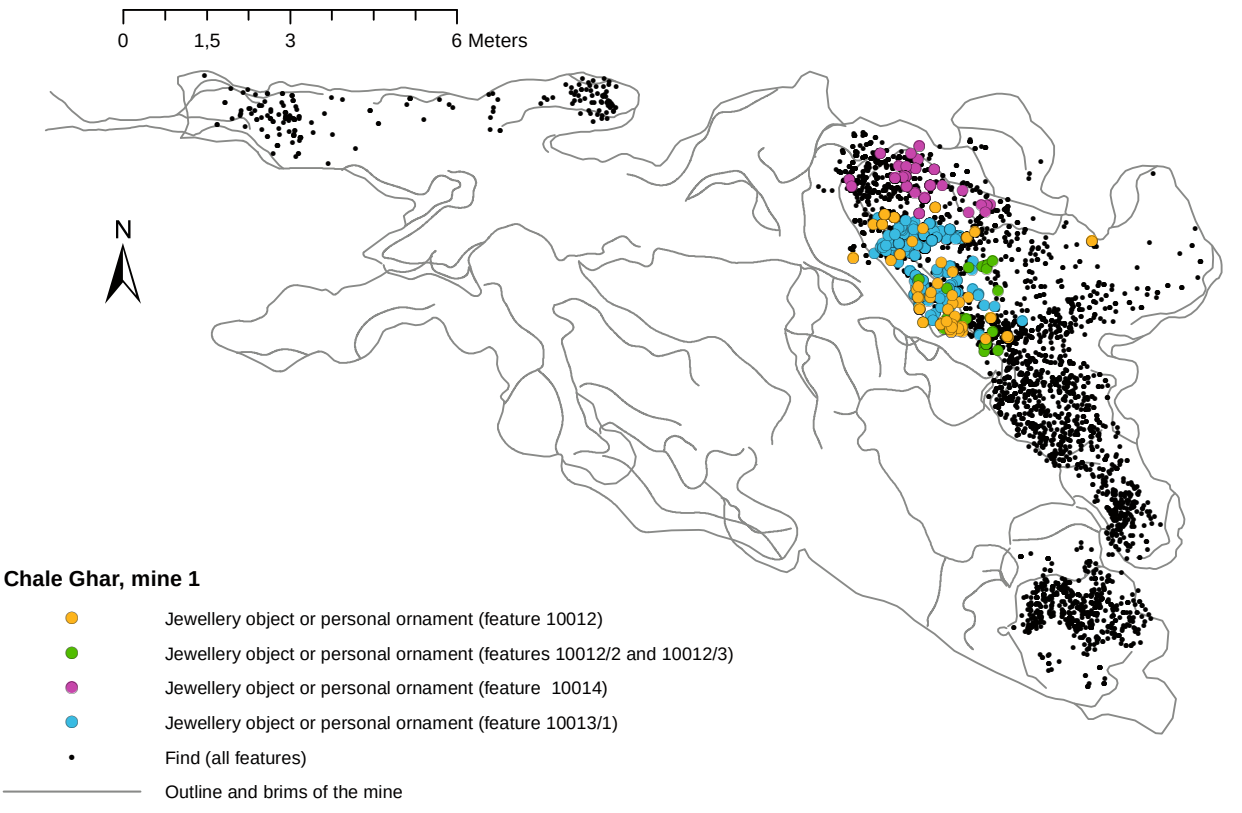
Map 4: Jewellery objects and personal ornaments dated to the Sasanian/late Sasanian period (N. Bagherpour Kashani).



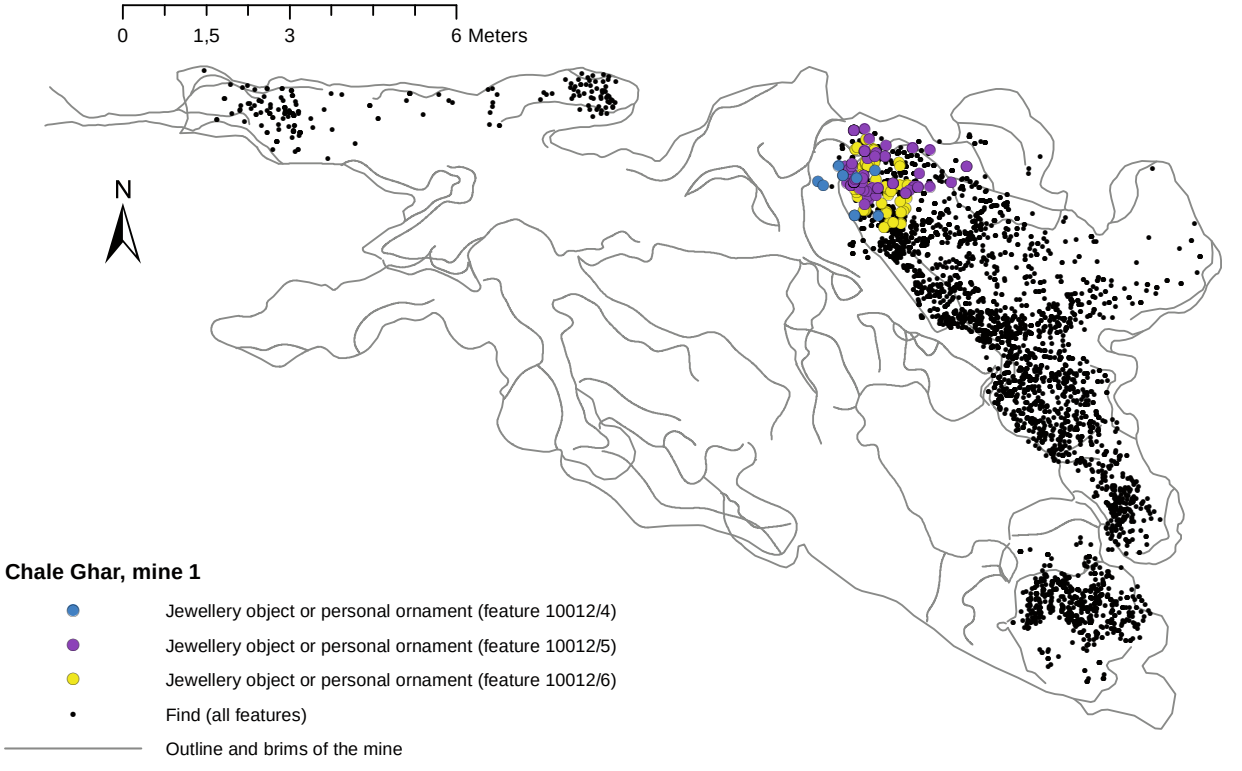
Map 5: Coin dated to the early Islamic period (N. Bagherpour Kashani).



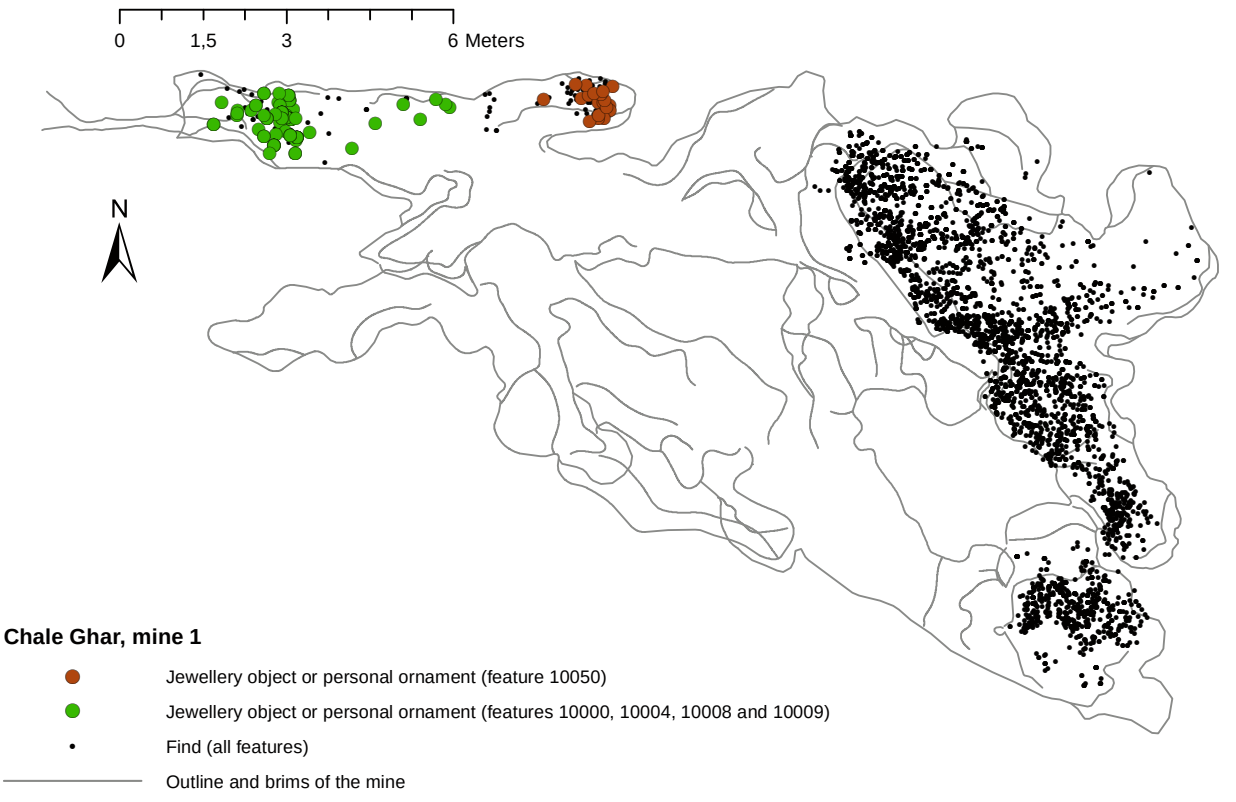
Map 6: Distribution of the jewellery finds and personal ornaments in the Arsacid/late Arsacid to Sasanian feature 10013 (N. Bagherpour Kashani).



Map 7: Distribution of the jewellery finds and personal ornaments of the Sasanian to late Sasanian features (N. Bagherpour Kashani).



Map 8: Distribution of the jewellery finds and personal ornaments of the late Sasanian to early Islamic features in the main chamber (N. Bagherpour Kashani).



Map 9: Distribution of the jewellery finds and personal ornaments of the early Islamic features in the entrance area (N. Bagherpour Kashani).

