Causes of Neolithic Settlement in the Highland Areas of Northern Oman, Insights from the Qumayrah Valley

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Introduction

The process of Neolithisation of the Arabian Peninsula is currently one of the most interesting research problems of Near Eastern archaeology. Despite over 35 years of research in this field, the fundamental question concerning the genesis of the Neolithic transition in this part of the world remains open. Due to specific geographic and environmental conditions the transformation of hunter-gatherer communities into food producers happened here along different lines than it did in the Fertile Crescent. The over four thousand years long (7100-3100 BC) Late Stone Age in this region is characteristic for the peculiar (compared to the traditional definition of the Neolithic) economic system that developed here, which based predominantly upon pastoralism, intensively supplemented by specialized gathering, fishing and seasonal hunting. This, in turn, influenced human settlement preferences and resulted in a half-nomadic way of life. Permanent settlements were located mainly in the coastal zones along the shores of the Gulf of Oman and the Arabian Sea, as they offered sources of food available throughout the year. Inland regions were frequented during seasonal expeditions connected with herding, hunting, and gathering of raw materials (Cavulli and Scarufi 2013; Magee 2014). This kind of productive foraging management of natural resources which attests to surplus and pre-planning strategies characterizes the Arabian Neolithic socio-economy (Gebel 2019).

The Main Problem of Highland Neolithic in Arabian Peninsula, and the Role of Qumayrah Valley

The limited archaeological data available at this point show a growing interest of prehistoric populations in highland and mountain areas between 9000 and 4000 BCE, that is in the Early and Middle Holocene Period. This was brought about by climate changes that began in the Late Pleistocene period, pushing the range of summer monsoons from the Indian Ocean further to the north, bringing increased rainfall in much of the Arabian Peninsula (Sanlaville 1992; Fleitmann et al. 2003; Drechsler 2009: 71). According to many scholars, these climate changes increased the appeal of inland regions for hunter-gatherer groups, which resulted in the development of settlement in selected micro-regions (Cleuziou and Tosi 2007: 45-47). This process is, however, very poorly recognized as there is a big disproportion in the state of knowledge on the Neolithic transition in the Arabian Peninsula between the better-explored coastal zones and the far less-researched interior, so many crucial questions regarding this process remain open. Therefore, new research on this subject is much anticipated by the scholarly community.

The Qumayrah Valley in the eastern part of the Hajar Mountain Range (Fig. 1) lies in one of the least archaeologically known regions of northern Oman, so research there provides new information about the Neolithic of highland areas within a context of environmental and social changes[1].

It was selected for study due to its specific location. It is a about 12 km long mountain valley, stretching between the modern villages of `Ayn Bani Saida and Bilt[2]. What makes this area significant is its geographic position almost exactly in the middle of the Hajar Mountains, at the crossing of natural passes both from the Persian/ Arabian Gulf and the Gulf of Oman towards the interior and to the north-western part of the Arabian Peninsula. It is also the shortest available land route connecting the three abovementioned geographic regions, bypassing the peninsula that forms the Straight of Hormuz. These geomorphological factors since prehistory have made the Qumayrah Valley an important point in human migrations regardless of their reasons.

Fig. 1 Map of northern Oman showing the location of the Qumayrah Microregion. (Drawing: A. Szymczak, PCMA)

Prehistoric Investigationsin the Qumayrah Valley

An archaeological reconnaissance of the micro-region conducted during three seasons of fieldwork in 2016,

