First Evidence of A New Funerary Tradition on The Necropolis of Khawr Jirama: Towards The Discovery of An Original Culture in Oman During The 4th Millennium Bc?

Christophe Sévin Allouet, Guillaume Gernez, Aline Thomas, Nicolas Gautier

ABSTRACT

Archaeological campaigns led during five years on the necropolis of Khawr Jirama, located in the Sharqiya, have brought to light what appears to be a new prehistoric funerary tradition still unknown in Oman. The excavation of seven tombs, located not far from the Jarama lagoon, has enabled the discovery of the earliest monumental Neolithic tombs built in Oman. The oldest ones have been dated from the middle of the 4th millennium BC, that is to say several centuries before the tower tombs of the Hafit period. These tombs discovered at Jarama are characterized by new architecture and funerary practices, rising the question of either the arrival of a new population in this area, carrying new funerary tradition reflecting their social organization, or cultural evolution of local Neolithic cultures. This discovery participate to fill a relative void of data observed until now in Sultanate of Oman between 3500-2900 BCE, a period of transition between the end of the Neolithic and the beginning of the Hafit period. Moreover, the Jarama tombs challenge the standing interpretation of the first prehistoric societies in Sultanate of Oman. The evidence presented in the paper suggests that, before the intensification of trading routes with the city-states of Mesopotamia and the Indus Valley during the 3rd millennium BC, the region was home to strongly structured and probably hierarchical groups, led by members buried in monumental tombs.

KEYWORDS: Oman Peninsula, Neolithic, Bronze Age, funerary practices, monumental tombs.

الأدلة الأولية على تقليد جنائزي جديد في مقبرة خور جرمة: نحو اكتشاف ثقافة جديدة في عمان خلال الألفية الرابعة قبل الميلاد؟

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الملخص:

سلطت الحملات الأثرية التي جرت على مدى خمس سنوات في مقبرة خور جرمة الواقعة في منطقة الشرقية الضوء على ما يبدو أنه تقليد جنائزي غير مكتشف يعود إلى عصر ما قبل التاريخ في عُملان. لقد مكنت عملية حفر سبعة مقابر تقع على مقربة من بحيرة جرمة من اكتشاف أول مقابر ضخمة معروفة حتى الآن في عمان. وقد أرِّخ لأقدم هذه المقابر على أنها تعود لمنتصف الألفية الرابعة قبل الميلاد، أي قبل عدة قرون من أبراج المقابر في فترة حفيت. تتميز هذه المقابر بهندسة معمارية جديدة فضلاً عن ممارسات جنائزية جديدة لوحظت في عُمان: وهي تثير تساؤلاً حول وصول سكان جدد إلى هذه المنطقة، يحملون تقاليد جنائزية جديدة تعكس تنظيمهم الاجتماعي، و/أو تطور محلي لثقافات العصر الحجري الحديث وأسباب هذا التطور. يسد هذا الاكتشاف فجوة في المعلومات التي لوحظت حتى الآن في عمان بين ٣٦٠٠ و٣١٠٠ قبل الميلاد، أي فترة الانتقال بين نهاية العصر الحجري الحديث وبداية فترة حفيت. وعلاوة على ذلك، تغير مقابر جرمة بشكل كبير الرؤية التي كانت لدينا حول مجتمعات ما قبل التاريخ الأولى في عمان؛ فيوجد هنا قبل تكثيف طرق التجارة مع دول المدن في بلاد ما بين النهرين ووادي السند خلال الألفية الثالثة قبل الميلاد، مجموعات منظمة بقوة، ربما اتسمت نظمها الاجتماعية بالهرمية وكان يقودها أعضاء مدفونون في مقابر ضخمة .

الكلمات المفتاحية: شبة الجزيرة العُمانية، العصر الحجري الحديث، العصر البرونزي، الممارسات الجنائزية، المقابر الضخمة.

INTRODUCTION:

While archaeological research carried out in Southeastern Arabia since the 1960s has shed light on the main stages in the region's social and cultural development, leading to a chronology that is now well established, certain periods remain poorly understood. The thematic orientation of early research may have explained the lack of data about several periods during the first decades. Since then the multiplication of discoveries resulting from survey programs and/or linked to the development of urbanism works has led to a rebalancing of data and studies, so that the general framework of regional history is now quite well known despite a number of uncertainties. As a result, these data can be interpreted as reflecting at least part of a human reality, for example, a nomadic lifestyle leaving few built remains, a declining population, the abandonment of certain sites, and so on.

The case of the mid-4th millennium BC appears crucial: this is a period that marks the final phase of the well-documented local Neolithic (particularly on the coast), and precedes the start of the Bronze Age, which is also very well known both from funerary monuments and oasis towers and villages (Cleuziou and Tosi 2020, p.73-116). In other words, it can be assumed that it was during these four or five centuries, between 3700/3600 and 3200/3100 BC, that the social, economic and cultural transformations that led to the development of the Magan oasis.

Here, the excavations of the Khawr Jirama KJN-1 necropolis provide substantial information concerning this transitional stage between the Neolithic and the Bronze Age.

I. The 4th millennium in Eastern Arabia: the end of the neolithic and the beginning of the bronze age

The Neolithic period in Southeastern Arabia is distinct in almost all respects from the usual characteristics of the Levantine and Mesopotamian Neolithic: agriculture was not practiced, sedentary lifestyles were not evident, ceramics not known and the populations subsist by hunting, fishing and collecting shellfish (Cleuziou and Tosi 2020: 58-63). The only typically Neolithic economic aspect is animal domestication (caprines and cattle). This Neolithic also persisted later than in the Near East, until the first centuries of the 4th millennium, at a time when the sedentary and village societies of the Levant and Mesopotamia were at the dawn of the "Urban Revolution".

The Neolithic trajectory of Arabia was studied by Serge Cleuziou (Cleuziou 2005). Archaeological research concerning the last millennium of the local Neolithic (4500-3500 BC) has been carried out in coastal areas, both on the eastern facade with the excavations of Ra's al-Khaba KH-1 (Munoz et al. 2010), SWY-2 (Charpentier et al. 1998) and on the northern facade at Wadi Shab GAS-1 (Munoz and Usai 2020) with the main known site Ra's al-Hamra (RH-5, RH-6) (Salvatori 2007, Marcucci et al. 2021). A few sites in the interior are also known, including Jebel al-'Aluya (Lemée et al. 2013) and Jebel Buhais BHS-18 (Jasim et al. 2005; Uerpmann and Uerpmann 2020).

During the Arabian Neolithic, populations exploited a favorable environment linked to the resources of the sea and the mangrove; fishing and shellfish collecting provided part of their subsistence, supplemented by the practice of livestock breeding (Cleuziou and Tosi 2020: 61-63). Habitats were made up of perishable materials which form camps rather than villages. It has been proposed that population mobility was quite low, in any case confined to the coastal zone, based on dietary research conducted at the RH-6 site (Zazzo et al. 2016), with residents being able to enjoy the abundance of resources.

Neolithic funerary practices are characterized by a majority of individual (sometimes double or multiple) primary burials (Munoz 2019: 24) in pits, gathered in necropolises located near inhabited spaces, and sometimes reusing these same spaces after abandonment. The best known examples are Jebel Buhais BHS-18 (Jasim et al. 2005), Umm el-Quwain UAQ2 (Phillips 2002), Ra's al-Hamra RH-5 (Salvatori 2007), Wadi Shab GAS-1 (Gaultier et al . 2005), Ra's al-Khabbah KHB-1 (Munoz et al. 2010). The multiple burial of Umm el-Quwain UAQ2 is interpreted as the consequence of a violent event (Mery et al. 2016). The only other notable exception is Area 43 of Ra's al-Hamra

RH-5, containing the remains of 77 individuals; its interpretation is debated (Santini 2002).

Individuals of both sexes and of all ages (with the exception of the youngest children) were buried in a similar way in terms of position (lying on their side, lower limbs bent), with the only distinguishing burial treatment being items of adornment (bracelets, pendants, beads, earrings), generally in shell or soft stone, with very elaborate shapes and decorations.

After 3700/3600 BC, data are rare on most Neolithic sites, although the last archaeological layers of some sites could be dated to this period, attesting to a certain continuity of occupations. Nevertheless, remains are particularly rare for these levels (Béguier and Marcucci 2018). The example of a site dated to the middle of the 4th millennium is the sanctuary of Akab, but this site is so unique that it cannot contribute to conclusion about the way of life of the Neolithic populations. On its own, the site bears witness to of an elaborate symbolic domain, already perceived in certain gestures of funerary practices associating for example human skulls and sea turtle skulls (Salvatori 2020: 118).

Especially, it is from the beginning of the Bronze Age, around 3200/3100 that the data becomes consistent again, testifying to changes so considerable that Serge Cleuziou and Maurizio Tosi considered this period (Hafit period, 3200/3100-2700 BCE) as the final stage of the "Great Transformation" (Cleuziou and Tosi 2020: 73); in the Ja'alan, authors call it "New Era" (Azzarà and Cattani 2020). The multiplication of cairns and tower tombs on reliefs (summits and slopes of hills, summits of plateaus and terraces, etc.) forms a new funerary landscape which still remains visible today. This monumental funerary architecture was at the origin of the first discoveries of the protohistory of southeastern Arabia, with the excavations of Jebel Hafit (Madsen 2017), and has since been the subject of numerous regional studies and excavations, for example at Ra's al-Jinz and Ra's al-Hadd (Salvatori 2001) and the Ja'alan region (Giraud 2010), Zukayt (Bortolini 2013), Dhank (Williams and Gregoricka 2013), Wadi Andam (Deadman 2014), Batina (Deadman, et al. 2015) and many others. The presence of Mesopotamian pottery from the time of Jemdet Nasr, 3100-2900 BC in Mesopotamia, made it possible to date these tombs. These tombs built of stone and corbelled vaults, sometimes several meters high, have a room accessible via a small entrance and corridor through the double or triple wall (Munoz 2019: 24-25). These elements indicate that the tombs were designed to be used for several burials. Excavations of the best preserved tombs have revealed the remains of several individuals arranged successively, from three or four to a dozen, and exceptionally up to 29 (Munoz 2019: 27). These are the first tombs with collective deposits in the region (Méry et al. 2016: 328). Based on the position of the bone remains, these are primary burials (Jebel Hafit (Madsen 2017)) and Khuybab (Williams and Gregoricka 2013), although the bones are sometimes moved due to reuse of the tomb in the Bronze Age or disturbed by later populations or taphonomic events. If elements of ornaments are still attested, notably bead necklaces, the quality and diversity of the ornaments is much less than in the Neolithic. On the other hand, a noticeable novelty is the presence of metal artifacts, tools and weapons (daggers) (Madsen 2017; Williams and Gregoricka 2013: 144).