Plates

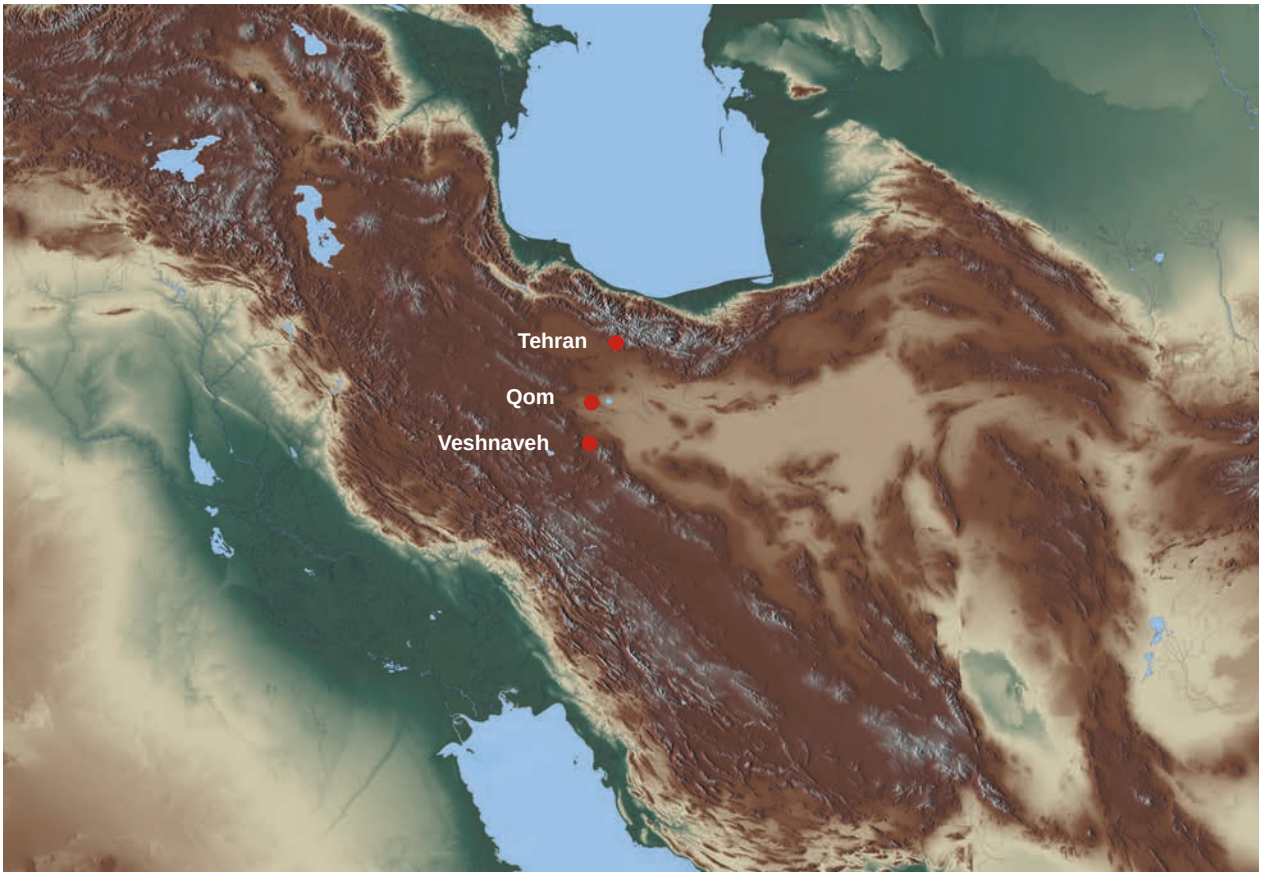


Plate 1.1: Map of Iran (source: https://maps-for-free.com).

Plate 1.2: Landscape around Veshnaveh (photo: N. Bagherpour Kashani).

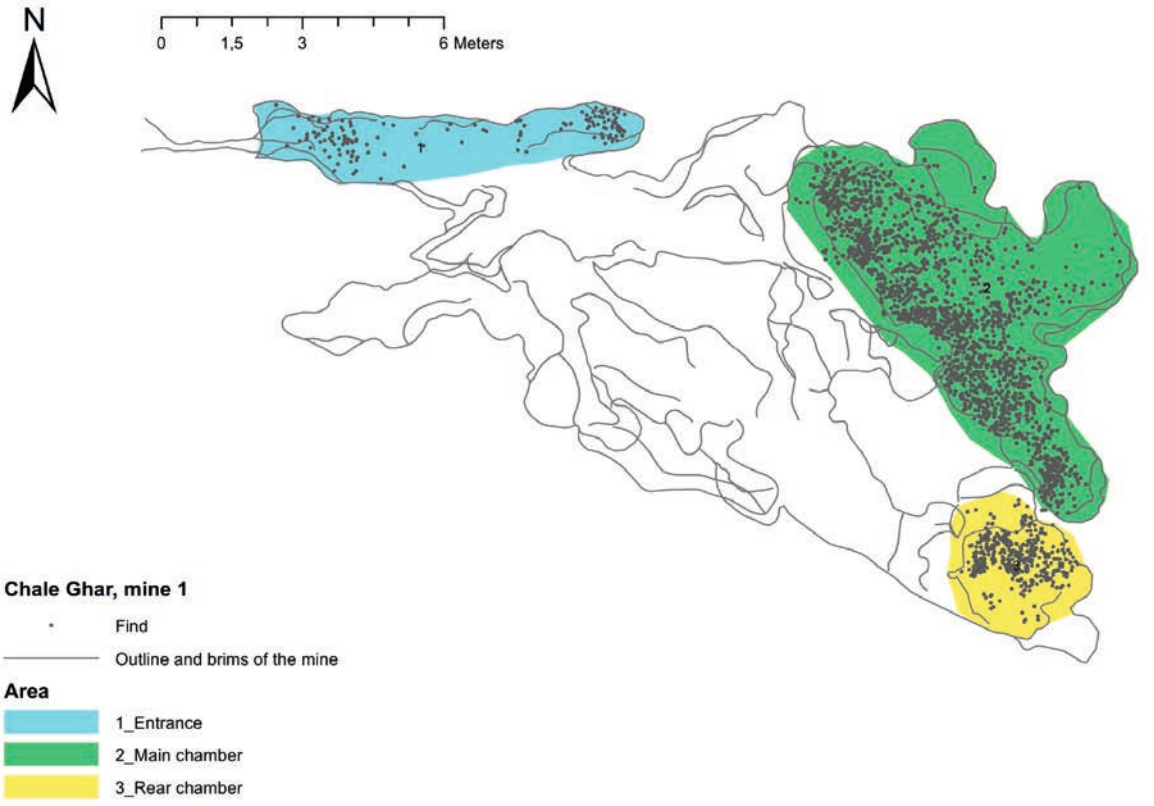


Plate 2.1: Outline of Chale Ghar 1 (illustration: N. Bagherpour Kashani).

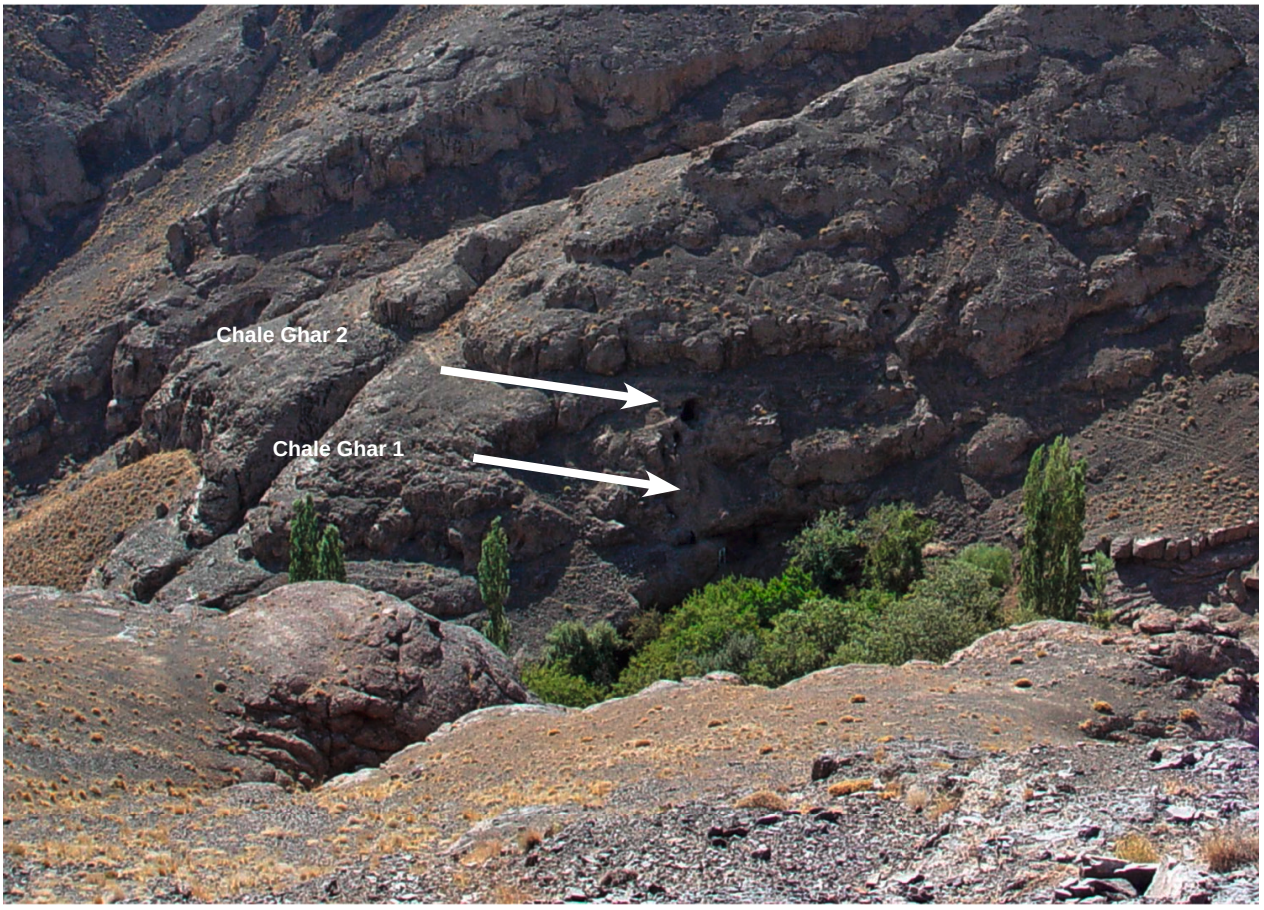


Plate 2.2: Exterior view of Chale Ghar 1 and 2 (photo: N. Bagherpour Kashani).

Plate 3.1: The main chamber of Chale Ghar 1 before excavation (photo: Deutsches Bergbau-Museum Bochum).

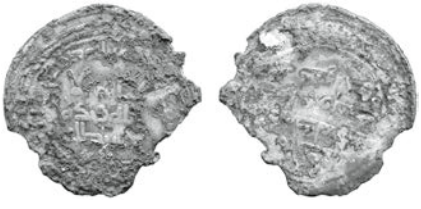
Plate 3.2: Feature in the Main chamber (photo: Deutsches Bergbau-Museum Bochum).

ChG 1348, scale 1:1

ChG 1639, scale 1:1

ChG 1217c, scale 1:1

ChG 1835i, scale 1:1



ChG 4456, scale 1:1

Plate 4: Coins from Veshnaveh (photos: Deutsches Bergbau-Museum Bochum).

ChG 4299c, scale 2:1

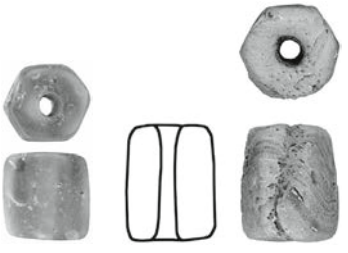
ChG 1629e, scale 2:1

ChG 1629f, scale 2:1

ChG 1883c23, scale 2:1

ChG 1782c, scale 2:1

ChG 1949f, scale 2:1



ChG 1171a, 1776a, scale 2:1

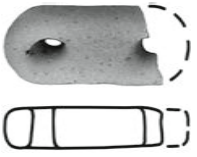
ChG 4571b, scale 2:1

Plate 5: Monochrome glass beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4950, scale 2:1

National Museum of Iran no. 3497, scale 1:1

ChG 6129, scale 2:10

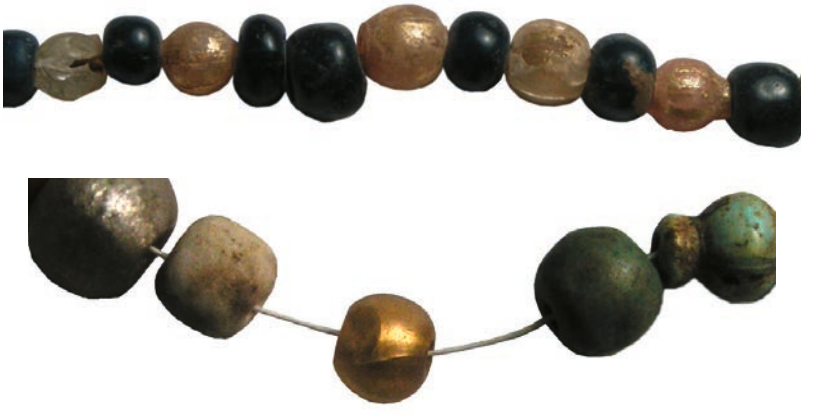


ChG 4318c, scale 2:1

ChG 1872h, 4090e, scale 2:1

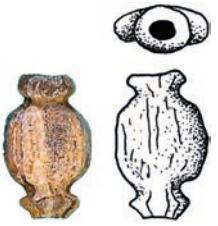
ChG, 4581g, 1752a, scale 2:1

ChG 1222b2, 1202, scale 2:1



Teheran National Museum 3473, 4412 scale 2:1

Plate 6: Monochrome glass beads and gold-in-glass beads from Veshnaveh (photos: Deutsches Bergbau-Museum Bochum). Translucent melon bead from Germi (no. 3497) and gold-in-glass beads from Abadije Sheikhlar and Khalkhal (nos. 3473, 4412) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).