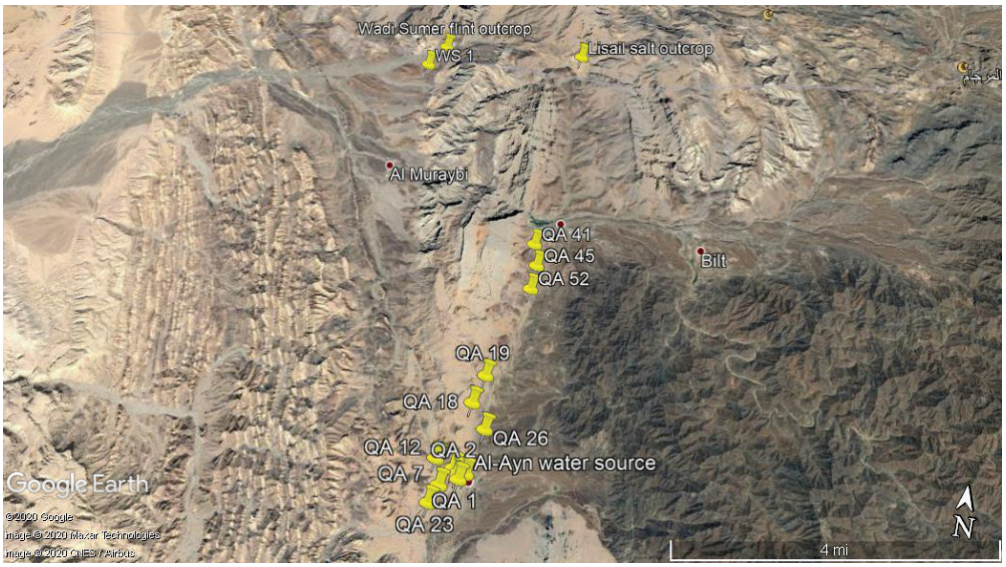

Fig. 2 Qumayrah Valley with location of main sites and resources. (M. Białowarczuk; based on Google Earth satellite image)

2017 and 2019 covered the wide southern entrance to the valley as well as the wadi bed up to the village of Qumayrah. Its main goal was to determine the character of settlement in the region and capture its subsequent phases. The systematic survey brought to light 21 archaeological sites (Fig. 2) and settlement traces related to the Late Stone Age, indicative of the nature of this settlement as well as some location pattern.

Only seven of the 21 registered points can be identified as settlements or camps in a common sense of these words. Each covers an area of over 100 m^2, with significant surface scatter of artifacts and occasional structural remains. The most persistent problem with excavating prehistoric sites in this part of the world is their poor state of preservation. Erosion and deflation usually lead to a complete loss of stratigraphic relations, so surface artefact scatters are in most cases the only source of knowledge on the prehistory of this region (see Usai 2000; Crassard 2008). However, two of the three archaeologically tested sites in the Qumayrah Valley preserved remains of the oldest layers, with the site of QA 2 turning out a well-preserved fireplace, stone platform and the outline of a shelter. Apart from numerous flint artefacts, the sites yielded also a few other objects made of stone and marine shells. All the mentioned data indicate seasonal occupation encompassing late and terminal phases of the Neolithic period (Białowarczuk 2017; Białowarczuk and Szymczak 2018, 2020).

All of these settlements and camps are located on the west side of the valley, on flat terraces with excellent exposure (*cf.* Fig. 2). The most preferable areas were those that were naturally flattened and slightly elevated above the wadi bed, providing a good vantage point over the valley. Only flat terraces at the entrance to the valley and a few areas along the main valley bed meet these criteria. All such places lay at an altitude between 560 and 660 m a.s.l. and all recorded sites were located in these elevations, including settlements and camps as well as traces of settlement and stray finds, the latter being the most frequent part of the archaeological record, probably related to activities of the residents of the nearby camps. The largest settlements, that are also located the lowest, concentrate in the area of the wide entrance to the valley, while those spread along the wadi bed go up to 650 m a.s.l. This rule is closely related to the geomorphological shape of the valley. Areas below 560 m a.s.l. are too close to the seasonal riverbed, which would cause them to be flooded while areas over 660 m become too steep to set up camps. Another key factor affecting the concentration of settlements at the entrance to the valley is a water source (*cf.* Fig. 2) that provides water supply throughout the year.

The Subsequent Settlement Phases in the Area

Based on a techno-typological analysis of the discovered artefacts, it can be surmised that the valley was settled a few times, starting perhaps in the Early/ Middle Neolithic and certainly during the Late Neolithic I and II periods, dated here between 4500 BCE and 3100 BCE. Presence of older stages of the Neolithic period (Białowarczuk 2017; Białowarczuk and Szymczak 2018, 2019) is not fully proved and must remain speculative. However, the Late Neolithic stages are well indicated by the presence of characteristic diagnostic chipped flints as well as stone and shell beads, mostly from soundings at the tested sites of QA 2, QA 6 and QA 12.