As during the Neolithic, women and men of all ages were placed in the tombs (Cleuziou and Tosi 2020: 203). And here again, it seems that all members of society are buried with this same funerary treatment.

The way of life seems from this period at least partly sedentary and based on oasis agriculture: Hafit period settlements differ completely from those of the Neolithic, both by the diversification of its location (multiplication of foothill sites), the morphology of the sites which are now real villages, the shape and construction technique of the houses. These are now built of mudbricks on stone bases, and their shape is rectangular as at al-Ghoryeen (Al-Jahwari et al. 2020), sometimes of a tripartite structure as at Ra's al-Hadd HD-6 (Azzarà and Cattani 2020). If domestic housing is characterized by a great renewal, the other remarkable element is the appearance of monumental circular/oval structures in bricks or stones, towers or platforms located in the oases, and whose functions seem multiple, sometimes associated with the metallurgy (Döpper and Schmidt 2017; Döpper 2020) and more generally water control, based on the presence of a well and large circular ditches as in Hili 8, Bat and Bisya (Cleuziou and Tosi 2020: 238 -250). Society now appears more complex, perhaps characterized

by a form of authority capable of managing the construction of funerary and public monuments as well as water management, food transportation, ore mining and production metal.

One of the most essential questions, to date unresolved, is to know the internal and external factors that led to so many transformations. If the Mesopotamian influence seems clear (imported pottery, brick construction), and potentially already linked to the copper trade that could include Iran in this network of interactions, internal factors could also be at work to explain these technical, economic, cultural and social developments.

The excavations of Jarama, and the discovery of tombs dating from this crucial intermediate period between the Neolithic and the Bronze Age, could be an essential index of this transitional local development, including in particular one of the oldest funerary monumentality known in southeastern Arabia.

II. The necropolis of Jarama: tombs architecture and funerary practices

The excavations of the Jarama necropolis, not far from the village of Ra's al-Hadd (Ash Sharqiya South), were carried out between 2018 and 2022 with the support of the Ministry of Heritage and Tourism. This necropolis is located on an alluvial terrace bordering a wadi leading to the Khawr Jirama at 3 km to the south-west. Here at the top of a promontory eleven tombs are attributable to the Hafit period based on their shape and topographical location, while on the terrace seven other tombs much larger in size and show very different characteristics (**Fig.1**).

This paper concerns these seven monuments which present two distinct groups of tombs: the "northern group" and the "southern group". The tombs of these two groups differ in their architecture, in the materials used, and also in the funerary practices observed. The dates appear very old in both cases, during the second half of the 4th millennium BCE. The chronological relationship between the two groups of tombs and the social and cultural interpretations drawn from these new discoveries are discussed in the following sections.

- *Northern group tombs*

The northern group includes tombs 1, 3 and 5. These tombs, separated from each other, were built in limestone. The architecture attests that the stones were extracted from a quarry located nearby and finely arranged to erect the monuments.

Tomb 1

Tomb 1 measures almost nine meters in diameter and reached 1.88 meters in height at the time of excavation. The tomb was composed of a double-ring external facing wall of which the largest rectangular blocks, finely squared, measured 50 x 40 cm. The tomb was then built with a series of very large blocking stones assembled with natural mortar (mud), which make up the heart of the monument (**Fig.2**).

An oval-shaped chamber oriented E-W, entirely filled with sand and scattered rubbles, was discovered in the center of the monument. The uppermost slabs, once topping the corbelled vault, were resting directly on this backfill. The inner chamber was about 1-1,50 m square at the top, while human remains was laid onto the floor, which was made non-contiguous pieces of grey limestone slabs.

A single body was deposited in this monumental tomb. Despite numerous disturbances observed on the skeleton (non-articulated, fragmented, significant mobilization of bones outside the initial corpse's volume), the anatomical position is consistent with the initial positioning of the body. This attests (along with the presence of small bones) to a primary deposition (i.e. decomposition of the body *in situ*). The body was laid on the floor of the central chamber in crouched position on the right side, oriented W-E, facing south, with hands back to the head (**Fig.2**). According to the observations made on bones, the skeleton corresponds to a male over 30 years old. Sexual diagnosis is based on the conformation of the hip bones (Bruzek et al 2017).

Funerary goods in the chamber were very few. Only a few small beads (< 1 cm) were unearthed, scattered erratically at the bottom of the tomb, at the level of the head and torso of the deceased. These included nine steatite beads and seven carnelian beads. The significant absence of funerary goods and the numerous disturbances, breaks and displacements evidenced by the human remains seem both linked to an episode of looting (Sévin Allouet et al. 2018).

Figure 1*: Necropolis of Khawr Jirama (photos & map by C. Sévin ©Archaeological Mission of Khawr Jirama).*

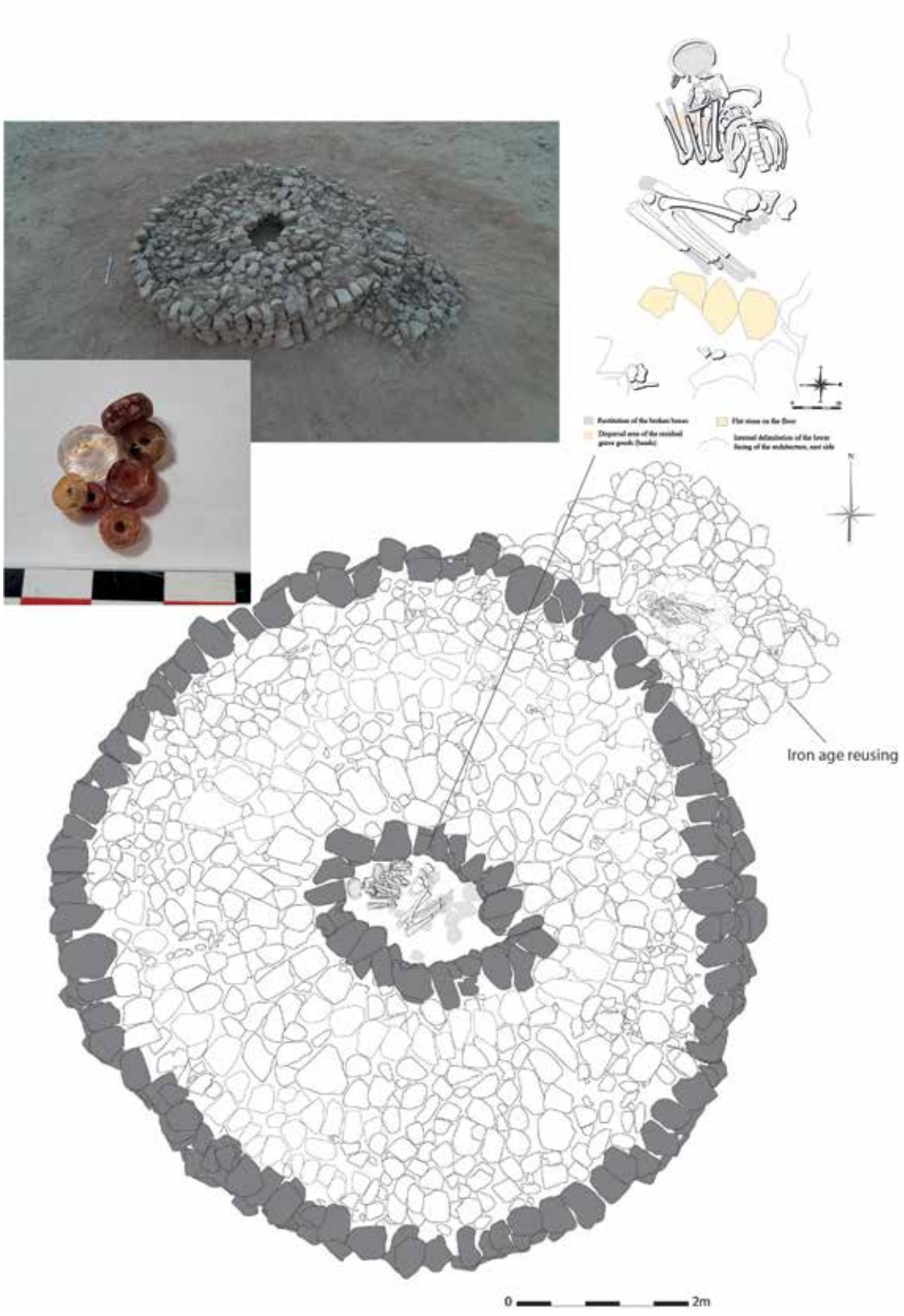

Figure 1*: Tomb 1 of the necropolis of Khawr Jirama (photo C. Sévin, drawing C. Sévin & A. Thomas ©Archaeological Mission of Khawr Jirama).*

Attempts at radiocarbon dating of the skeleton were not possible due to a lack of collagen. Two other bone samples were therefore submitted for analysis of the mineral fraction of the bone (bioapatite). The results are consistent with each other and place the deposit in the second half of the 4th millennium BC (dates #1 and #2 : **Table 1**).