ChG 1752b, scale 2:1

ChG 1949o, scale 2:1

Teheran National Museum no. 3490, scale approx. 2:1

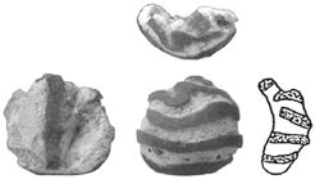
ChG 4596d, scale 2:1

ChG 1799i, scale 2:1

ChG 4768b, scale 2:1

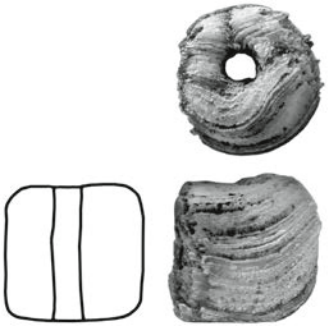
ChG 4924c3, scale 2:1

ChG 4494c11, scale 2:1

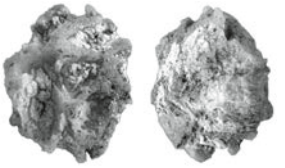


ChG 1396b2, scale 3:2

Plate 7: Gold-in-glass and stripe decorated glass beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Collared gold-in-glass beads from Germi (no. 3490) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).



ChG 1831n, scale 2:1



ChG 4582b, scale 2:1

ChG 1844, scale 2:1

ChG 4960c1, scale 2:1

ChG 1883c22, scale 3:1

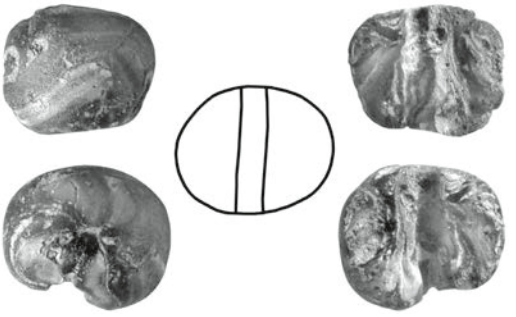
ChG 1834a, scale 2:1

ChG 1529, scale 2:1

Plate 8: Stripe decorated glass beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

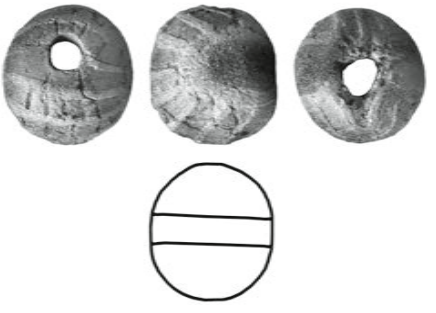
ChG 4416b, scale 2:1

ChG 1115a, scale 2:1



ChG 4273, scale 2:1

ChG 4475a, scale 2:1



ChG 4451, scale 2:1

ChG 4732a, scale 2:1

Plate 9: Stripe, variously decorated and mosaic glass beads from Veshnaveh (photo and drawings: Deutsches Bergbau-Museum Bochum).

ChG 1472, scale 2:1

ChG 6885, scale 2:1

ChG 1875, scale 2:1

ChG 4326 scale 2:1

ChG 1163, 4924c1, scale 2:1

National Museum of Iran, no. 3497, scale 2:1

ChG 4311b, scale 2:1

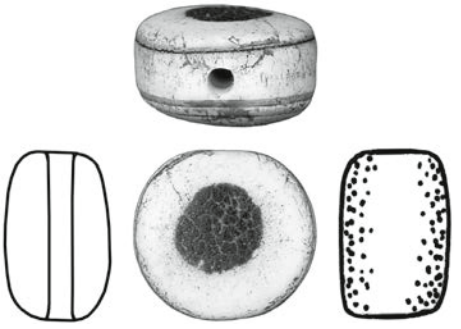
ChG 7002a, scale 2:1

Plate 10: Mosaic and eye glass beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Eye glass bead from Germi (no. 3497) (photo: N. Bagherpour Kashani with permission of the National Museum of Iran).

ChG 6135a4, scale 2:1

ChG 1018c2, scale 4:1

ChG 4960c2, scale 2:1



ChG 1847, scale 2:1

ChG 6098c2, scale 2:1

ChG 6151a3, scale 4:1

ChG 4483, scale 2:1

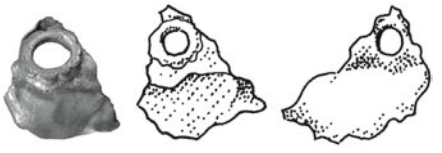
ChG 1087c, scale 2:1

Plate 11: Mosaic and eye glass beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

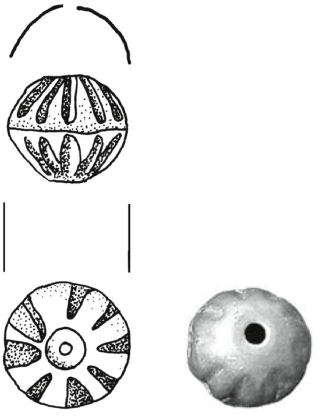
ChG 1087d, scale 2:1

ChG 1718a, scale 2:1

ChG 1986, scale 2:1



ChG 4924d1, scale 3:1



ChG 1206a, scale 2:1

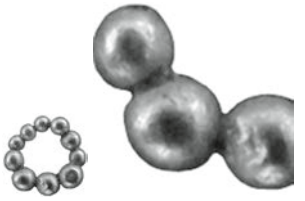
ChG 1206b, scale 2:1

ChG 1206c, scale 3:1

ChG 4270, scale 3:1

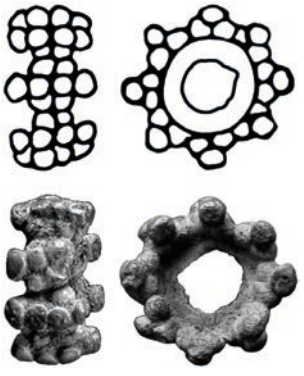
Plate 12: Eye glass beads and metal beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4962c2, scale 3:1



ChG 1349, and detail scale 2:1 and 4:1

ChG 1195a, scale 3:1



ChG 4296c, scale 2:1

ChG 1086, scale 1:1

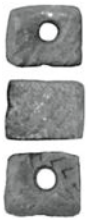
ChG 4494d, scale 1:1

National Museum of Iran 2473, scale 4:1

National Museum of Iran 2478, scale 4:1

National Museum of Iran 5644, D. of beads 0.55-0.6 cm

Plate 13: Metal beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Beads of unknown origins (nos. 2473, 2478) and Kaluraz (no. 5644) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).

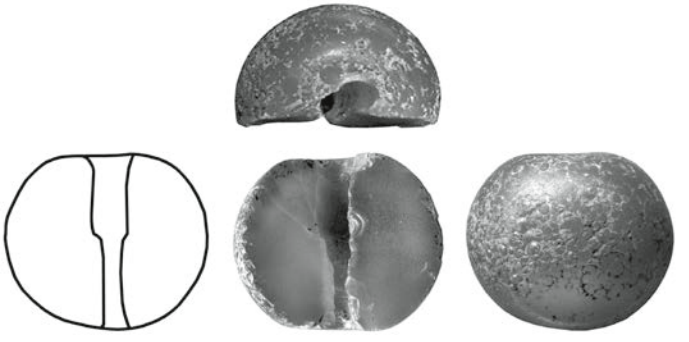


ChG 1295b, scale 2:1

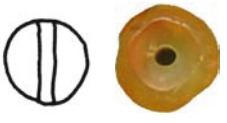
ChG 1342, scale 2:1

ChG 1501, scale 2:1

ChG 1872f, scale 3:1

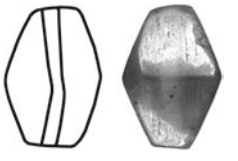


ChG 4518, scale 2:1



ChG 1516, scale 2:1

ChG 1212e, scale 2:1



ChG 1843, scale 2:1

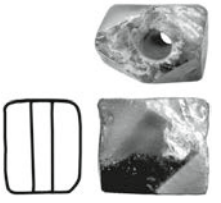
Plate 14: Metal and cornelian beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 1148, scale 2:1

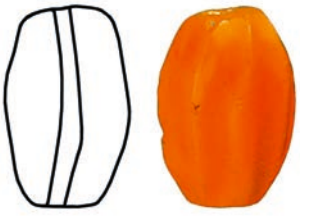
ChG 1592b, scale 2:1

ChG 6290, scale 2:1

ChG 1230, scale 2:1



ChG 4581h, scale 2:1



ChG 1540, scale 2:1

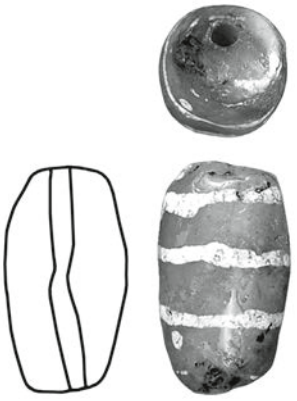
ChG 4345, scale 2:1

ChG 6090, scale 2:1

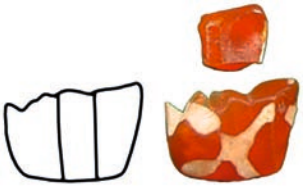
ChG 1860, scale 2:1

Plate 15: Cornelian beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 1212c, scale 2:1



ChG 1778, scale 2:1

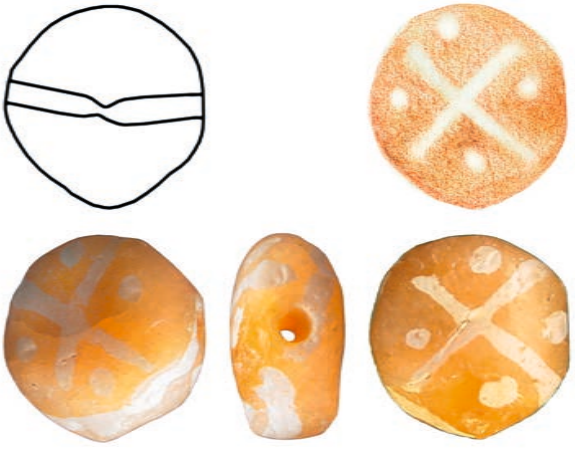


ChG 1941b, scale 2:1

National Museum of Iran 2569, scale approx. 2:1

ChG 1206d, scale 2:1

ChG 1117, scale 2:1

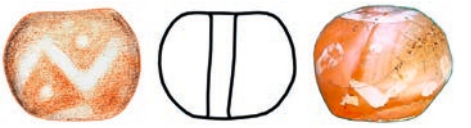


ChG 4480, scale 2:1

ChG 1635, scale 2:1

Plate 16: Etched cornelian beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Etched cornelian bead from Susa (no. 2569) (photos: N. Bagherpour Kashani with permissionof the National Museum of Iran).

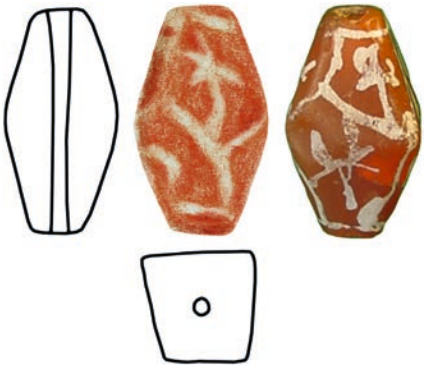
ChG 1679b, scale 2:1



ChG 1773, scale 2:1

National Museum of Iran 5857, scale 2:1

ChG 1106, scale 2:1



ChG 1577, scale 2:1

National Museum of Iran 5858, scale 2:1

National Museum of Iran 5867, scale 2:1

National Museum of Iran 5869, scale 2:1

Plate 17: Etched cornelian beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Etched cornelian beads from Rudbar (nos. 5858, 5867, 5869) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).