The Late Neolithic I phase is indicated by the presence of bifacial foliated pieces, including fragments of small bifacial points (Fig. 3:6) related do this period (*cf.* Charpentier 2008: 66-75) and stone tubular beads (Fig. 4:2-3) of the Akab type (*cf.* Charpentier and Méry 2008) found at the neighboring sites of QA 2 and QA 1 (*cf.* infra).

The terminal phase of the Late Neolithic II period might be pointed to by materials from QA 6, dominated by side-scrapers, denticulated pieces and unipolar macrolithic flakes and blades (Fig. 5:2-5), and the absence of pressure technique – techno-typological

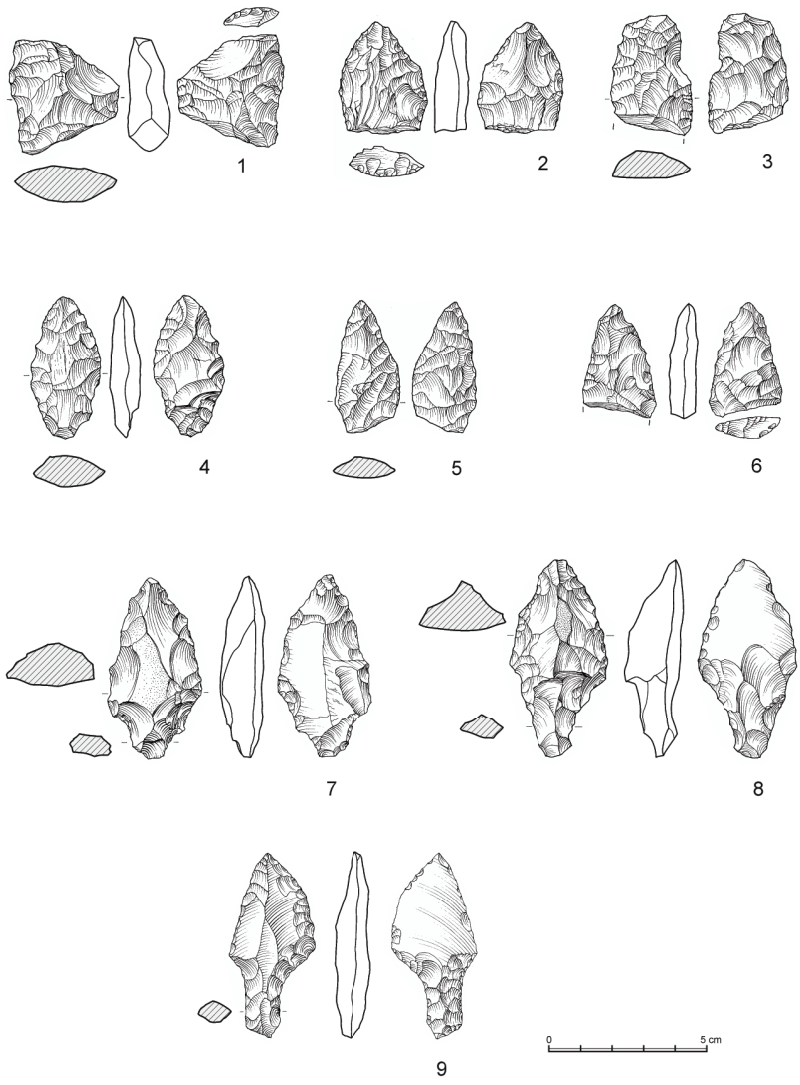

Fig. 3 Late Neolithic points of Qumayrah: QA 1 (1-5); QA 2 (6); QA 12 (7-9). (Drawings: M. Puszkarski, PCMA)

features characteristic for the time between c.3700-3100 BC (Charpentier 2008: 75; Maiorano *et al.* 2018). Single examples have been found on QA 2 as well (Fig. 5:1). Another chronological indicator is a shell bead from the site surface of QA 6 (Fig. 4:4), which has parallels in materials from Neolithic cemeteries in Buhais 18 and FAY-NE 15 (De Beauclair *et al.* 2006: Fig. 5, 179-180; Kutterer and de Beauclair 2008: 141, Fig. 14).