A small annex rectangular structure of about 2,5 m length on 2 m wide, subsequently re-built in the scree of the monument on its north-east facade, revealed an adult skeleton in tightly flexed position (knees brought towards the head) (**Fig.2**). Bioapatite dating confirmed the late establishment of this second deposit, made during the Iron Age II (date #3 **Table 1**). This date also compatible with funerary artefacts which notably included a pin copper.

A tomb of such a large size and built for a single individual has no other comparison in the entire Oman Peninsula. It seems suggest that the individual placed within such a monument, which required a very large workforce to erect, had a strong social status within the group. This observation is also enhanced by the presence of carnelian beads in this tomb, with a high value due to their rarity, and showing after initial analyses contacts with distant regions of India (**Fig.2**) (Pr. Mark Kenoyer, *personnal communication*).

Furthermore, in addition to the obvious social importance of the deceased buried in this tomb, it is also the very early dating of this individual which considerably modifies our understanding of funerary monumentality in Oman. Indeed, the two bioapatite dates obtained on human bones from the central chamber in this tomb were probably between 3510 and 3330 cal. BC (**table 1 and Fig.7**), thus bringing it into a much older chronological range than the tombs of the Hafit period. This early monumentality contrasts sharply with known mortuary practices taking place during the earlier Neolithic.

Tomb 3

Tomb 3, located on a small promontory 200 meters from tomb 1, reaffirms the high date obtained on the latter as well as the original funerary practice observed.

This monument, measuring 6.8 meters in diameter and 1.6 meters high, was built with the same limestone material and according to the same architectural model. Here, however, a crown of wadi pebbles surrounds the monument (**Fig.3**).

The central chamber of the monument is also oval in shape, oriented in the E-W axis. But, unlike tomb 1, the chamber revealed several levels of human burial, from the top (last deposit); to the bottom of the chamber (initial deposit), plus an intermediate deposit.

At the bottom of the chamber the human remains which correspond to the initial deposit rest in a sandy and stony matrix. The bones are disarticulated and scattered all over the floor of the room, without anatomical logic. The presence of small elements (teeth, phalanges) suggests a primary burial. However, the arrangement of the bones does not allow us to locate the initial position of the corpse. Larger bones or bone fragments are found near the south and east walls. Small pieces of bone littered the center of the room. Although the skeleton is incomplete, the main anatomical parts are represented: head, upper/lower limbs, hands, feet, shoulder/pelvic girdles. The bones seem compatible with those of an adult. In the absence of any duplication, we assume that they belong to single adult individual. The only preserved coxal bone fragment is insufficient to make a sexual diagnosis.

No funerary goods were found with the deceased. This observation, added to the osteological observation is similar to the situation observed in tomb 1 ; looting could explain both the absence of artefacts and the presence of scattered and broken bones. Indeed, the relatively good skeletal representation does not suggest emptying or cleaning the space for its reuse.

Table 1: *Radiocarbon datings (apatite) of the necropolis of Khawr Jirama (©Archaeological Mission of Khawr Jirama)*

Sample						Analyse information			C14 Dating		
#	**Group**	**Tomb**	**Structure/ US**	**Description**	**Type**	**Fraction analysed**	**Lab sample**	**Date**	**BP**	**BC (1 sigma)**	**BC (2 sigma)**
1	North	Tomb 1	1004	Human deposit in central chamber	bone (humerus)	bioapatite	AK79	2019	4580 ± 25	3376-3331	3494-3125
2	North	Tomb 1	1004	Human deposit in central chamber	bone	bioapatite	AO13	2020	4610 ± 20	3510-3339	3510-3196
3	North	Associated Tomb 1	1001	Human deposit in adjacent structure of T1	bone (fibula)	bioapatite	AK78	2019	2530 ± 25	688-548	794-548
4	South	Tomb 2	02.004	Human deposit	bone (fibula)	bioapatite	AK77	2019	4360 ± 25	3081-3069	3081-2906
5	South	Tomb 2	02.004	Faunal deposit (caprine)	bone (humerus)	bioapatite	AK82	2019	4340 ± 25		3016-2904
6	North	Tomb 3	01.009	Human deposit at the bottom of the central chamber	bone	bioapatite	AO16	2020	4530 ± 30	3360-3264	3360-3103
7	North	Tomb 3	01.006	Human deposit at the intermediate level of the central chamber	bone	bioapatite	AO15	2020	3920 ± 30	2476-2335	2476-2306
8	North	Tomb 3	01.002	Human deposit at the top of the central chamber	bone	bioapatite	AO14	2020	2240 ± 25	388-346	388-206
9	North	Associated Tomb 3	St.05	Faunal deposit (equidae) in structure 5 close to T3	bone	bioapatite	AO17	2020	2130 ± 25	347-318	347-56
10	South	Tomb 4		Human deposit in central chamber	bone	bioapatite	CIRAM-3141	2021	4541 ± 29	3246-3102	3368-3102
11	North	Tomb 5		Human deposit in central chamber: individual A in secondary position (“reduction”)	bone	bioapatite	CIRAM-3142	2021	4413 ± 30	3316-3165	3316-2918
12	North	Tomb 5		Human deposit in central chamber: individual B in primary position	bone	bioapatite	CIRAM-3143	2021	4142 ± 28		2875-2586
13	South	Tomb 6		Human deposit in central chamber	bone	bioapatite	CIRAM-3144	2021	4524 ± 29	3361-3264	3361-3101
14	South	Tomb 7		Human deposit in central chamber: individual A	bone	bioapatite	CIRAM-3145	2021	4459 ± 29	3336-3211	3336-3020
15	South	Tomb 7		Human deposit in central chamber: individual B	bone	bioapatite	CIRAM-3146	2021	4459 ± 30	3336-3210	3336-3018

Figure 3*: Tomb 3 of the necropolis of Khawr Jirama (photos C. Sévin & A.-C. Allard, drawing A. Thomas ©Archaeological Mission of Khawr Jirama).*

Bioapatite dating places the initial burial of tomb 3 in the second half of the 4th millennium, between 3500-3360 cal BC (**Fig.7**), making it the contemporary of tomb 1.[1]

Tomb 5

Tomb 5 is located on the same terrace as tomb 1, at the foot of a rocky promontory (**Fig. 1**). The method of construction of tomb 5 is similar to tombs 1 and 3, built of limestone and of a similar structure, but with smaller dimension ; its diameter does not exceed 3.5 meters and 0.88 meters high (**Fig.4**). Despite this reduced size, the central chamber, oval in shape and oriented SW-NE, has a width and length similar to the chambers of tombs 1 and 3.

The partial poorly-preserved remains of two adult individuals were unearthed from the burial chamber. One skeleton was represented only by an articulated set of lower limbs and feet in anatomical connection. This makes it possible to reconstruct an initial positioning of the body as crouched on the side, with feet on the NE side, the head should therefore rest to the SW. The upper part of the body, up to the pelvis, is only represented by a few scattered fragments, some of which were found at the height of the filling. This partial destruction of the skeleton is attributed to an episode of looting, traces of which had been detected above the filling of the chamber, precisely in its SW part. The only artefacts unearthed were small (<1 cm) steatite and shell beads, scattered throughout the disturbed area.

The second human interment is characterized by disarticulated bones gathered at the NE end of the chamber, at the same level or just under the bones of the skeleton in place. The bones are all mature, or compatible with the size of an adult. The main anatomical parts of the skeleton are represented, and no duplicates were identified, which allows us to postulate the presence of a single subject in a secondary position. The presence of small bones and the position of certain bones below the feet of the existing skeleton suggests an episode of "reduction" of an initial deposit, deliberately moved to the side after decomposition of the flesh. Following this hypothesis, the skeleton in the secondary position should therefore possess an earlier date relative to the skeleton in the primary position, corresponding to a reuse of the tomb.

The bioapatite dating of the two skeletons (dates #11 and #12: **Table 1**) corroborate the hypothesis of tomb use in two stages, with the earlier skeleton in the reduction position. Its dates place it at the end of the 4th millennium or the beginning of the 3rd millennium BCE. The second deposit took place several centuries later, in the first half of the 3rd millennium BCE.

- *Southern group tombs*

A second group of four tombs, located in the southern part of the necropolis, corresponds to a more recent phase of use of the necropolis. The dates obtained for these four tombs are homogeneous, ranging between 3300 and 2900 BCE **(Fig.7)**. The latter can be thus a little bit older than those of the beginning of the Hafit period and/or even contemporaneous as they chronologically overlap them.

Again, mortuary architecture, burial, and early dates attest to original funerary practices at Jarama, distinct from the previous Neolithic period.

One of the striking elements of these tombs, which are also found in the necropolises currently being investigated as part of an ongoing project across the region of Al Sharqiya, is the fact that they most often found in pairs of two tombs located side-by-side.

For example, tombs 2 and 4 and tombs 6 and 7 appear to be geographically associated, with only a few meters separating these structures **(Fig.1)**.

The architecture of these tombs is very different from those of the northern group. These tombs were built in radiolarite, which is an extremely friable stone, so the tombs here are less well preserved than the limestone tombs of the northern group (**Fig.5** and **Fig.6**). Circular in shape, their diameter varies

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*1 Noted that like tomb 1, tomb 3 was reused, but here directly in the central chamber (***Fig.3***).*

Immediately above the initial deposit, an adult was buried on a paved floor and dated from the second half of the 3rd millenium BC. The second one, at the top of the chamber, immediately below the first layers of the scree, are the partial remains of a skeleton in a crouched position and dated from the 3rd century BC. The radiocarbon datings of these two burials (dates #7 and #8: **Table 1***) are consistent with their stratigraphic succession on the one hand, and the associated artefacts on the other. Noted that the last date is compatible with that of a primary deposit of an equine, a donkey, unearthed in an adjacent pit (date #9:* **table 1).**

between 5 and 6 meters, and their height rarely exceeds one meter ; they are therefore much smaller tombs. A large flat limestone slab is located at the bottom of all these tombs; this is where funeral deposits are initially placed. On the other hand, and just as for the tombs of the northern group, no permanent entry system has been observed in these architectures. In the case of multiple interments we assume that the individuals probably died and were deposited around the same time.