National Museum of Iran 3815, scale 2:1

National Museum of Iran 3822, scale 2:1

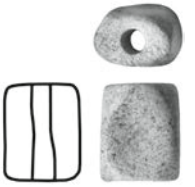
National Museum of Iran 2566, scale 2:1

National Museum of Iran 2569, scale 2:1

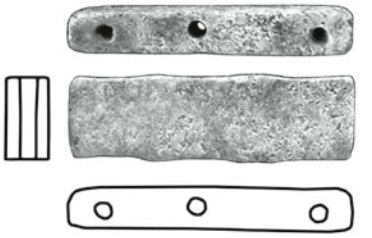
ChG 1947, scale 2:1

ChG 1790c, scale 2:1

ChG 1883c9, scale 2:1



ChG 4517d, scale 2:1



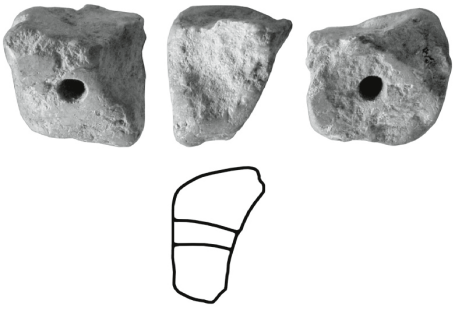
ChG 4584c, scale 2:1

Plate 18: Etched cornelian, garnet and lapis lazuli beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Etched cornelian beads from Djuben (nos. 3815, 3822) and Susa (nos. 2566, 2569) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).

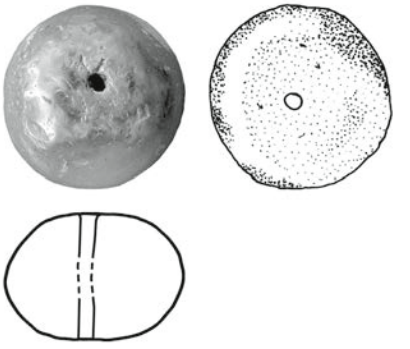
Kush x 201, scale 2:1

ChG 4333e, scale 2:1

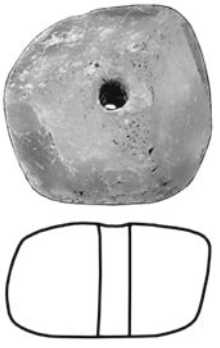
ChG 4516c, scale 2:1



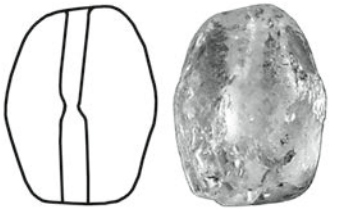
ChG 1883c11, scale 2:1



ChG 1072, scale 1:1



ChG x, scale 2:1



ChG 4594, scale 2:1

ChG 1480, scale 2:1

Plate 19: Lapis lazuli bead from Kush (no. x 201) (photos: N. Bagherpour Kashani with permission of the British Museum). Jet, turquoise and other stone beads from Veshnaveh (photos and drawings: Deutsches-Bergbau-Museum Bochum).

Kush x 209, scale 2:1

Kush x 424, scale 2:1

ChG 1188, scale 2:1

ChG 4760a, scale 2:1

ChG 1734b, scale 2:1

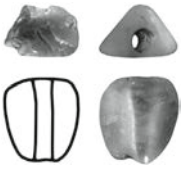
ChG 1790d, scale 2:1

ChG 1400a, scale 2:1

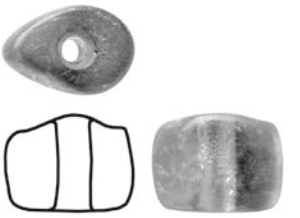
ChG 6198, scale 2:1

Plate 20: Rock crystal beads from Kush (nos. x 209, x 424) (photos: N. Bagherpour Kashani with permission of the British Museum). Amber beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4841a, scale 2:1



ChG 1883c13, scale 2:1



ChG 1103b, scale 2:1

ChG 6888a, scale 2:1

ChG 6870b, scale 2:1

ChG 6909d, scale 2:1

ChG 6878a3, scale 2:1

ChG 7134b, scale 2:1

ChG 7135c4, scale 2:1

Plate 21: Amber and shell beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 6993, scale 2:1

ChG 6846, scale 2:1

ChG 6871a, scale 2:1

ChG 7226, scale 2:1

Kush x 94, scale 2:1

Siraf 252, scale 3:1

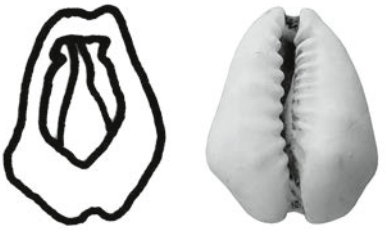
ChG 6882d, scale 3:1

ChG 7166c4, scale 3:1

Siraf 174, scale 3:1

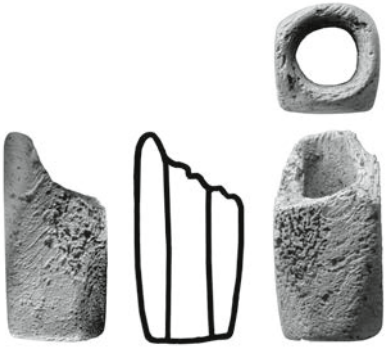
Plate 22: Shell and nacre beads from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Shell beads from Kush (no. x 94) and shell and nacre beads from Siraf (no. 174) (photos: N. Bagherpour Kashani with permission of the British Museum).

Kush x 275, scale 3:1



ChG 6865, scale 2:1

ChG 4403a, scale 2:1

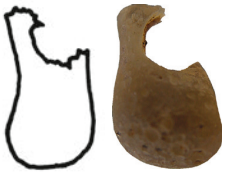


ChG 1612a, scale 2:1

ChG 4189b, 6151a2, scale 2:1

ChG 1848, scale 2:1

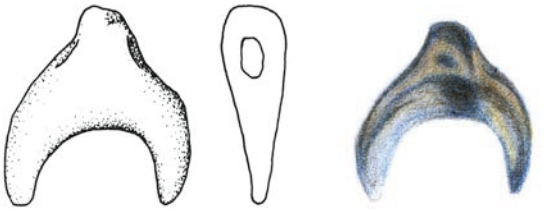
ChG 1883c26, scale 2:1



ChG 6044, scale 2:1

National Museum of Iran no. 3500, scale 2:1

Plate 23: Nacre bead from Kush (no. x 275) (photos: N. Bagherpour Kashani with permission of the British Museum). Beads of shell, and of organic material, and glass pendants from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Glass pendant from Germi (photo: N. Bagherpour Kashani with permission of the National Museum of Iran).

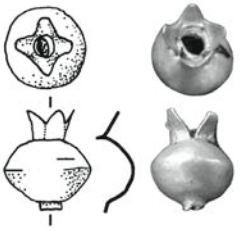


ChG 1965g, scale 2:1

ChG 6084, scale 2:1

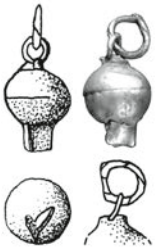
ChG 4496a, scale 2:1

ChG 6837a, scale 2:1



ChG 1250, scale 2:1

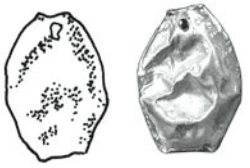
ChG 1768a, scale 2:1



ChG 4666a, scale 2:1

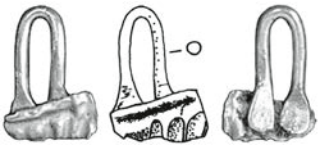
ChG 6919, scale 2:1

Plate 24: Glass and metal pendants from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



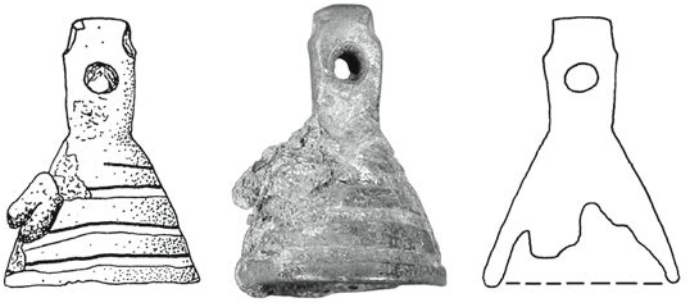
ChG 4663, scale 3:2

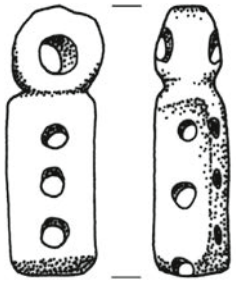
ChG 1993b, scale 2:1



ChG 1212g, scale 2:1

ChG 1872e, scale 3:1

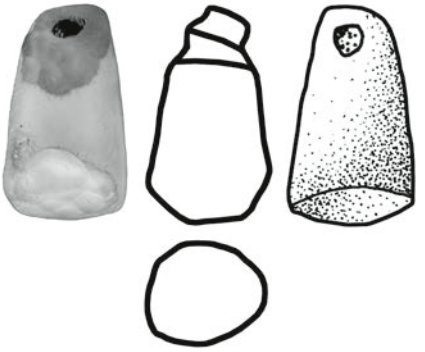




ChG 6840, scale 3:1

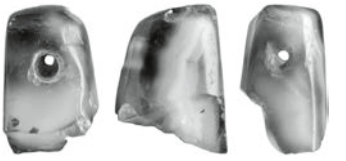
ChG 1739, scale 2:1

Plate 25: Metal pendants from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



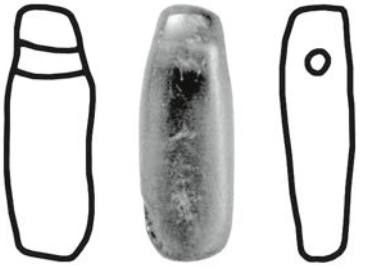
ChG 1087a, scale 2:1

ChG 4266b, scale 2:1



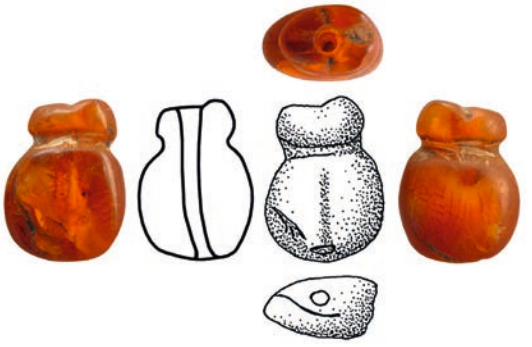
ChG 4347a, scale 2:1

ChG 6195, scale 2:1



ChG 6173 scale 2:1

ChG 6193, scale 2:1



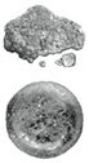
ChG 1107, scale 3:2

ChG 1883c33, scale 2:1

Plate 26: Stone and amber pendants, and a glass inlay from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4750e, scale 2:1

