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LATE PREHISTORIC AGGREGATION PATTERNS
IN JORDAN’S EASTERN BADIA

Gary O. Rollefson

1. The pioneering work in the Black Desert by A. Betts, a colleague who entered Jordan at the same time as I did in 1978, was an inspiration that captivated me and my colleagues in later years. A. Wasse asked me to participate in a survey of the earliest phases of pastoral nomadism at the head of Wadi Sirhan in 2002, and this also widened my horizons of archaeological interests. By 2008, Y. Rowan, with his background in Chalcolithic archaeology, joined us in the eastern badia, and M. Kersel became part of the team in 2009. In addition to the Department of Antiquities of Jordan, we also hail the support of ACOR and CBRL in Amman, as well as Whitman College students J. Rozar, L. Evislizer, M. Du Bray, and I. Kretzler. We also welcomed the photographic and GPS wizardry of W. Abu-Aziz in 2011, as well as the dedicated assistance of biological archaeologist M. Perry.

2. Whitman College, USA.

Résumé – Depuis plus de trente ans, la recherche archéologique s’est intéressée à l’étude de la fin de la période préhistorique et à la protohistoire de la région du Désert Noir de basalte jordanien. Les travaux récents effectués ces cinq dernières années ont permis d’éclaircir de nombreux aspects des modalités d’exploitation de ce territoire et de ses ressources au cours du Néolithique récent, du Chalcolithique et de l’âge du Bronze ancien. Plusieurs secteurs du Désert Noir de basalte témoignent de visites répétées au cours du temps, très vraisemblablement sur la base d’une occupation saisonnière au cours de l’hiver ou au début du printemps, quand les ressources en eau sont disponibles. Deux secteurs — celui des reliefs tabulaires de mesas situés à 60 km à l’est d’Azraq et celui de Wissad localisé à 60 km plus à l’est — montrent des schémas de concentration de l’occupation bien différenciés, peut-être en partie liés à des variations dans le régime de précipitations entre 6500 et 2500 av. J.-C. Le secteur des dépressions naturelles de Wissad, en particulier, semble avoir été beaucoup plus fréquemment visité, même au cours des périodes historiques, et la distribution des groupes de tumuli suggère une dimension économique et rituelle du site plus importante.


Abstract – Fieldwork in the Late Prehistory of Jordan’s basalt-strewn Black Desert has a history of more than thirty years of research, and recent investigations over the past five years have begun to clarify many of the aspects of the character of the landscape and the exploitation of its resources during the Late Neolithic, Chalcolithic, and Early Bronze Age. There are many areas of the Black Desert that demonstrate repeated visits to the same locations, undoubtedly on a seasonal basis corresponding with reliable water resources during the winter and early spring. Two areas — the basalt-topped mesas c. 60 km east of North Azraq and Wisad Pools, about 60 km farther to the east — show contrasting patterns of aggregation, possibly related, in part, to changes in precipitation between c. 6,500 and 2,500 BC. Wisad Pools, in particular, appears to be much more frequently visited, even into historic times, and the distribution of tumuli clusters suggest that the site may have witnessed more than economic and ritual activities.

Key-Words – Eastern Azraq Mesas, Wisad, Late prehistory, Seasonal aggregation, Water availability.
Introduction

Archaeological research into the Late Prehistory (here taken to be the period beginning with the Late Neolithic at 6,500 cal BC) of the Black Desert in Jordan was scant until the pioneering work by Helms at Jawa 3 and Betts along a swath extending from near North Azraq to Burqu’4. After a hiatus in fieldwork in this region for more than a decade, new projects were launched in this part of the badia, including the Eastern Jordan Badia Project in 2007, which is currently investigating two major parts of the Black Desert: the basalt-capped mesas roughly 60 km east of North Azraq and the huge necropolis at Wisad Pools, an additional 60 km to the east 5 (fig. 1).

Several seasons of reconnaissance, survey and mapping have taken place since 2007 in both areas, and some patterns of local exploitation seem to be different in both areas, as well as demonstrating some degree of uniqueness compared to other regions in the Jordanian Black Desert, the Hauran, the southeastern deserts of Jordan, and other regions of the northern, western, and southern Arabian Peninsula. At the same time, there are close parallels of ritual architecture that link the mesas and Wisad Pools with northern, western, and central Saudi Arabia as well as central Yemen, the last some 2,000 km to the south.

A Brief Description of the Architecture at the Mesas and at Wisad Pools

The built environment at both locales comprises a series of different forms and,
presumably, different functions. Construction materials at both Wisad and the mesas took advantage of the fractured basalt that naturally assume the form of rectilinear slabs of variable size, a shape that was efficient for erecting walls to a height of more than 3 m in some cases.