Like the tombs of the northern group, the southern tombs only hold a small number of individuals.

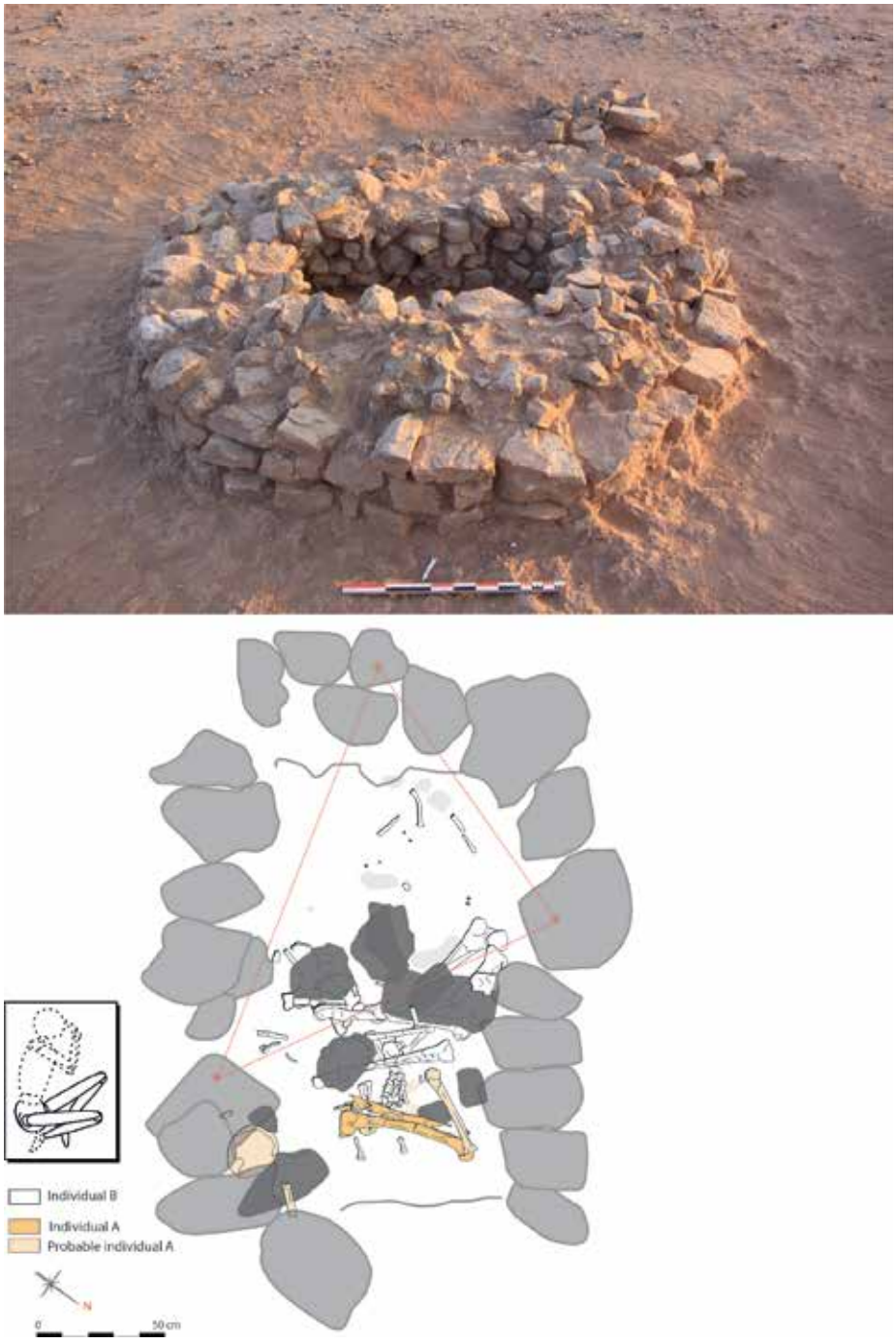


Figure 4*: Tomb 5 of the necropolis of Khawr Jirama (photo C. Sévin, drawing A. Thomas ©Archaeological Mission of Khawr Jirama).*

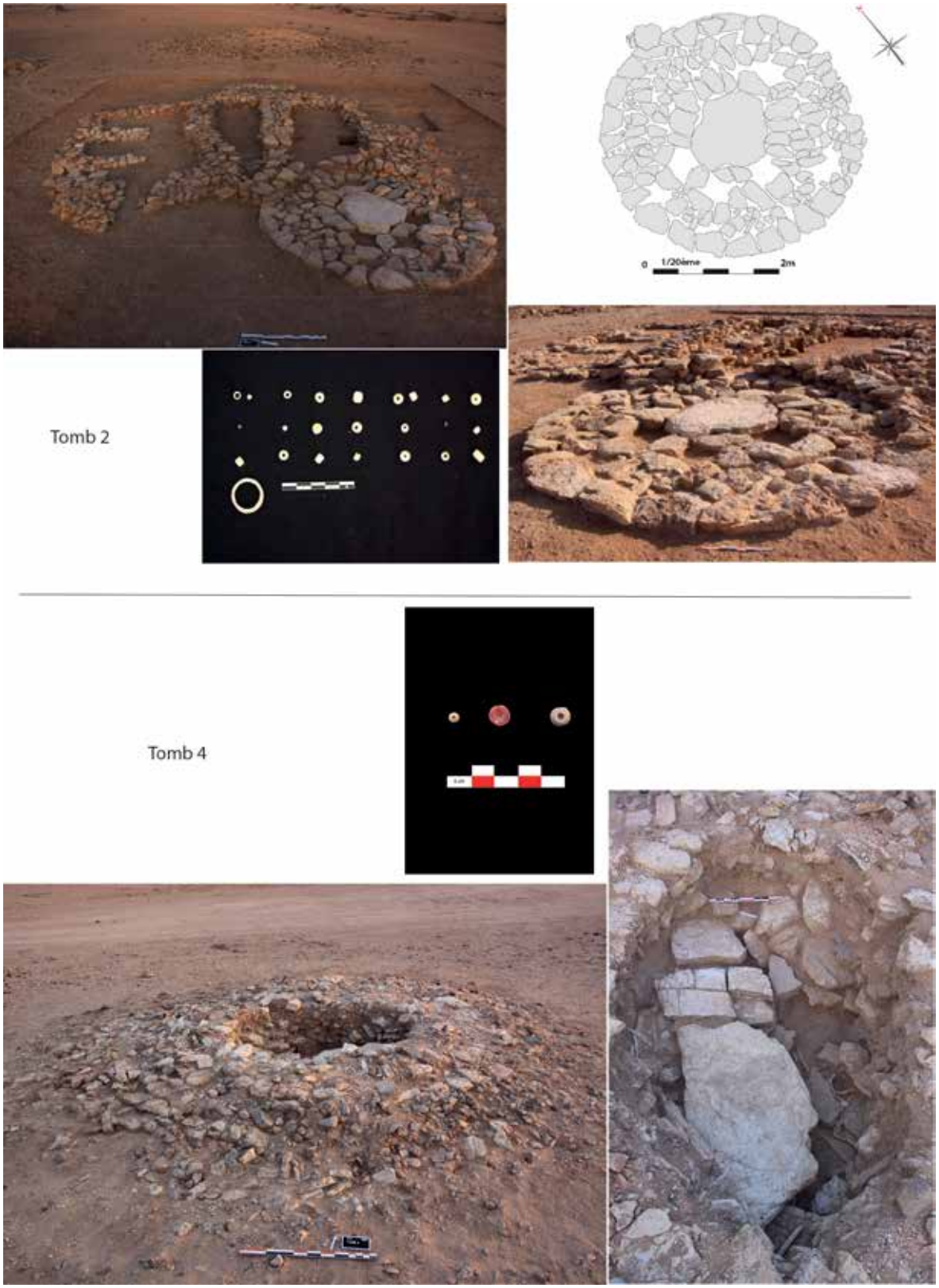


Figure 5*: Tombs 2 and 4 of the necropolis of Khawr Jirama (photo C. Sévin, drawing C. Sévin ©Archaeological Mission of Khawr Jirama).*