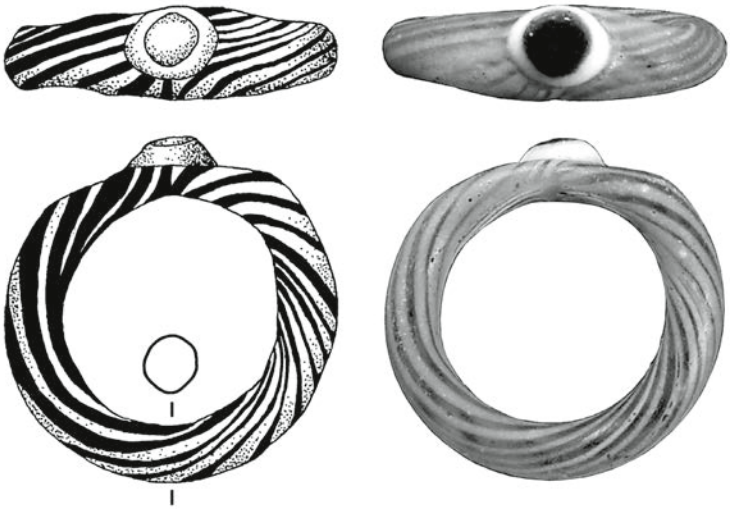
ChG 1295a2, scale 2:1



ChG 1105, scale 2:1

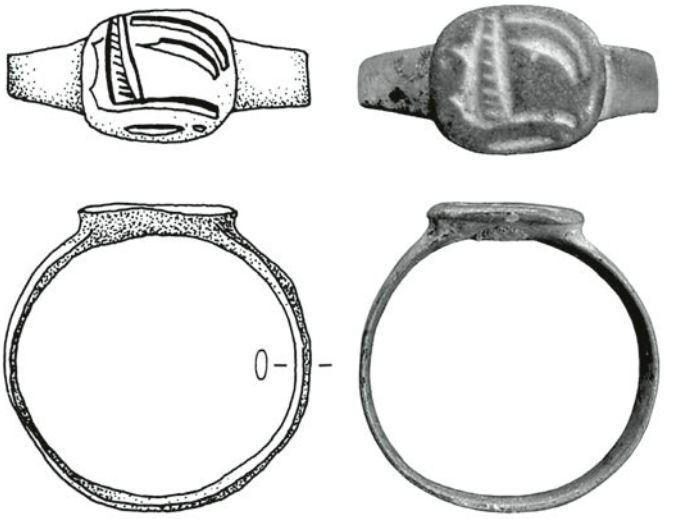
ChG 4954c1, scale 4:1

ChG 1505, scale 3:1

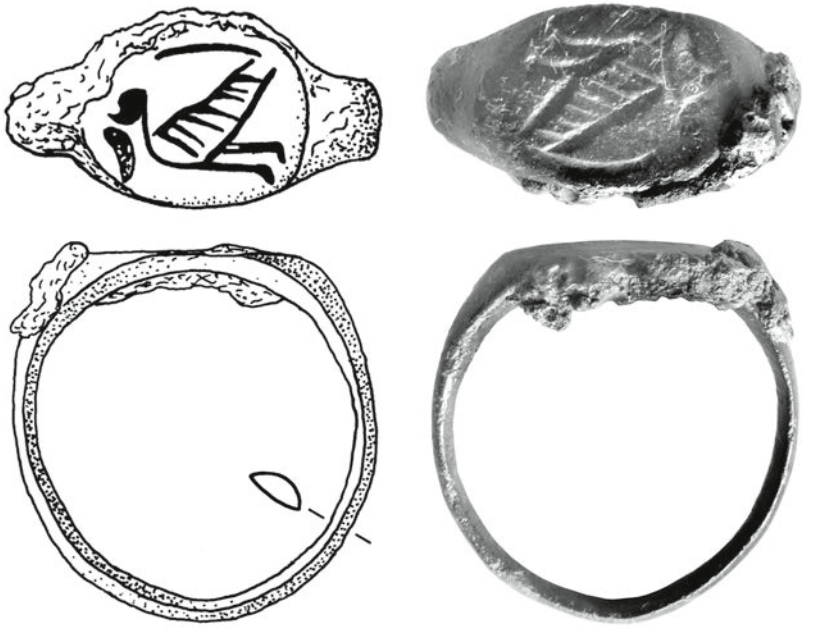


ChG 1903b, scale 2:1

Plate 27: Glass inlays, glass gem, and glass finger ring from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



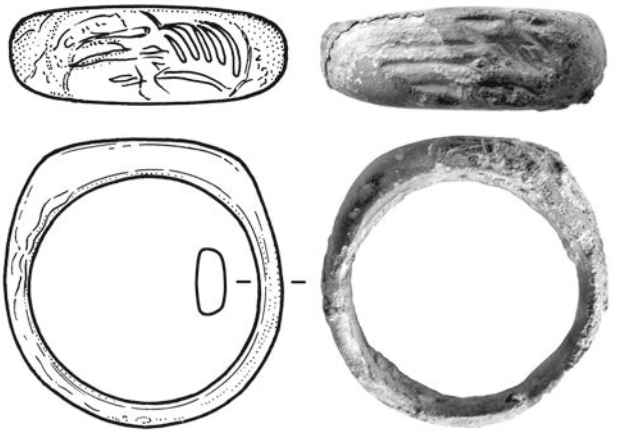
ChG 1814, scale 2:1



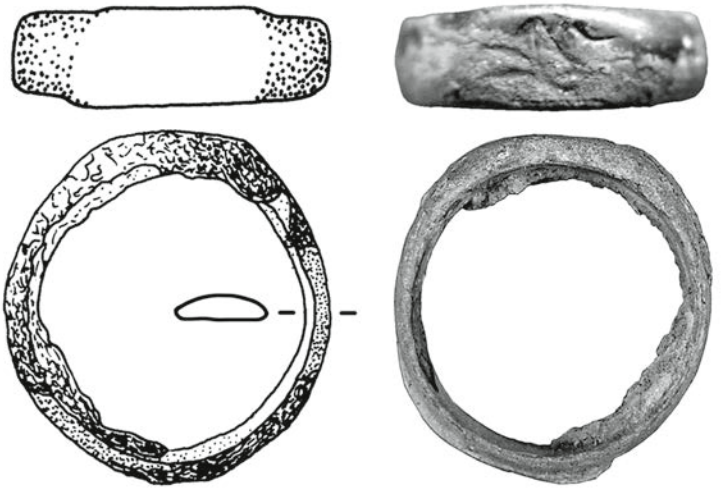
ChG 1517, scale 2:1

Plate 28: Finger rings with decoration of a bird from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4597, scale 3:2

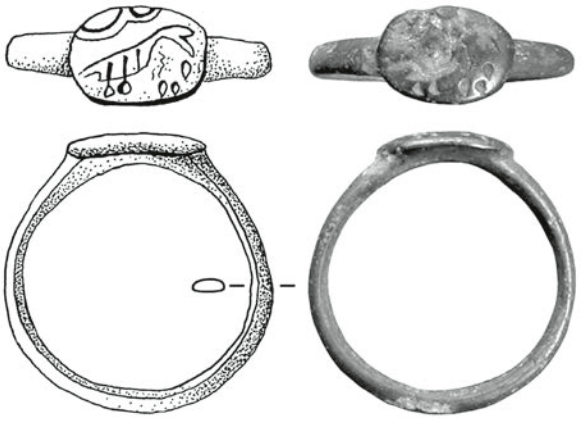


ChG 4516a, scale 2:1



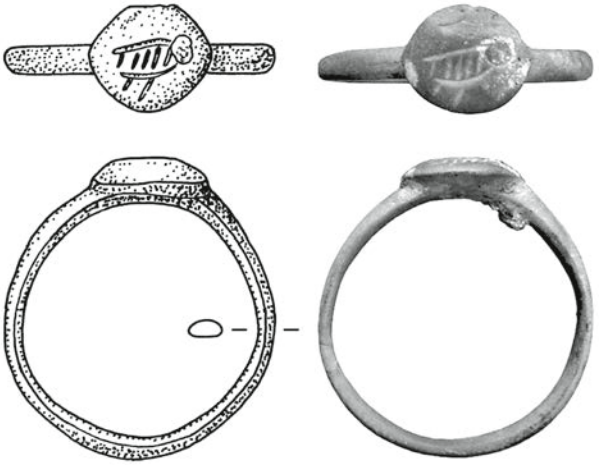
ChG 1793, scale 2:1

Plate 29: Finger rings with decoration of a bird from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

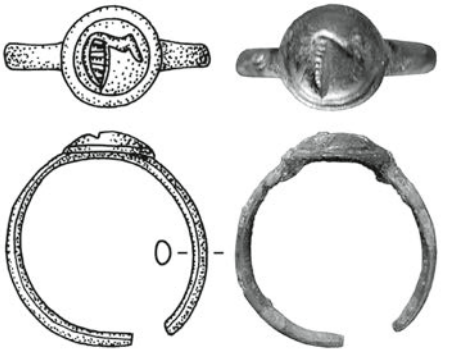


ChG 1846, scale 2:1

ChG 4521, scale 3:2

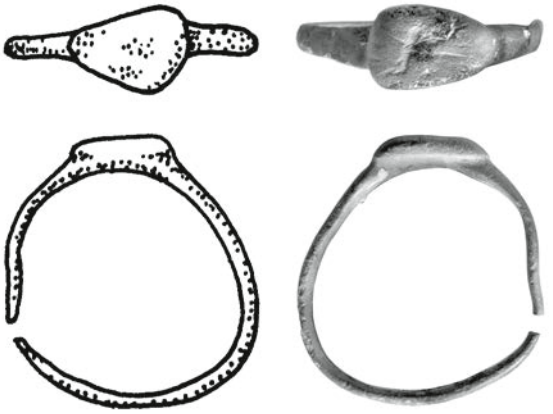


ChG 1828, scale 2:1

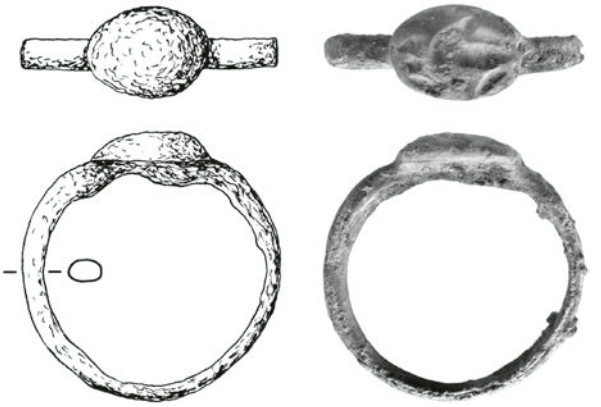


ChG 4531, scale 3:2

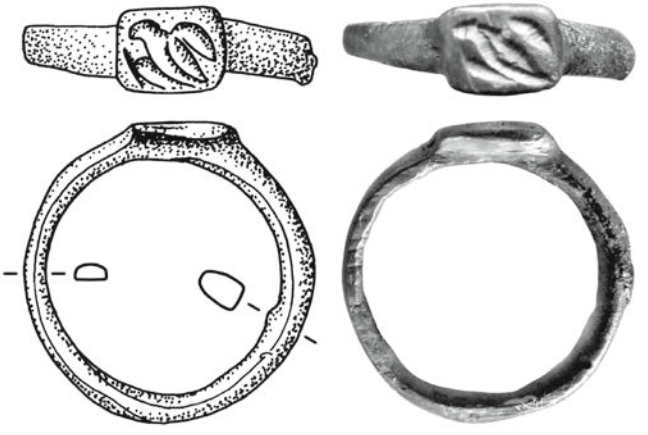
Plate 30: Finger rings with decoration of a bird from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



ChG 4513, scale 2:1

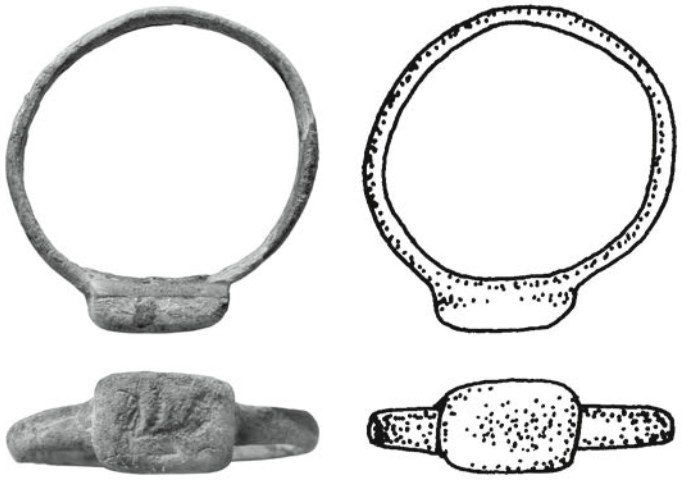


ChG 1824, scale 2:1



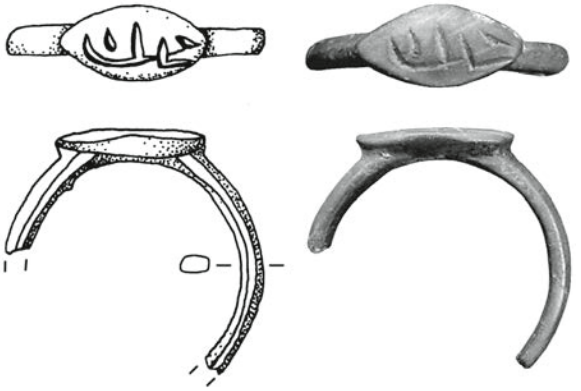
ChG 4515, scale 2:1

Plate 31: Finger rings with decoration of a bird from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