Finally, the three tanged spear points (Fig. 3:7-9) found on QA 12 (Białowarczuk and Szymczak 2020) have close technological similarities to some points from SHA-2 and SHA-10b (Maiorano *et al.* 2018: 228-231) attributed to the Late Neolithic.

All the mentioned materials are broadly dated and cannot on their own serve as precise chronological indicators. However, they correspond to a radiocarbon date obtained from a marine shell found on the largest excavated site of QA 2, which relates their chronology to the second half of 5th millennium BC (Białowarczuk and Szymczak 2020).

The other sites recorded during the survey provided incomparably less materials.Nonetheless, many of them show techno-typological analogies that allow them to be regarded as the Late Neolithic as well. Among them, QA 1, QA 41, QA 45 and QA 52 seem particularly promising (*cf.* Fig. 2).

The site of QA 1 was recorded as an Umm al-Nar cemetery located just beside QA 2 (Rutkowski 2017), however, a study of lithics from the site's surface identified some similar forms as those from QA 2, including bifacial points (*cf.* Fig. 3:1-5) as well as an Akab-type bead (*cf.* Fig. 4:2-3) (Białowarczuk and Szymczak 2020). Moreover, during excavations in 2017 a circular outline of a stone structure similar to the shelter discovered on QA 2 was traced on QA 1. Its chronology is still unclear and needs to be verified but it was built below the level of foundation of the Umm an-Nar graves. These data suggest the existence of a Late Neolithic settlement here prior the Umm an-Nar cemetery.

The other mentioned sites were discovered during the 2019 season. QA 41 is located south of the modern Qumayrah Village and consists of remains of a short-term campsite: two circular stone alignments (Fig. 6) close to each other with two side scrapers found nearby. It is also untypically located inside a small wadi, while QA 45 and QA 52 represent typical location on flat terrace tops. In their cases, thin lithic scatters were spread over quite a wide area of the terraces. Lithics collected

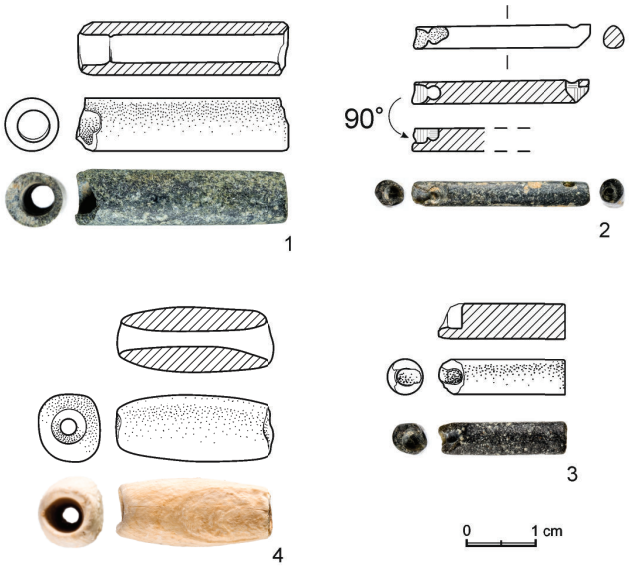

Fig. 4 Late Neolithic beads of Qumayrah: QA 1 (3); QA 2 (1-2); QA 6 (4). (Photos: A. Oleksiak/ PCMA; drawings: M. Puszkarski and M. Momot, PCMA)