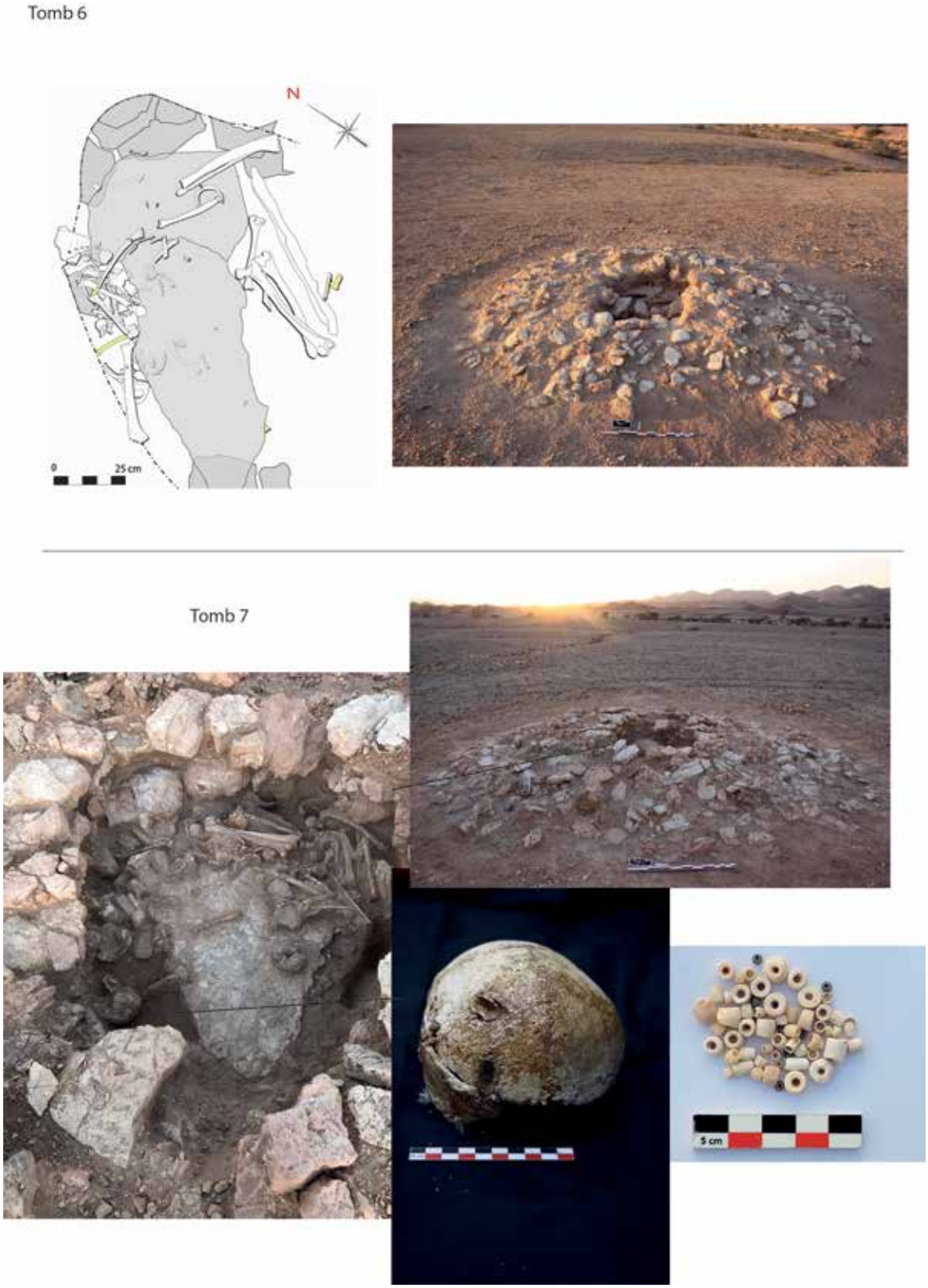


Figure 6*: Tombs 6 and 7 of the necropolis of Khawr Jirama (photo C. Sévin and G. Gernez, drawing E. Ciesielski ©Archaeological Mission of Khawr Jirama).*

Tomb 4

Tomb 4 measures approximately 4.8 meters in diameter and 1.10 meters high at the top of the central chamber (**Fig.5**). The chamber, oval in shape, measures 1.5 meters wide from north to south and almost 2 meters long from east to west. The large limestone slab at the bottom rests on squared stone blocks. It is associated with two other limestone blocks which extend this platform to the NE edge of the chamber. Although massive, the slab is not exactly dimensioned to the width of the bottom of the chamber, so that space is present between the slab and the edges of the chamber.

It is in this space that human (N-NW side) and animal remains (S-SE side) were unearthed, at the same level as the ground on which the central slab rests. The poorly preserved human bones are commingled and represent one individual adult. Nevertheless, with the exception of the most fragile bones of the trunk (ribs and vertebral column), most of the skeleton is at least partially present, including small bones. The missing bones probably correspond to taphonomic destruction. The sex of the individual was estimated as male based on hip bone measurements (Bruzek 2017).

The animal remains include two left articulated goat shoulders showing a certain anatomical logic. No traces of consumption-related streaks, characterized by cut-marks, were identified, suggesting the initial deposition of meat wedges. Finally, three small beads (<1 cm), two steatite and one carnelian coming from Iran, were unearthed in the gaps between the stones and around the central slab.

Bioapatite dating of the human skeleton (date #10: **Table 1**) indicates deposition at the end of the 4th millennium BCE.

Tomb 2

Architecturally, all that remains of tomb 2 is the first layer, made up of fairly large blocks of radiolarites arranged around a large central limestone slab, in a perfectly circular shape, 4.8 meters in diameter (**Fig. 5**). The other layers of blocks were apparently reused for the construction of an adjacent later building, radiocarbon dated to the Umm an-Nar period (Sévin Allouet et al. 2019).

Human and animal bone was unearthed around the central slab, in the interstices of the blocks constituting the first layer, and mainly inside three niches, or free spaces between several blocks against the slab (**Fig.5**). The skeletal remains are in a poor state of preservation, highly fragmented and commingled. All bones of the skeleton are represented, although only partially, including small bones (particularly from hand). The majority of human remains are consistent with those of a mature or adult individual. However, the presence of several duplicates indicates a minimum of two adult. Additionally, several immature bones were recovered, including a mandible belonging to a child of approximately 1 year (±4 months) according to the stage of dental eruption (Ubelaker 1989). The other nonadults remains are of compatible size and maturity. There is therefore a minimum of three individuals in total, two adults and a young child.

The animal remains, mixed with human bones in the southwest recess, are those of goats corresponding to the left shoulders and thighs of two individuals. Finally, a total of 23 steatite beads and a conus ring were unearthed, scattered throughout the levels where human and animal bones appeared.

Two bioapatite dates were carried out, one on a human bone sample (date #4) and the other on an animal bone sample (date #5). Both are remarkably concordant and place the deposit at the end of the 4th or very beginning of the 3rd millennium BCE (**Table 1**).

Tomb 6

This tomb 6 has exactly the same architectural characteristics as tombs 2 and 4. Like the latter, it was built with local radiolarite that was heavily damaged by weathering (**Fig.6**). It also has a circular plan with a diameter of about 4.8 meters, with access to the chamber from the top. This chamber was of oval shape and measured approximately 1.80 m long and 0.80 m wide. The funerary deposits were also deposited here on white limestone slabs laid flat at the back of the chamber. One of them was broken and was placed vertically.

The bones, belonging to an adult male of large stature according to the first anthropological observations, had slipped on either side of this slab,

probably once again under the effect of bad weather and periods of flooding in these low terraces.

A goat scapula unearthed in this tomb also indicates that a deposit of a quarter of meat accompanied the deceased. This is the only offering uncovered in this tomb.

Bioapatite dating performed on this individual gave a similar dating to tombs 2 and 4 at the end of the 4th millennium, between 3361 and 3101 cal. BC (see below).

Tomb 7

Tomb 7 is located only a few meters north of tomb 6. The latter has an architectural plan quite similar to tombs 2, 4 and 6. Also constructed of radiolarite, it has an oval plan showed a slightly larger diameter than the other tombs with a dimension of 5.10 by 5 meters (**Fig.6**). The central chamber, also oval in shape, measured 1.20 by 1 meter in diameter. Bioapatite dates obtained between 3336 and 3020 cal. BC attest that this tomb is contemporary with tombs 2, 4 and 6.

At the bottom of the chamber was a large white limestone slab laid flat. On this slab, and all around, lay the skeletal remains of two commingled mature individuals with no anatomical coherence (**Fig.6**). One caprine bone was also present in the tomb.

The commingling of the bones is so great that it is impossible to assess the original position of the two human bodies. Here, the simultaneous deposit of both individuals should be considered. The perfect match of the radiocarbon dates of the two individuals, between 3336-3020 cal. BC, indeed supports such hypothesis. Of course, due to the chronological range of these dates, it remains possible that a slight chronological shift exists between the two deposits. This can only be possible if the architecture of the tomb allowed the burial chamber to be reopened ; however, the architectural analysis of this tomb, identical to tombs 2, 4 and 6, does not support the existence of a permanent entrance, and one may thus assume that these deposits are simultaneous.

The bones are quite well preserved, although very fragile. In order to prevent the destruction of the bones at the time of their collection, a sexual diagnosis was carried out in the field from the measurements of the os coxa (Bruzek et al. 2017) ; both individuals were estimated to be female. The particular interest in this tomb comes from one of the two skulls with two lesions on the left parietal bone (**Fig.6**). The two defects show such great similarities in shape and size that it suggests the same implement. Observations suggest traumatic impacts presumably caused with an axe/adze-type implement, where the cranial vault has been compressed inwards but remained partly attached to the outer table. The small fragment in the defect in the superior vault may be an exfoliated part of the cranial vault. To whether these injuries were perimortem or whether the individual survived for a short period will be resolved with further investigations. The results of additional analyzes will provide valuable information on the status of the dead and the context of their burial at Jarama, but of course among the multitude of hypotheses, that of the killing of at least one of the two deceased appears possible.

Numerous beads were found in this tomb, testifying to one or more rich ornaments worn by the deceased, as well as a *Pecten* sp. shell that may have contained ointments or other cosmetic products (**Fig.6**).

- *Fauna & artefact deposits*

In all southern group tombs from the southern group, an original and still unknown practice of depositing goat meat quarters was observed (Sévin Allouet *et al* 2021). These are fleshy parts of the animal, the shoulder or the thigh, which can thus be considered as food offerings intended to accompany the deceased to the tomb. Studies on these faunal elements have made it possible to define that it is young individuals who have been selected to be placed in the tomb with the deceased, and not old or sick animals (Sévin Allouet *et al*. 2021 ; Rivière and Sévin Allouet 2022).