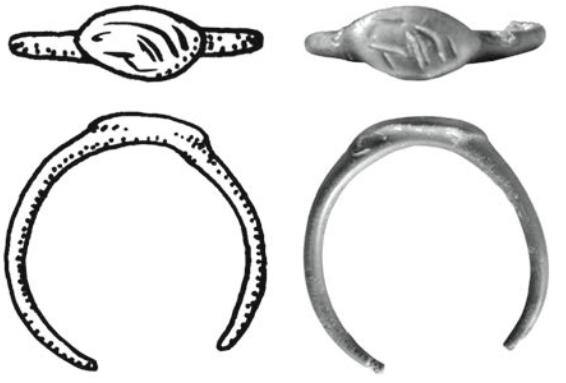


ChG 4523, scale 2:1

ChG 1227, scale 2:1

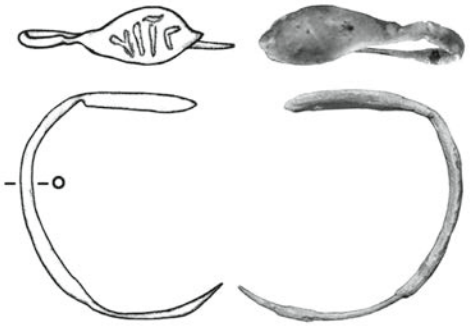


ChG 1829, scale 2:1

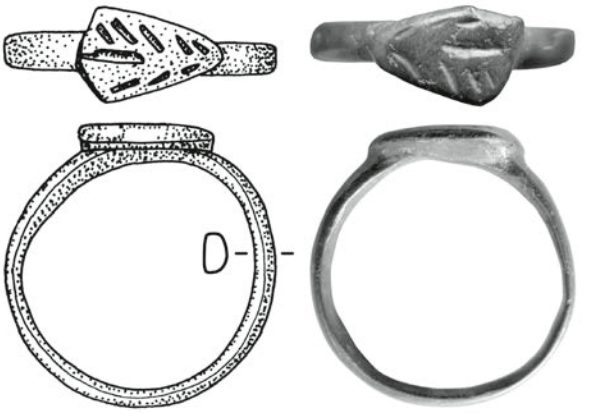


ChG 4498, scale 2:1

Plate 32: Finger rings with decoration of a griffin, a stag and of inscriptions from Veshnaveh (photo and drawings: Deutsches Bergbau-Museum Bochum).

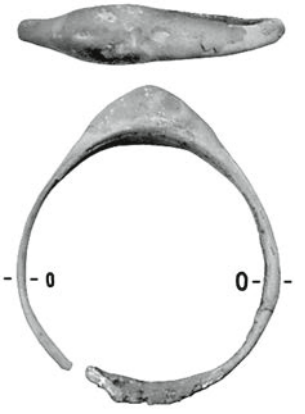


ChG 4240a, scale 2:1



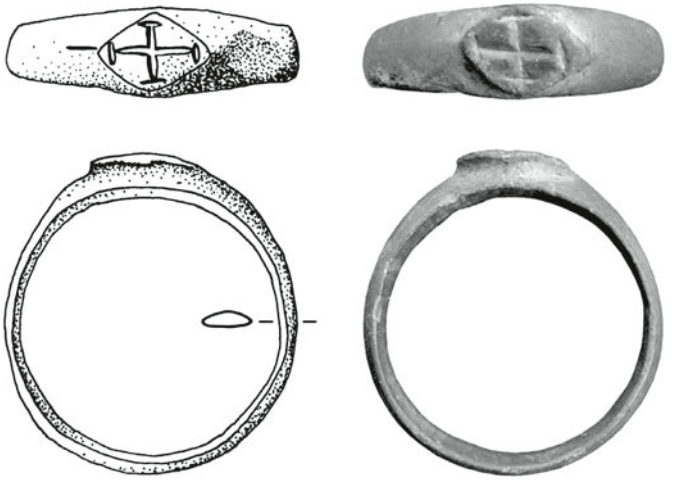
ChG 4311d, scale 2:1

ChG 4442a, scale 2:1

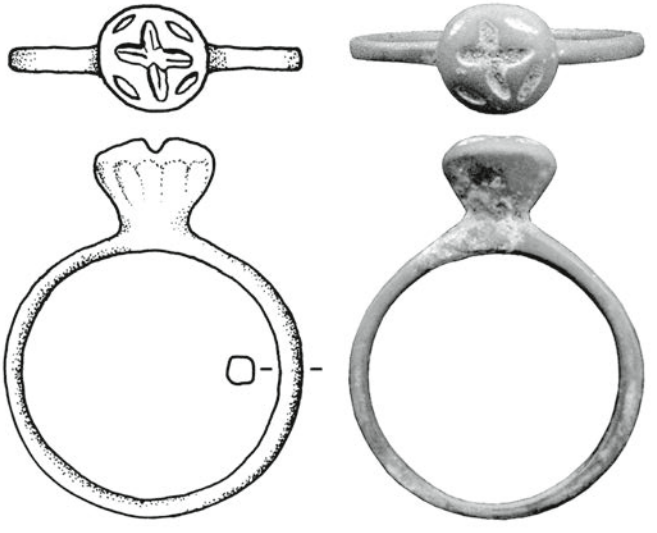


ChG 1638a, scale 2:1

Plate 33: Finger rings with decoration of inscription and plants from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

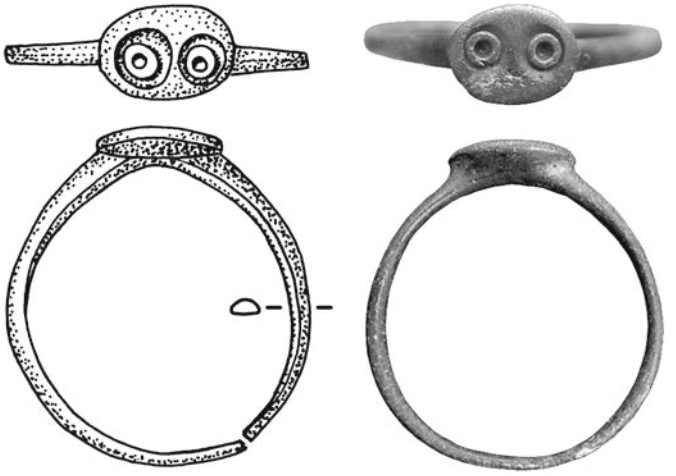


ChG 1820, scale 2:1



ChG 1091, scale 2:1

Plate 34: Finger rings with decoration of a cross from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

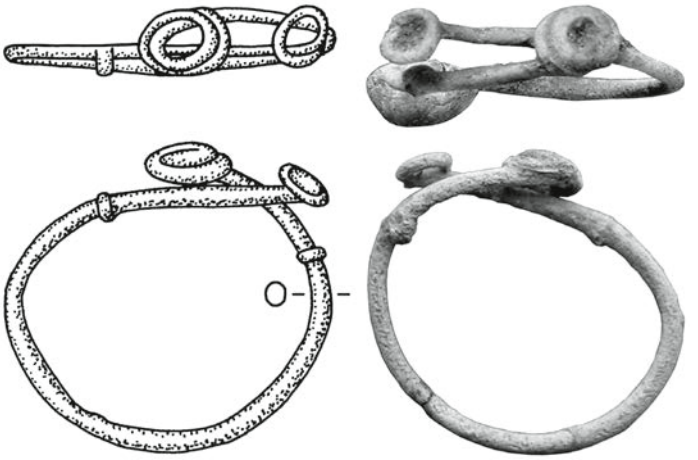


ChG 1807, scale 2:1

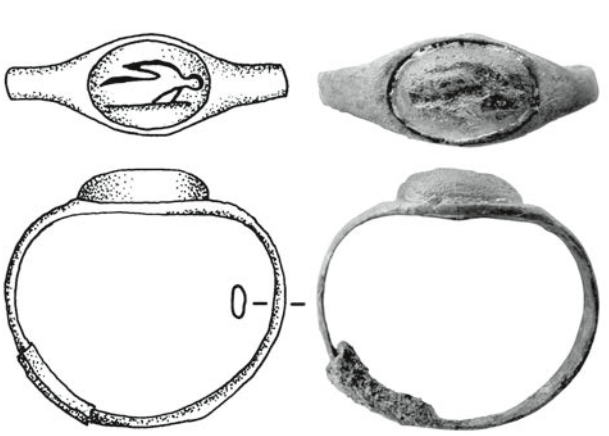
ChG 6064a, scale 2:1

ChG 4574c, scale 2:1

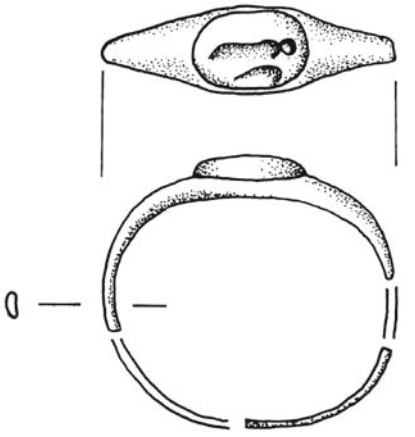
Plate 35: Finger rings with decoration of circles or eyes and rings of other decorations from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



ChG 4339a, scale 2:1

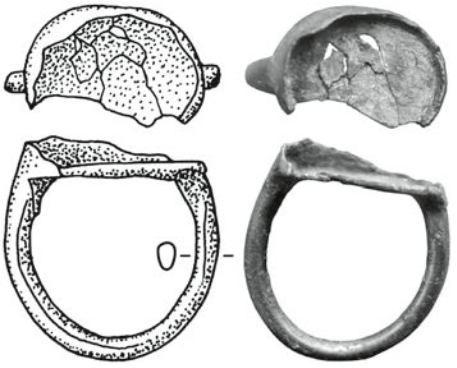


ChG 1108, scale 2:1

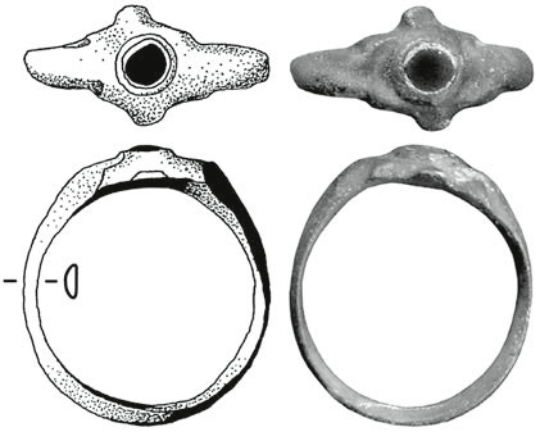


ChG 1131, scale 2:1

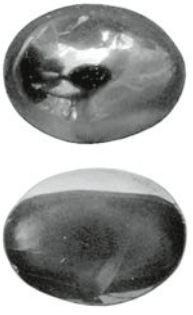
Plate 36: Spiral finger ring and finger rings with green glass inlay from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



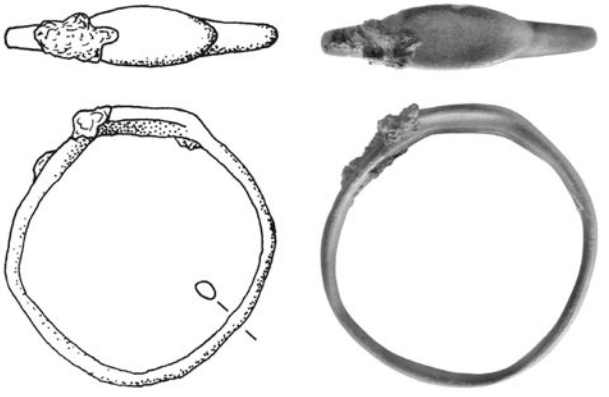
ChG 4445, scale 2:1



ChG 4182a, scale 2:1

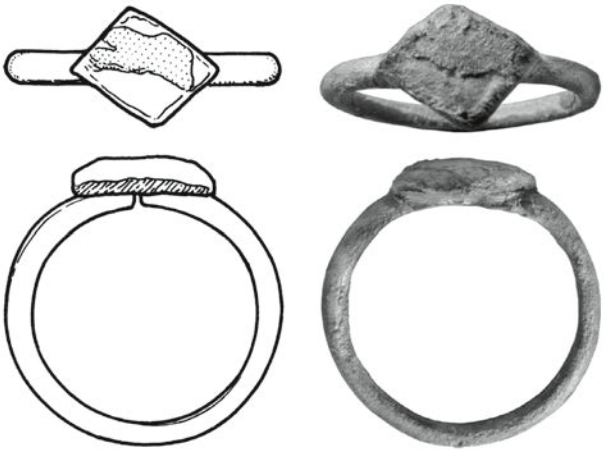


ChG 1228, scale 2:1



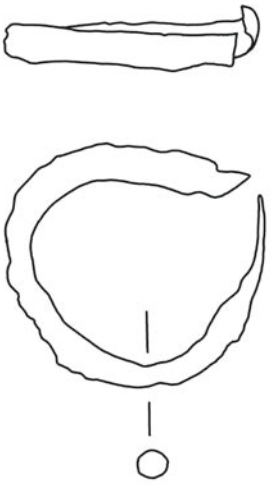
ChG 1826, scale 2:1

Plate 37: Finger rings with lost inlay, blue eye inlay and plain from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



ChG 4341a, scale 2:1

ChG 4478, scale 3:2



ChG 1775a, scale 2:1

ChG 1110, scale 2:1

ChG 1783a, scale 2:1

Plate 38: Plain finger rings from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

National Museum of Iran no. 2998, scale 2:1

National Museum of Iran no. 2977, scale 2:1

National Museum of Iran no. 2951, scale 2:1

National Museum of Iran no. 3020, scale 2:1

National Museum of Iran no. 2983a, scale 2:1

National Museum of Iran no. 3011, scale 2:1

Plate 39: Finger rings with decoration of birds, incisions or inscriptions and plant decoration from Siah Darreh (nos. 2998, 2977, 2983), Rudbar (no. 2951), Amolu (no. 3020) and Khark (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).