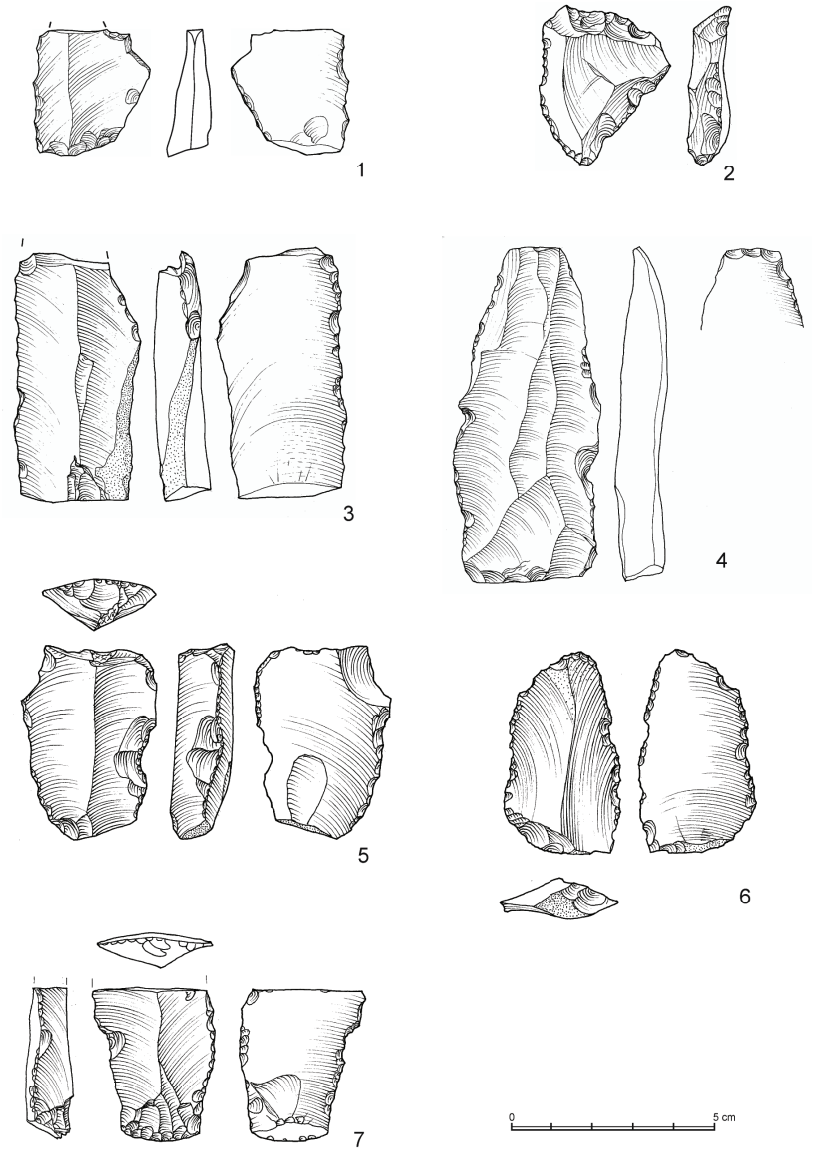

Fig. 5 Laminar macrolithic blades and flakes: QA 2 (1); QA 6 (2-5); QA 45 (6-7). (Drawings: M. Puszkarski, PCMA)

from the described sites base, as in the other cases, on local raw materials easily available in the closest vicinity. Retouched tools represent the same simplicity of production as observed in the sites investigated previously, with most characteristic use of flat slabs of flints simply retouched by direct scaled retouch. Another technological feature relating these artifacts to the Late Neolithic is the appearance of macrolithic laminar flake and blade technology identified on QA 45 (*cf*. Fig. 5:6-7), which is reminiscent of that from QA 6.

Factors of the Neolithic Settlement in the Qumayrah Valley in Environmental Contexts

In all these phases the settlement seems to have been seasonal but there is still no data so that it can be linked directly with climate changes in the Early and Middle Holocene periods. Of note is the occurrence of marine shells (shell fragments and shell artifacts) at QA 2 and QA 6. In an area located about 100 km from the sea coast they bear witness to links with the coastal zone. This, in turn, might be indicative of the development of a specific, semi-nomadic subsistence model of prehistoric populations occupying individual micro-regions.