Three caprines were unearthed in tomb 2 and two in tomb 4. Tombs 6 and 7 contained faunal remains corresponding to at least one individual each. In a still semi-nomadic society where small herds are of paramount importance in supplying the community with food and wool, slaughtering healthy animals to place them in tombs underlines, in addition to the

size of the monuments, the social importance of the individuals buried there.

Other offerings left with the deceased do not differ from the tombs of the northern group ; they include shell or stone beads corresponding to elements of adornment, as well as a shell ring unearthed in tomb 2 (**Fig.5** and **Fig.6**). Like tombs 1 and 3 of the northern group, *Pecten*-type shells were also unearthed in three of the southern group (tombs 2, 6 and 7). These shells thus appear to be a characteristic offering of this tomb type, and it is appropriate in the future to analyze the sediment contained within them to determine if they contained any food, cosmetic, etc.

III. Dating and chronology of the Jarama necropolis

Bioapatite dating on human or animal bones was carried out on 10 samples in order to best date the use of this necropolis, and thus to propose the most precise chronological framework possible for these monuments. Considering the raw results of these dates carried out on apatites, the northern tombs (tomb 1 and 3) appears older than the tombs of the southern group, the former having a chronological range between 3595 and 3300 cal. BC, while the southern group was used between 3330 and 2900 cal. BC (Fig.7).

In both cases, these tombs are located chronologically in the second half of the 4th millennium BC and appear older than (northern group), and/or partially overlapping with (southern group), those of the beginning of the Hafit period.

This question of datings is of course at the heart of coastal archeology in Oman due to the reservoir effect which we still find difficult to assess today (Zazzo et al. 2012 ; Cleuziou et al. 2005). This effect fluctuates depending on many characteristics: chronological periods, places (it is much more important in equatorial zones), climate, marine streams, the mixing of surface waters with deep waters (« upwelling » phenomen), and in the end by the quantity of marine protein consumed by the people and animals at the site.

The Jarama necropolis does not really constitute a coastal site, as it is located approximately three kilometers from the coast. Nevertheless, while we do not know what quantity of marine proteins were consumed by the populations living there, this question cannot be pushed aside. Like other sites in the region, it is possible that the dates obtained here are older than the actual date of the sample due to this reservoir effect. However, a certain number of elements allow us to suggest that these dates are viable and do not seem to have been impacted by a reservoir effect.

First of all, the presence of goat meat in the tombs clearly indicates that these populations consumed at least some terrestrial animal proteins as part of their diet. Unlike coastal sites, it is not fish, dolphins, or turtles that we find in the tombs, but livestock. Even if the consumption of shellfish and fish seems obvious for populations living not far from a lagoon, the people buried in Jarama are probably both, coastal and pastoralist population. This does not constitute an evidence, but an indication that marine protein is not necessarily the main food consumed by the populations of Jarama relied on both, livestock and coastal resources.

Futhermore, the dates obtained in tomb 2 come from both goats and humans, and the latter are absolutely identical (Fig.7). Even if it is possible that the goats consumed fish scraps as we see today, the bulk of these animals› diet was certainly not marine proteins. Thus, the fact of obtaining identical dates, in the same tomb, on a sample coming from a goat having consumed little or no marine protein and the deceased, highlights the fact that this reservoir effect, it exists, has little or no impact on dating at the site.

Finally, as already mentioned, the first unpublished analysis on the beads from tombs 1 and 4 of Jarama, sent to Professor Mark Kenoyer of the University of Wisconsin, attest that the latter come from Gujarat and date to the 4th millennium BC (personal communication). This will of course be the subject of a later article in collaboration with the people working on these beads and on the Indus Valley. These beads therefore also attest that the funerary goods corresponds perfectly, in at least two tombs, with the dates obtained.

Thus, for all the reasons mentioned above, the dates obtained on the Jarama site seem valid and only weakly impacted by a potential reservoir effect.

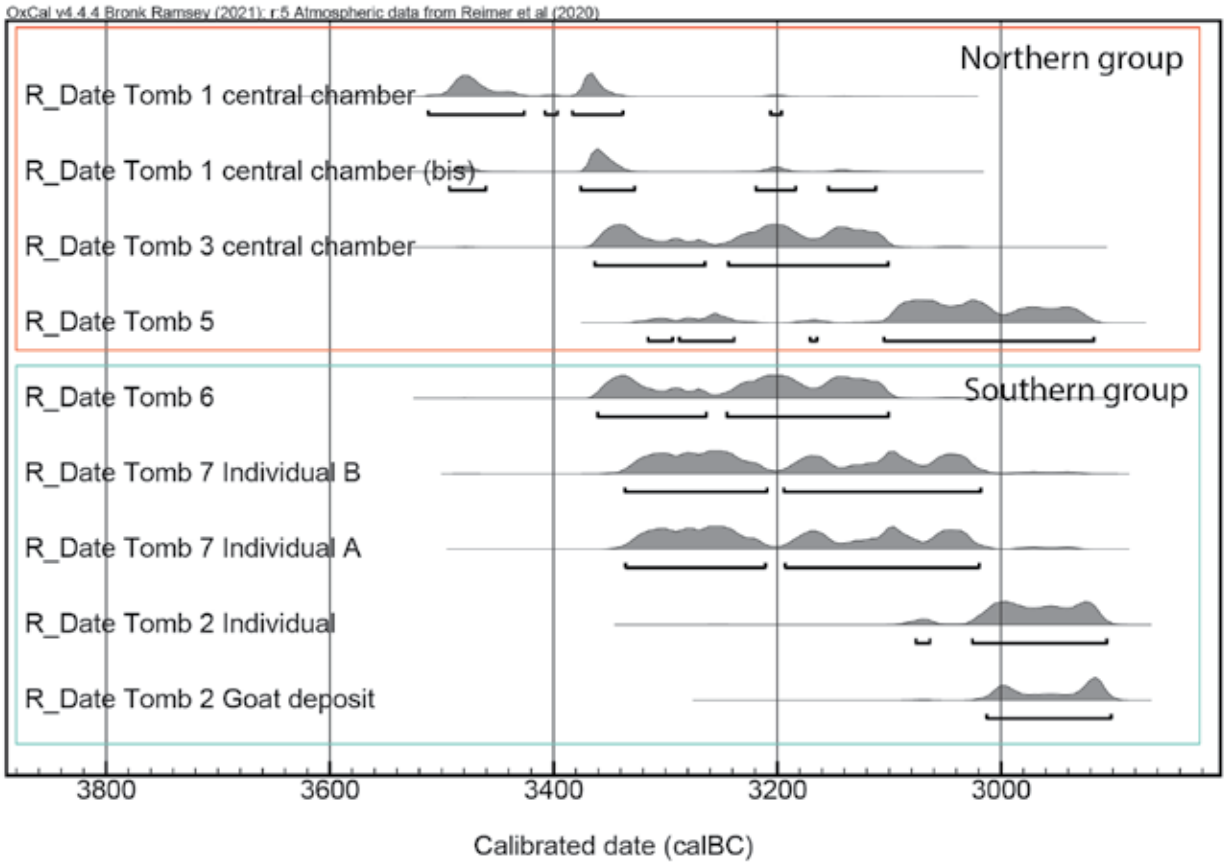


Figure 6*: Chronological dating of the necropolis of Khawr Jirama (C. Sévin ©Archaeological Mission of Khawr Jirama).*

IV. Synthesis

Following the investigations carried out on this necropolis of Khawr Jirama, it appears that there are probably two distinct periods corresponding to two different types of architecture and mortuary practices (**Fig.8**).

The dates obtained in these tombs underline this observation: we observe the earlier dates of tombs 1 and 3, located to the north of the necropolis, in relation to tombs 2, 4, 6 and 7, located in the southern part. It seems likely that they do not belong to the same groups who settled here, as the monuments and funerary traditions differ from one to another. The most likely hypothesis is that this necropolis was abandoned for a time before it was re-used by a new group who settled nearby; this idea is in line with a society that was still semi-nomadic during this transitional period between the end of the Neolithic and the beginning of the Bronze Age. Tomb 5, however, raises questions since it has the same architecture and the same funerary practices as tombs 1 and 3, but with dates clearly more recent.

In all cases, it seems highly probable both in the northern group and the southern group that there was a very strong selection of the individuals deposited in these tombs, and that these tombs were erected for deceased people occupying an important social place amongst the group. There are only seven tombs and nine individuals in total in this necropolis, representing a period of approximately three centuries. There are thus clearly not enough tombs in this necropolis, and in these tombs not enough individuals, to represent an entire community. This indicates that the vast majority of community members received another, more modest funeral treatment, that left no trace.