National Museum of Iran no. 3009, scale 2:1

National Museum of Iran no. 2952, scale 2:1

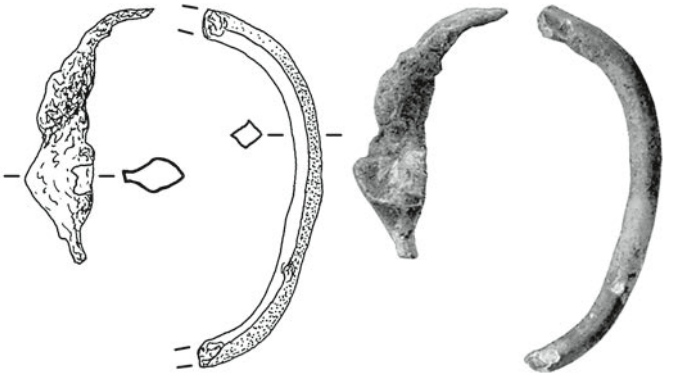
National Museum of Iran no. 3003, scale 2:1

National Museum of Iran no. 3140, scale 2:1

National Museum of Iran no. 3002, scale 2:1

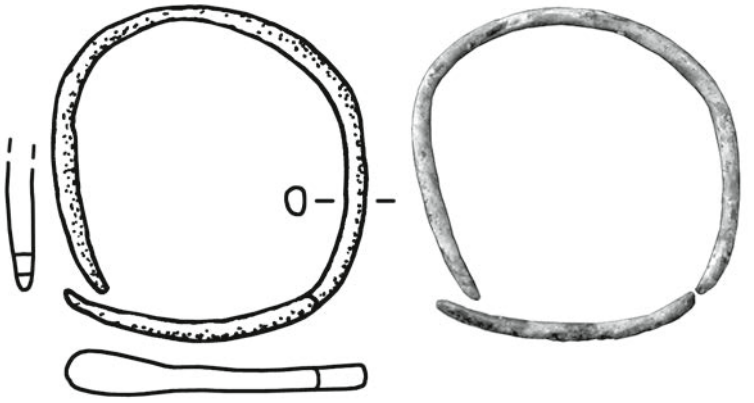
National Museum of Iran no. 3142, scale 1:1

Plate 40: Finger rings with decoration of plants and eyes from Sia Darreh (nos. 3009, 3003, 3002), Rudbar (no. 2952) and Cheragh Ali Tappeh (Marlik) (nos. 3140, 3142) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).

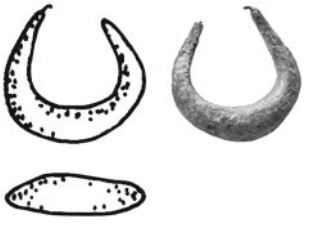


ChG 1574, scale 2:1

ChG 4476a, scale 2:1

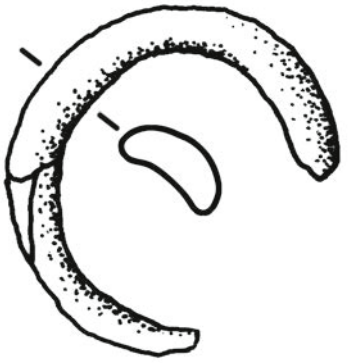


ChG 1347, scale 2:1



ChG 4497a, scale 2:1

Plate 41: Metal earrings from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).



ChG 1336b, scale 2:1

ChG 6389a1, scale 2:1

ChG 4188f, scale 2:1

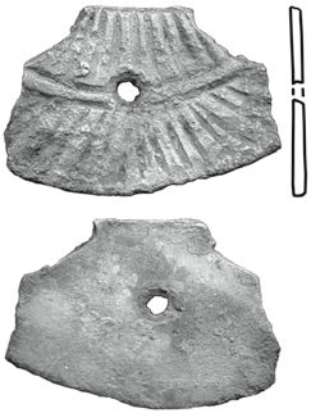
ChG 4302a, scale 2:1

ChG 4527, scale 2:1

ChG 6787d, scale 2:1

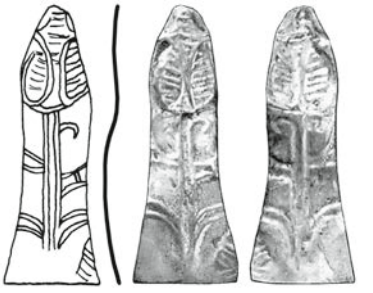
Plate 42: Metal earrings and a shell earring from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4454, scale 2:1

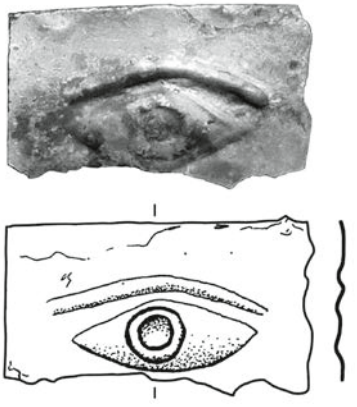


ChG 4568d, scale 2:1

ChG 4409a, scale 1:1



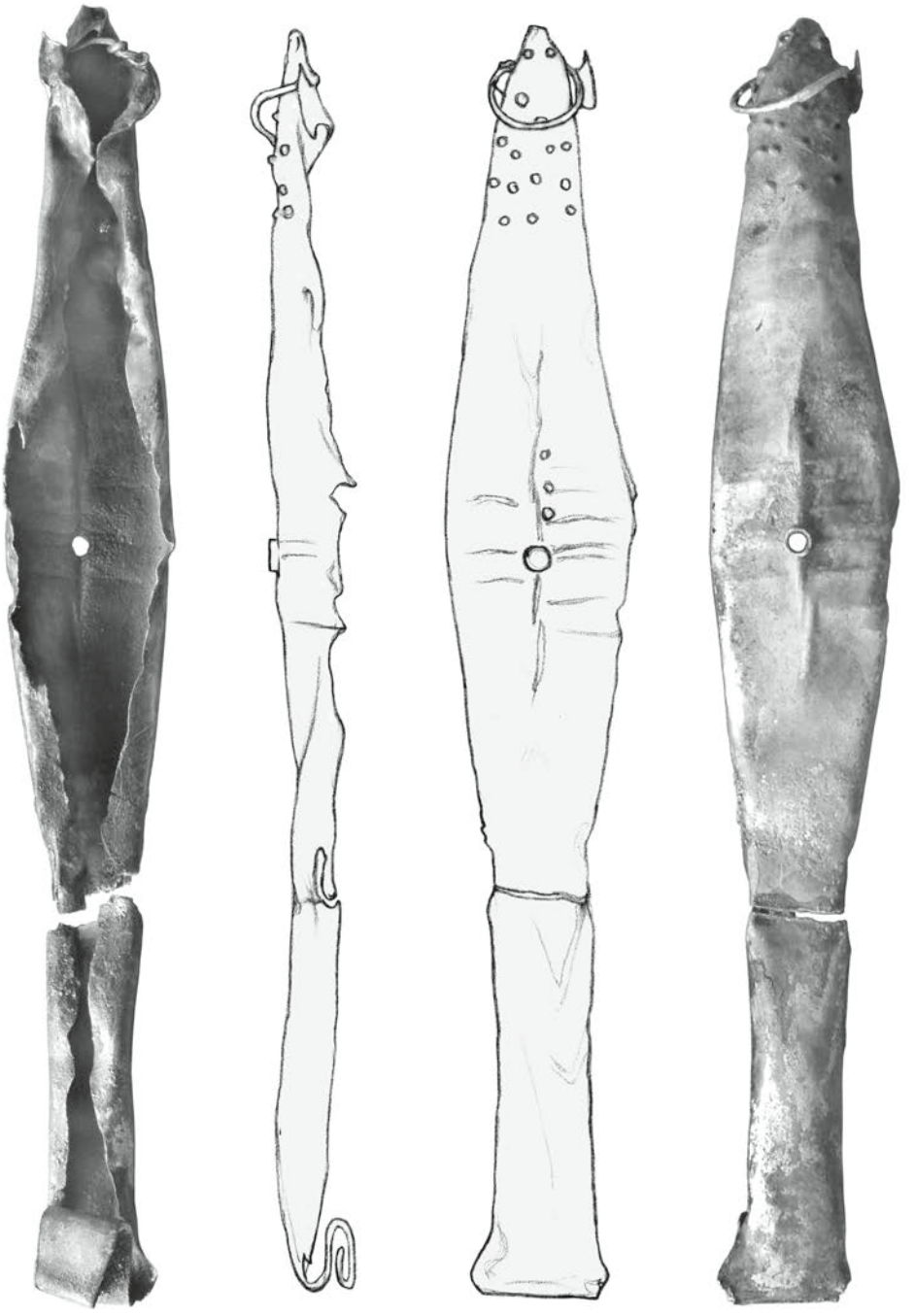
ChG 4581f, scale 2:1



ChG 1813, scale 2:1

4408a, scale 2:1

Plate 43: Decorated metal sheets from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

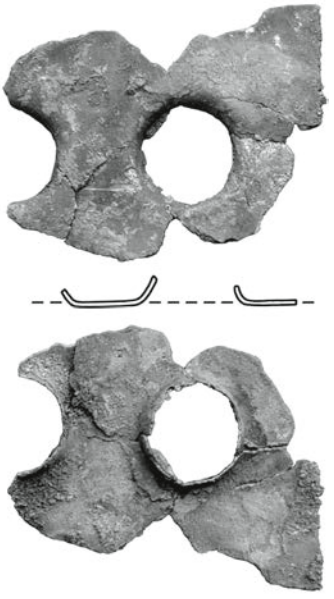


ChG 4526, scale 2:1

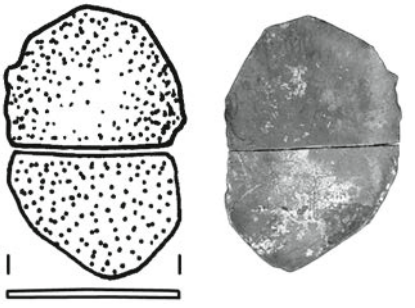
Plate 44: Fish amulet from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

ChG 4183a, scale 2:1

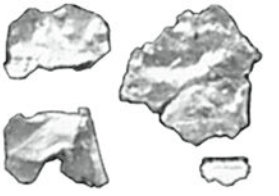
4457a, scale 2:1



ChG 1883a, scale 2:1



ChG 4424a, scale 2:1

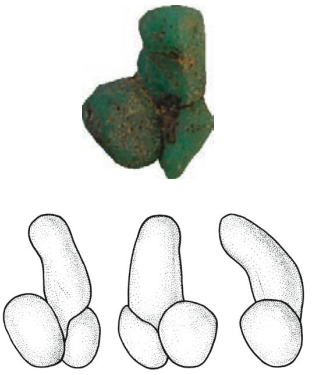


ChG 4750a, scale 4:1

National Museum of Iran no. 4546,
scale 1:1

National Museum of Iran no. 2430,
scale 1:1

Plate 45: Decorated and plain metal sheets from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Gold sheets with plant pattern from Masjid-e Suleiman (no. 4546) and of unknown origin (no. 2430) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).