This paucity of data leads to marked differences of opinions among scholars on the importance of the described subsistence model for the inhabitants of various ecological zones of the south-eastern Arabian Peninsula during the beginnings of the Middle Holocene period, and on the model's functioning in relation to the annual cycle. Some researchers are of the opinion that nomadic migrations between the coastal and highland zones were very limited due to a strong preference for coastal and mangrove environments that offered access to food sources for most parts of the year. Therefore, expeditions to the mountains would have only been undertaken in the summer season (see Biagi and Nisbet 2006; Cleuziou and Tosi 2007). Results of archaeological investigations in the Ra`s al-Hamra and Ja`lān regions point to the emergence of small human groups living far apart, but most probably sharing a common culture, controlling a certain territory and its resources by seasonal wanderings between campsites scattered from the coast, through the lagoons, to the highland and mountain zones (Cleuziou and Tosi 1998, 2007; Salvatori 1996, 2007).

A similar model of subsistence is favored by Margaret and Hans-Peter Uerpmann based on investigations in

Fig. 6 Remains of circular shelter on QA 41. (Photo: M. Białowarczuk)

al-Buhais and Jebel Faya. In order to take advantage of the various resources, groups of pastoralists and fishermen inhabiting this area seasonally changed their location. In winter, when fish are abundant, they could dwell on the coast, whereas summer heat occasioned migrations to the mountains where temperatures were more moderate. According to this model, in spring the migrating groups settled in water-rich highland plains, offering good pastures for their flocks (see Uerpmann M. and Uerpmann 1996, 2000; Uerpmann M. *et al*. 2000, 2012; Uerpmann M. 2003; Uerpmann and Uerpmann M. 2003). An alternative theory has been proposed by Mark Beech (2004). Based on analyses of fish bones from numerous sites from the Arabian Gulf coast coupled with ethnographic data he asserts that the best fishing season persists from late spring till early summer.

Most of the theories presented above are based on the study of sites located about 40 km inland, inhabited during the climate optimum and related to seasonal pastoralism and controlling resources in a certain territory. From the perspective of the discoveries in Qumayrah, the reasons for the development of settlement seem to be quite similar but some marked differences appear as well. First of all, the region is located on the southern side of the mountain range at a distance of almost 100 km from the nearest shoreline. Secondly, archaeological data indicate the intensification of settlement since the second half of the fifth millennium BC when, according to many scholars, the climate conditions of inland areas at this latitude are again deteriorating as a result of the monsoon belt shifting to the south (Drechsler 2009: 71; Magee 2014: 43). In addition, there are no traces of pastoralism. The above observations seem to exclude hunting or pastoral expeditions as the reasons for human presence in this region. A much more likely factor influencing the development of seasonal settlement in the Late Neolithic period, and its stabilization over subsequent periods, seems to be the wide range of resources available there. This factor has already been pre-signaled (Białowarczuk and Szymczak 2018, 2019, 2020), and the geological research carried out in the latest research season seems to confirm this theory.

The main raw materials that may have affected Qumayrah's settlement are flint, salt and perhaps various types of steatite rocks. A geological survey conducted by Dr. Hubert Kiersnowski from the Polish Geological Institute showed that the rocks surrounding the valley contain sources of flint, identical to that used for the production of tools at the tested sites. The chocolate variety is particularly abundant here, characterized by a uniform silica structure and excellent knapping quality. This kind of flint occurs throughout the area in small concretions hidden under a thick layer of cortex (Fig. 7). A large outcrop was located near the Wadi Sumer (Fig. 8), about 4 km north-west from Qumayrah (*cf.* Fig. 2).

Another natural resource is salt, a large outcrop of which is located in the Lisail Area, deep in the

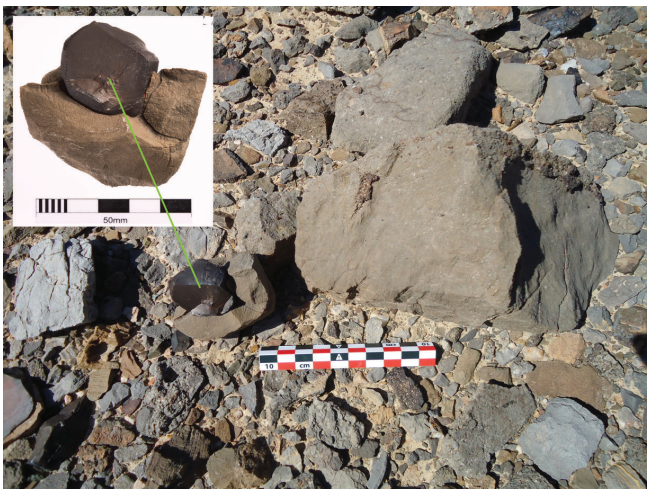

Fig. 7 "Chocolate" flint nodule found on the site of Wadi Sumer 1. (Photos: M. Białowarczuk, A. Oleksiak)