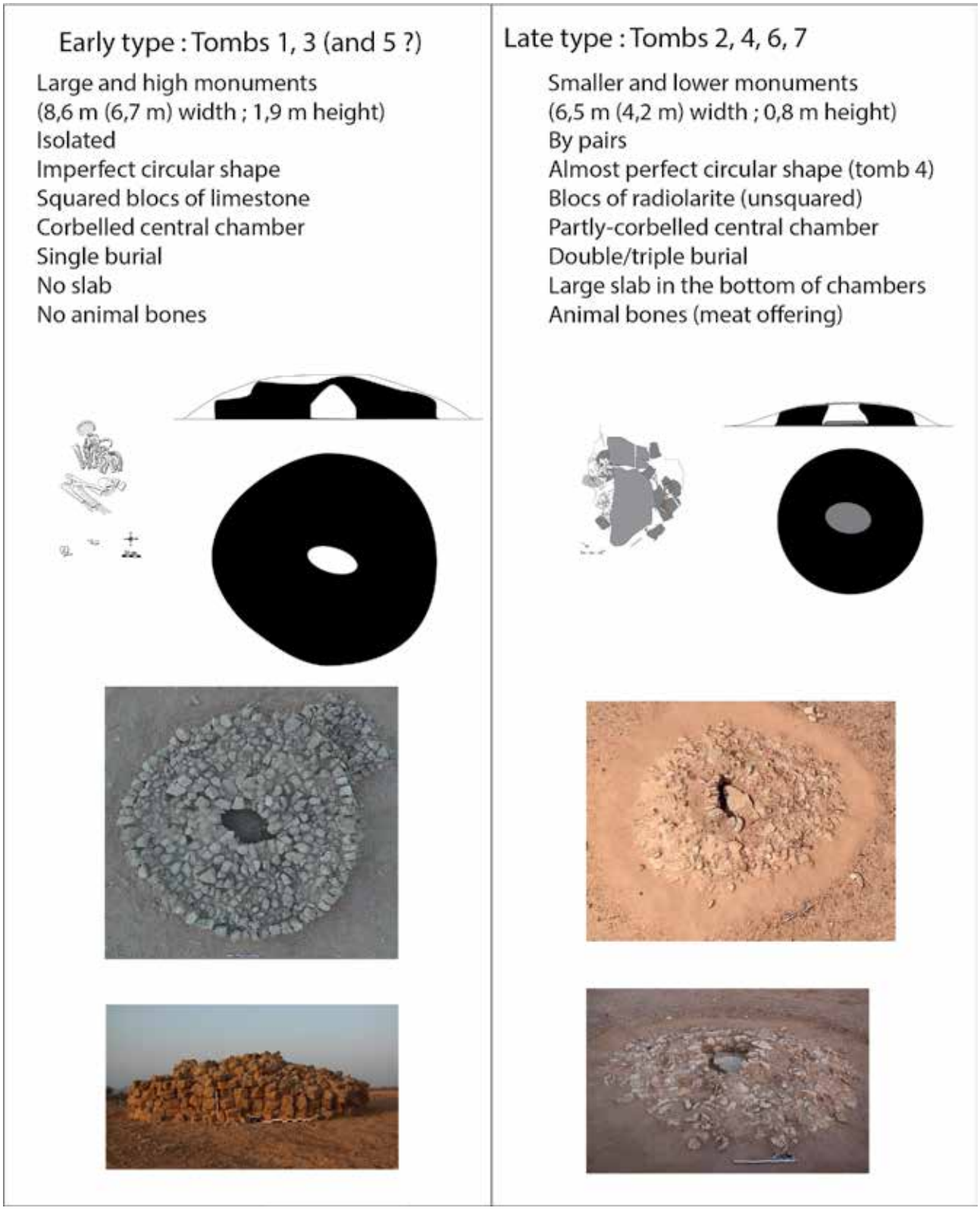


Figure 8*: Summaries of features and differncies between the northern and southern group of tombs of the necropolis (©Archaeological Mission of Khawr Jirama).*

The monumental architecture of tombs 1 and 3 clearly required the mobilization and investment of a large workforce as well as specialized individuals to carry out the operations, including design, management, and stone shaping, in order to ultimately deposit only a single individual. This underlines the important role that the individuals must have in society. The presence of carnelian beads in tomb 1, coming from long-distance exchanges with neighboring regions (Gujarat and Iran), further emphasizes the importance of the deceased individuals.

While the tombs of the southern group appear much smaller in size, there are still not enough individuals in them: only one individual in tombs 4 and 6, three in tomb 2 (two adults and one nonadult), and two females in tomb 7. In tomb 7, the observation of traces of blows on one of the two skulls raises numerous questions: is this case of interpersonal violence well known during these periods and as observed for example on the sites of Buhais, in particular BSH 18 (Kiesewetter 2006), or from Umm al Quwain (Mery et al. 2016), or from Ras al Hamra where a shark tooth arrow was found planted in the vertebra of a deceased (Santini 2002)? Or are we rather here in the presence of the killing of at least one of the two deceased, as part of a mortuary practices in the framework of the funeral of a socially important member of the group ? In any case, the absence of a permanent entrance in these tombs suggests that the deposits were made at the same time, and therefore that the death of these two women is very close, if not contemporary, in time.

The systematic presence of quarters of goat meat in these tombs of the southern group, placed as offerings to accompany the deceased in death, once again highlights the importance of the latter. Indeed, the archaeozoological studies carried out have highlighted that it is young and healthy individuals who were slaughtered (Rivière and Sévin Allouet 2022; Sévin Allouet *et al*. 2020), and in societies that are still semi-nomadic where livestock management is necessary to meet the needs of the community, taking the youngest and healthiest individuals from the herd to offer them to the deceased constitutes a strong act and an obvious sacrifice for the community.

Finally, we will note that tombs located in the southern part of the necropolis are associated two by two according to criteria still unknown: tombs 2 and 4, as well as tombs 6 and 7, are each located a few meters apart. The investigations in progress, within the framework of a new project that we are conducting on the scale of the region, have made it possible to observe that this phenomenon was repeated systematically on another necropolis showing exactly the same characteristics as the one of Jarama, and so could also date to this same period of the second half of the 4th millennium BC in Oman. This particularly the case on one of the necropolis of Ras Al Jinz where we have conducted excavations in 2023 on four tombs: these latter belong at the same period and show exactly the same architectural characteristics and mortuary practices than those of Jarama (*archaeological report in progress*).

- *Jarama : a monumentality prior to the "Hafit" period and culturally distinct*

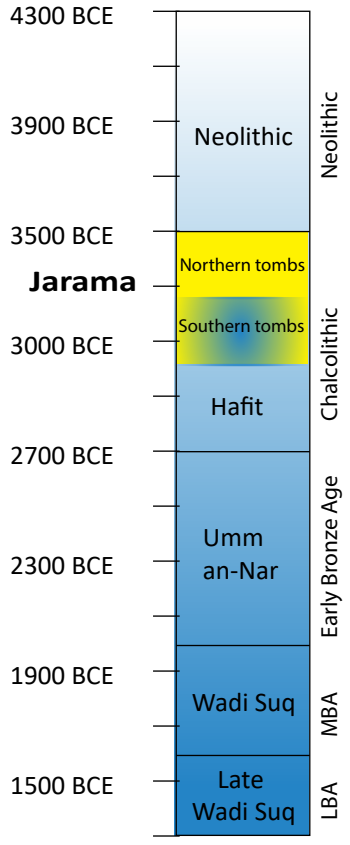
In the scientific literature, it is accepted that the first funerary monuments in eastern Arabia were erected at the very beginning of the Hafit period (3200-2700 BC) [2], i.e. at the dawn of what is conventionally called the "Bronze Age" (Bortolini and Munoz 2015; Méry, Charpentier et al. 2009). Several hypotheses - sometimes contradictory - were put forward to explain this new phenomenon at the end of the 4th millennium BC, in particular because of the radical change in shape observed between the Neolithic (most often burial pits in cemeteries) and the Hafit period (collective burials in monuments built in high places) (Giraud and Cleuziou 2009; Bortolini 2013; Bortolini and Munoz 2015; Cleuziou and Tosi 2020; Deadman 2014; Deadman et al. 2015).

This close link between funerary monumentality and the "Hafit" period has become so obvious that fallen funerary monuments are often attributed by default to this period due to their location and/or their dimensions (see for example Giraud and Gernez 2007: 40; Cable 2013: 106-110).

2 *The chronology is not fixed for the very beginning of the period, but the literature places it around 3200-3100 BC (ex. Cleuziou and Munoz 2007:298; Bortolini and Munoz 2015; Thornton and Cable 2016 : 3).*

The main contribution of the archaeological excavations of the Jarama necropolis is precisely to question this evidence. The comparison between the standard Jarama burial practices unequivocally shows differences between the Jarama burial practices and those known from the Hafit period (**Fig.9**). The only point of resemblance is that they are stone-built monuments. For the rest, and despite limited data, they are distinct in terms of location, morphology, architecture, entrance, funerary practices and associated artefacts.

The Jarama tombs are located in the plain, on the low terraces, while the Hafit tombs are generally located at the top of the hills, on the ridge lines or on the slopes of foothills (Cleuziou and Tosi 2020: 207; Giraud and Cleuziou 2009). The Jarama tombs are very wide for the oldest (up to 8.5 meters) and quite short (height between 1 meter and 1.8 meters), with a small oval chamber (phase 1) or circular chamber with a large single slab (phase 2) with no permanent entrance system. Conversely, Hafit tombs are always circular, with a diameter most often less than 5 meters (Deadman 2015:53), and can exceed 5 meters in height (Deadman 2015:51) consisting of a double or triple ring-wall crossed by a small corridor leading to an entrance, and sometimes paved floors, of varying dimensions (smaller in the case of cairns, larger in the case of transitional tower tombs).



	Jarama	Hafit
Dating	3500-3300 cal BC (North group) 3300-2900 cal BC (South group)	3200-2700 cal BC
Location	Lower terraces	Top of hills crest lines
Architecture	Circular stone monument Low and wide Small central chamber Central slab (phase 2) No entrance	Circular stone monument High tower-tombs / cairns 2-3 walls Larger central chamber Permanent entrance
Human deposits	Single deposit (phase 1) 1 to 3 simulataneous deposits (phase 2) -> Highly selected individuals	Successive deposits over time = collective tombs -> Family / clan (?)
Grave goods	No copper No pottery Shells, shell/stone beads Food (pieces of goats) (phase 2)	Copper objects Jemdet Nasr pottery Shell/stone beads No fauna

Figure 8*: Jarama period on the regional timeline of Prehistory in Oman and opposition with Hafit features (©Archaeological Mission of Khawr Jirama).*

Concerning interments, the northern tombs of Jarama were built to hold a single individual, which is confirmed by the single burial discovered in primary position, the small size and rectangular shape of the burial chamber, leaving no room for other internments, and the absence of an entrance. The more recent tombs, located on the southern part of the necropolis, were intended for one to three individuals. Conversely, the Hafit tombs contained more individuals: the average number of individuals is 6.1 (Munoz 2019: 31, fig. 2.4). Although often poorly preserved, Hafit tombs yield the remains of one to six individuals in northeastern Oman (Jebel Hafit, al Khubayb, Buraimi, Jebel Emalah) (Bortolini 2013:226, t. 5.18; Williams and Gregoricka 2013:146) and even more in the Ja›alan, with an average of 18 individuals at HD-10 and RJ-6 (Bortolini 2013:226, t. 5-18), the maximum being 29 individuals in Cairn 1 at RJ-6 (Munoz 2019: 27). Thus, the contrast between the tombs of Jarama and the Hafit tombs in the same region is particularly striking.