ChG 6560b2, scale 4:1

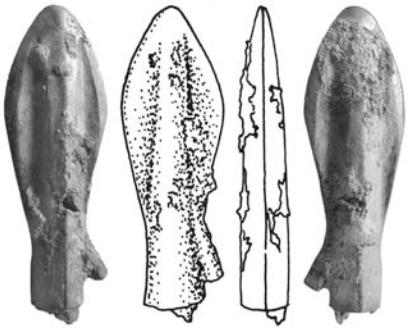
National Museum of Iran no. 3352, scale 2:1

ChG 6751, scale 2:1

ChG 4553, scale 1:1

ChG 7141, scale 1:1

Plate 46: Glass objects and glass vessels from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Glass phallus from Germi (no. 3352) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).



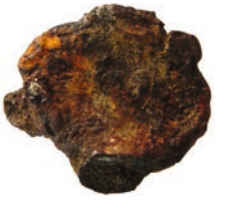
ChG 4492a, scale 1:1

ChG 1172, 1957k, scale 3:1

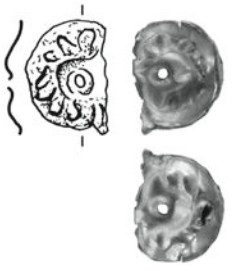
ChG 6704, scale 2:1

ChG 6931, scale 2:1

ChG 1465, scale 2:1



ChG 7147, scale 2:1

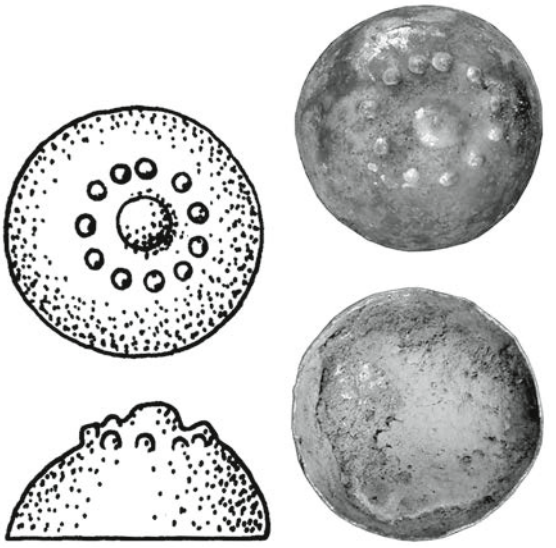


ChG 1252, scale 2:1

ChG 1232, scale 2:1

ChG 6131e, scale 2:1

Plate 47: Miscellaneous metal objects from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

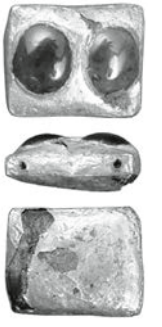


4468a, scale 2:1

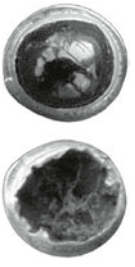
ChG 4476a1, scale 2:1

ChG 6892, scale 4:1

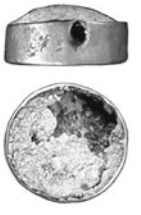
ChG 4563, scale 3:1



ChG 1617, scale 2:1



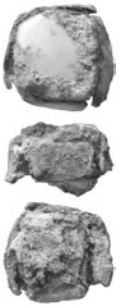
ChG 1251, scale 2:1



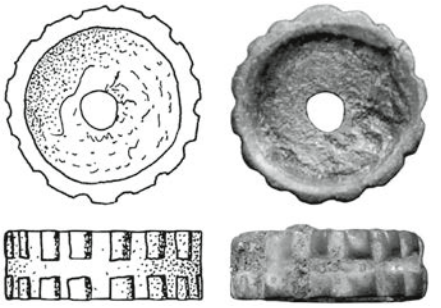
ChG 1907b, scale 2:1

ChG 1468, scale 4:1

Plate 48: Miscellaneous metal and stone objects from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum).

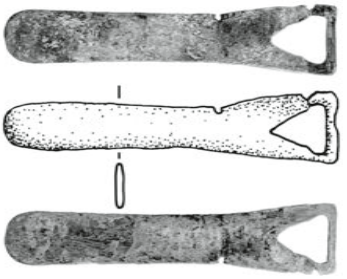


ChG 4450, scale 2:1



ChG 1809, scale 2:1

ChG 4485b, scale 2:1



ChG 1096, scale 1:1

ChG 1949p, scale 2:1

ChG 4692a, scale 3:2

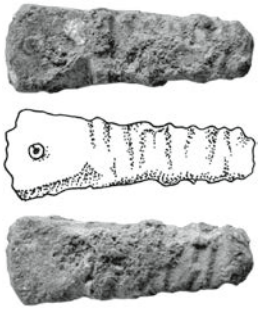
ChG 6921c, scale 1:1

ChG 4416a, scale 1:1

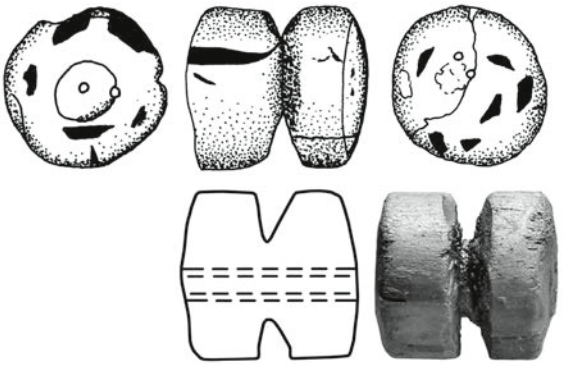
Modern metal amulet containing Qur´an verses with antique beads, from Iran, scale 1:1

Plate 49: Miscellaneous metal and stone objects from Veshnaveh (photos and drawings: Deutsches Bergbau-Museum Bochum). Recent amulet from Iran containing Qur'an verses, with ancient beads; private collection (photo: N. Bagherpour Kashani).

ChG 6928, scale 2:1



ChG 4732d, scale 3:1



ChG 4149c, scale 1:1

ChG 6079a4, scale 3:1

ChG 1289b, scale 1:1

National Museum of Iran 4546, scale 2:1

Plate 50: Miscellaneous metal objects from Veshnaveh (photographs and drawings: Deutsches Bergbau-Museum Bochum). Gold appliqué from Masjid-e Suleiman (no. 4546) (photos: N. Bagherpour Kashani with permission of the National Museum of Iran).

Modern Egyptian hand amulett, scale 1:2

Finger ring with decoration of hands from Yazd/Iran, scale 1:2

Fish amulet made of clay from Iran, scale 1:2

Plate 51: Modern amulets from Egypt and Iran. Private Collection (photos: N. Bagherpour Kashani).

Plate 52.1: The Caraftoo caves in Kurdistan, Iran. Large photo: view from the cave into the landscape. Small photo: view on the cave from south-east (photos: N. Bagherpour Kashani).

Plate 52.2: Inside the widely ramified cave (photos: N. Bagherpour Kashani).

Plate 53.1: Takht-e Suleiman in West-Azarbeijan, Iran, from south-east (photo: N. Bagherpour Kashani).

Plate 53.2: Takht-e Suleiman in West-Azarbeijan, Iran, view on the lake and the Ilkhanid remains (photo: N. Bagherpour Kashani).


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Plate 54: Sanctuary of Pir-e Sabz near Yazd, Iran. The photographs show the location with guest houses (1), the guard in front of the entrance (2), the inside of the sanctuary (3), and water dripping from the rock (4) (photos: N. Bagherpour Kashani).

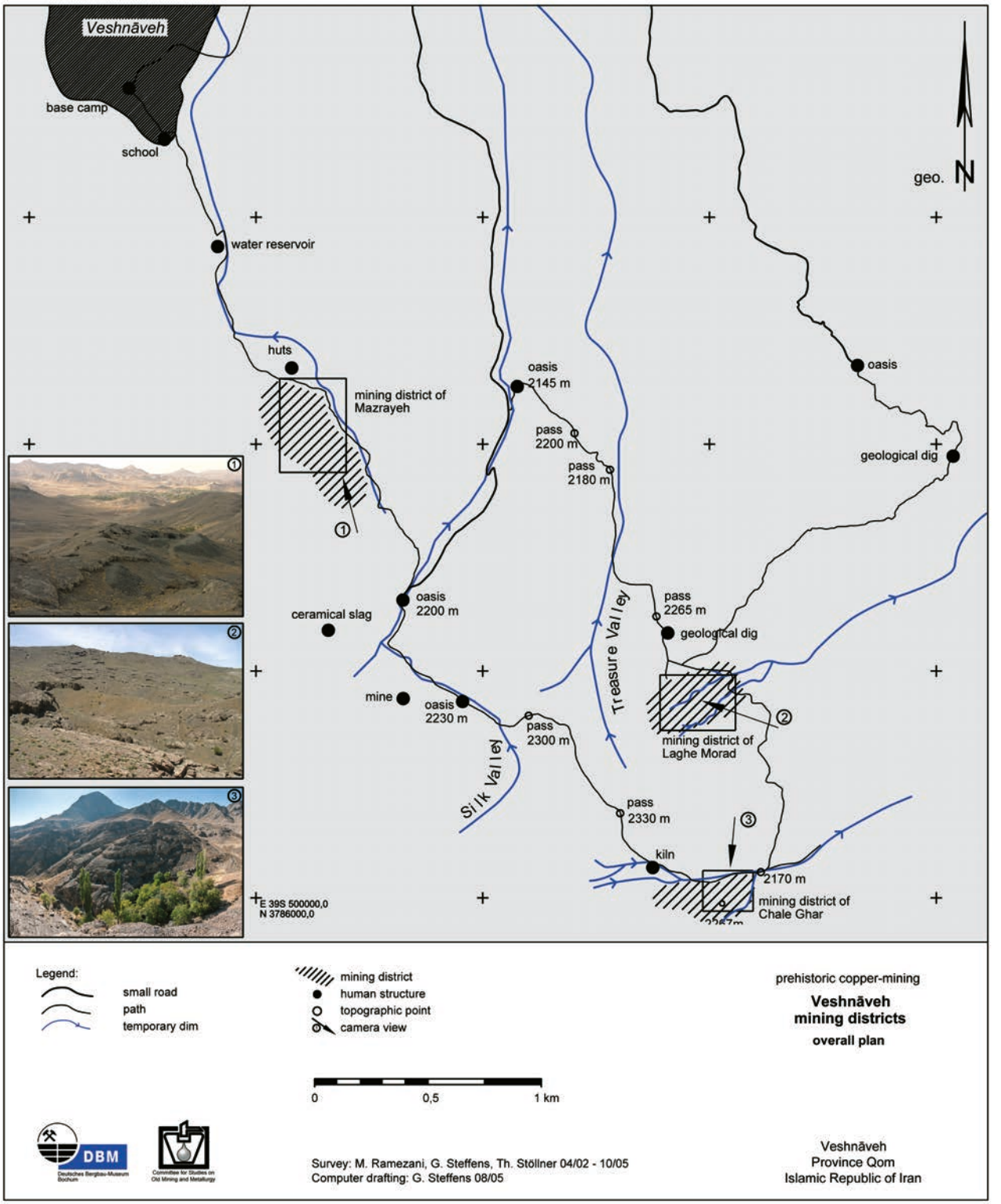

Fig. A: Veshnaveh. Overall map of the area with the three prehistoric mining districts, Mazrayeh, Laghe Morad and Chale Ghar (after Stöllner et al., 2011, Fig. 3).

Fig. B: Mountain scenery of Chale Ghar, view towards east to the valley (photo: DBM, G. Steffens, 2011).