mountains, on the extension of the Qumayrah Valley, just 3 km north of the modern village of Qumayrah (*cf.* Fig. 2). The outcrop has already been the subject of detailed geological surveys (Cooper *et al.* 2012) and is one of a few salt outcrops along the Hajar Mountains chain, and the only one in their western part.

The topic of the use of salt by prehistoric communities and its importance for their development has been raised on numerous occasions. The use of salt for the preservation of food and the curing of animal skins is one factor (Bloch 1971) and seems to be typical for hunters and shepherds. However, increased interest in this raw material is also characteristic of agricultural communities in both Europe (Clark 1952) and the Middle East (Mellaart 1975: 51; Kirkbride 1974). Although we have no direct evidence of the use of salt by the Qumayrah settlers, the dense settlement network around the Lisail outcrop does not seem to be accidental.

Stone raw materials, such as steatite, chlorite or the so-called soapstone could have been exploited here, especially with the advent of appropriate technologies during the Late Neolithic period and the Bronze Age (Magee 2014:16). The presence of the Akab type soft stone beads in a mountain region where sources of

Fig. 8 An outcrop of "chocolate" flint found near Wadi Sumer. (Photo: M. Białowarczuk)

this raw material are located (David 2002) is further evidence of connections with the coast, where such beads had almost exclusively been found on the UAE coast of the Arabian Gulf rather than at the coast less distant Gulf of Oman (Białowarczuk and Szymczak 2020). The geological survey has not yet confirmed the presence of this raw material in the Qumayrah Area, however, small cobbles of chlorite have been encountered. Some scholars argued that this kind of isolated softstone cobbles were used to craft small items, such as beads (David 2002). The appearance of chlorite beads in QA 1 and QA 2 indicates that this kind of raw material may have been a sought-after commodity. Further use of this resource is highly visible in the Umm an-Nar tomb excavated at QA 1 which contained decorated soapstone boxes (Rutkowski 2017). While small beads could be manufactured from small cobbles found in the vicinity of the sites, the bigger items, like boxes or vessels, require access to a good quality raw material. Some such outcrops may have been located in a place that was quite remote but easily accessible along the mountain valley trail. One of them has been identified in the area of Aqir al-Shamoos (Sivitskis et al. 2018),a few dozen kilometers east from QumayrahValley. Although the outcrop's exploitation has been associated with the Iron Age, the results of the prospection confirm the existence of chlorite outcrops in close vicinity of Qumayrah Valley.

Conclusions

After three seasons of research, I am deeply convinced that the Qumayrah Microregion is one of many Neolithic settlement clusters located along mountain valleys stretching from Yanqul to Buraimi. Archaeological investigation of the Neolithic settlement of the Qumayrah Valley seems to point to the development of productive foraging management of natural resources specific to the Arabian Neolithic socio-economy. This model is reflected in archaeological data which, however, are still scarce and insufficient for a detailed analysis of this process.

The question of the direction of migration also remains unresolved. The presence of typologically and chronologically similar materials recently discovered in the Rustaq Region (Bretzke *et al.* 2018) on the other side of the Hajar Mountain Range may point to the east – from the Gulf of Oman. The specificity of the location, however, also allows communication with the north and west – areas on the coast of the Persian/ Arabian Gulf. There is no doubt that these issues require significant intensification of research in the highlands of northern Oman.

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Endnotes

[1] Prehistoric investigations were conducted there as part of the Omani - Polish Qumayrah Archaeological Project, headed by Prof. Dr.Piotr Bieliński, a joint project of the Polish Centre of Mediterranean Archaeology, University of Warsaw and the Department of Archaeology and Excavations, Ministry of Heritage and Culture, Sultanate of Oman.

[2] Geographically, the Qumayrah Valley is part of a greater Wadi al-Fajj.

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