Taking into consideration southeastern Arabia in its entirety, we note that some tombs from the early Hafit period also contain very few individuals or even just one, for example tomb S002-001 at Al Khutma (Williams & Gregoricka 2013:138), which is a similarity to the Jarama tombs. In this case, however, there are differences in terms of location (top of the ridge at Al Khutma and plain at Jarama) and tomb architecture. In any case, the question of an evolution between Jarama and Hafit burial practices will have to be examined further on the basis of recent data.

Moreover, the artefacts deposited in the tombs of Jarama do not include copper or ceramics unlike the Hafit tombs (Cleuziou & Tosi 2020:204-205). They only contain shell and stone beads, of a fairly simple shape, and more rarely a Pecten-type shell. These funerary goods thus recall Neolithic practices (Munoz et al. 2010:27). The ornaments discovered in the Hafit tombs or produced at HD-6 are more varied (e.g., Cleuziou & Tosi 2020:203; Law 2020; Azzarà & Cattani 2020:150, Fig. 13.3). The originality of the meat quarters placed as offerings in the southern tombs of the Jarama necropolis (phase 2) have definitely no equivalent in Hafit tombs.

Finally, bioapatite dating demonstrates the earlier dates at Jarama, two to four centuries older than the oldest Hafit tombs.

For all these reasons, we can propose that the Jarama tombs which predate, or eventually in the case of southern group overlap with the very beginning of the Hafit period, and that they are not part of the Hafit culture. On the contrary, they seem rather linked to the Neolithic tradition in terms of deposition of bodies, but with new demonstrative manifestations (construction of large funerary monuments) reserved for a very small part of society, which is neither characteristic of the Neolithic nor from the Hafit era.

It could thus be a transitional stage between the Neolithic and the Bronze Age corresponding to the chronological span 3500-2900 cal. BC.

CONCLUSION

These investigations have brought to light what appears to be a new funerary tradition in Oman during a transitional period between the Neolithic and the Bronze Age. The question is whether this new funerary tradition could be the first evidence of a previously unknown prehistoric culture in Oman?

Indeed, funerary practices, much more than material culture, are often uniform over large geographical spaces and long periods of time and thus represent the deep identity of a group through the rites practiced and the beliefs that support them. Those observed at the Jarama necropolis have to date no known equivalent in Oman, neither at the level of chronological dating, nor at the level of funerary practices, nor in the shape of monuments. This necropolis clearly attests that funerary monumentalism existed in Oman before the Hafit period. It is expressed at Jarama in a spectacular way, with some tombs almost nine meters in diameter and 1.90 meters in height. Ongoing unpublished research carried out by a Czech team in Oman seem to show that monumentalism could even date back to the 5th millennium BCE, reminiscent of discoveries made in Yemen (McCorriston et al. 2011). It would also be associated with an early collective funeral phenomenon.

The idea is not to look for the earliest monumentalism in Oman, nor to look for the oldest collective tomb, but to emphasize that rather

than a linear evolution as presented to date, there was a proliferation of funerary practices and rites that co-existed during the same period. This is certainly the case for this pivotal period of the 4th millennium which carries with it the first elements of the profound social, economic and cultural transformations to come in the Bronze Age.

The presence of these monumental tombs, erected for only a few deceased, richly accompanied for some of them, also definitively dismisses the prevalent image of an egalitarian Neolithic society in Oman. There are clearly people occupying important position and exercising sufficient power within these societies to justify the construction of monumental tombs, in the context of a probable hierarchical and segmented society. This observation is consistent with the conclusion expressed by Steimer-Herbet and Besse (2020:116) on the scale of Arabia.

This single example of the Jarama necropolis is of course not sufficient on its own to define the limits and characteristics of an intermediate culture between the Neolithic and the Bronze Age. It constitutes the first evidence of it which was previously lacking, and it is now necessary to seek its geographical, chronological and cultural contours through additional excavation. From the point of view of architecture (e.g., the shape and absence of an opening ; see Munoz et al. 2017: 7, Fig. 4), individual funerary practice (Munoz et al. 2018: 7-8 and Munoz et al. 2017: 15) and grave goods (e.g., stone and shell beads ; see Munoz et al. 2018: 15, Fig. 16), several tombs in the Shiya necropolis could belong to the Jarama shape rather than the Hafit culture, especially as particularly high dates during the 4th millennium BCE have been noted for three of them : tombs 3, 4 and 5 (Munoz et al. 2018: 8, Fig. 3). Also, a similar observation can be done on Al Khutma tomb S002-001 (Williams & Gregoricka, 2013:141), which seems contemporary with the southern tombs of Jarama. Thus, considering that these tombs are probably not isolated but only the visible face of a more wide phenomena, a survey has been carried out during winter 2022 in the Sharqiya region in order to find other necropolis showing same characteristics. It made it possible to uncover seven other necropolis showing monuments with the same architectural characteristics as those observed at the Jarama necropolis (**Fig.10**).

Consequently, a new program, begun in winter 2023, aims to study these necropolis over the next five years in order to better characterize this new funerary tradition. The first results obtained at Ras al-Jinz necropolis, where four tombs were excavated in February 2023, has added to the data we have on these late Neolithic populations of Oman.

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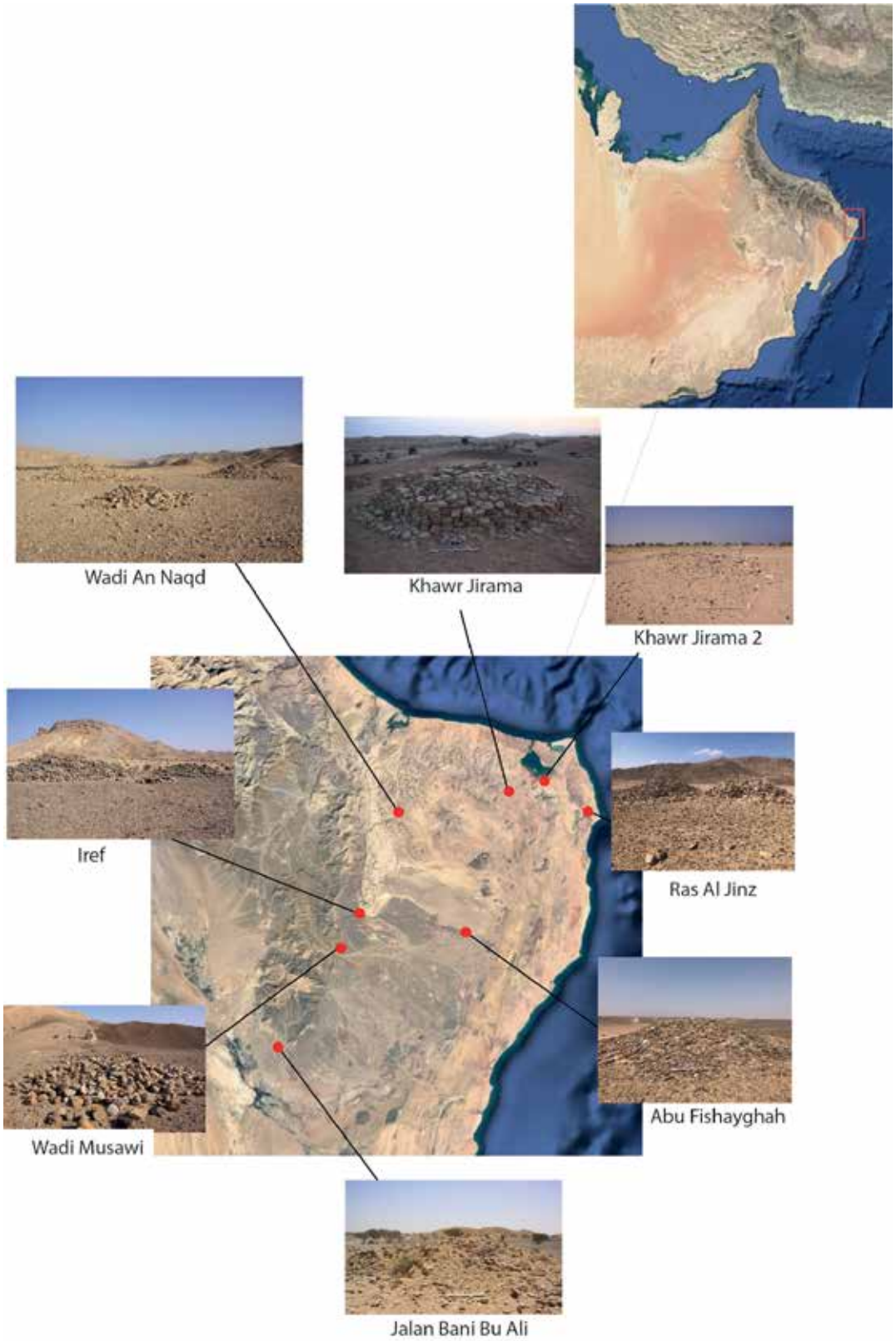

Figure 10*: Location of the necropolis owning the same caracteritics than Jarama and going to be investigated in the framework of a new project (©Archaeological Mission of Khawr Jirama).*

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