The Mesas

There are more than 50 flat-topped, basalt-covered mesas in the Wadi al-Qattafi, Qara Qataf, and Wadi Umm Nukhayla drainages (fig. 2). Surface artifacts on the summits are usually relatively rare, although a couple were notable for the presence of relatively dense scatters of Neolithic chipped stone tools, including several late PPNB or PPNC burin concentrations on Mesa M-5. On the eastern edge of the top of Mesa M-3 there was a dense collection of PPNB naviform blades and a few cores; the setting would have been ideal for a flint knapper to keep watch over the Wadi al-Qattafi below as he or she produced tools to hunt and process the intended prey. Just to the north, Mesa M-4 (often referred to as “Maitland’s Mesa”) had several Late Neolithic burin sites on the southern slope, as well as at least one Middle PPNB chipping station in the same area. M-4 also revealed dense scatters of Late Neolithic truncation burins at the eastern foot of the mesa, as well as an Epipaleolithic chipping station on the eastern slope. But the tops and slopes of most of the mesas were generally barren of stone tools, although M-4 produced some broken cortical scrapers, some debitage that is likely Ch/EB in age, and one Canaanean blade segment. Overall, it appears that most of the architecture is later than the Early (and even Late) Neolithic, and that most of the presence on the mesas can be attributed to the Chalcolithic and Early Bronze periods 6.

Atop each of the mesas is at least one tower tomb, although some mesas have two or three; the tower tombs vary in size, but the average dimensions center around 2.5-3.0 m in height and 4-6 m in diameter; the walls are usually less than a meter thick. The towers all appear to have been covered on top, probably using a corbeling technique with or without a central pillar to support the final layer of blocks. Of the mesa tops we have visited, it appears that all of the tower tombs have been looted, most in antiquity; some have also clearly been used a second time. In general, it seems to be commonly accepted that tower tombs date to the Chalcolithic or Early Bronze Age, but one tower on Mesa M-8 and two on Mesa U-14 were clearly re-used during a time that Safaitic scribes visited the region (fig. 3).

Many (but less than the majority, evidently) of the tower tombs on the mesas also involved straight “tails” or “chains” leading from them in a variety of directions, so it is unlikely that celestial associations were at work in these orientations. The “tails” consisted of either simple piles of rocks (numbering, usually, more than ten) or of constructed chambers. The tower tomb on Mesa M-4 had a tail of 10-11 (it is not clear) stone piles before continuing with well-built hollow rectangular chambers that were roughly 2 x 1 x 1 m in size; altogether, these piles and chambers numbered 53. Several of the chambers had been opened in the past, and there appeared to have been nothing inside, not even

6. Several Late Acheulian bifaces and Lower/Middle Paleolithic Levallois points and blades have been found on the surface at the foot of Mesa M-2, M-4, and between M-4 and M-5. Clearly this area was visited by late H. erectus-grade hominins as well as Archaic Homo sapiens individuals, but the evidence is scant, probably as a consequence of geological activity in this area.
much in the way of aeolian sediment (or looter backdirt). It is possible that the piles and chambers are simply markers of time and memory.

All of the mesa tops we’ve visited also had walls that may have served as animal pens and perhaps hut foundations. Of the mesas we’ve been able to investigate, virtually all have only a few stone alignments, usually linear walls separating one part of the summit from another, or stone enclosures of widely varying dimensions. Overall, summits evidently were not routinely used by herding groups as refuges, although Mesa M-4 is certainly the exception to this observation. Curiously, in addition to the presence of two tailed tower tombs, Mesa M-2 (“Tell A” according to Rees 7) also has a large trap of a kite on the summit, with kite walls leading to the trap from the east (fig. 4).

*Mesa M-4*

Mesa M-4 was brought to archaeological attention in 1927 with the publication of an aerial photograph by Flight Lieutenant Percy Maitland, a pilot on the Baghdad-Cairo airmail route 8. The top of M-4 exhibited numerous enclosures, some of considerable diameter, as well as the tower tomb tail of

![Figure 3](image-url)

Figure 3. a. Safaitic tomb built atop earlier Ch/EB tomb on Mesa M-8 (© G. O. Rollefson); b. One of two Safaitic tombs built on top of earlier Ch/EB tombs on Mesa U-14 (© G. O. R).

![Figure 4](image-url)

Figure 4. The trap of a kite on top of Mesa M-2; Mesa M-3 is at the upper left, and the Qara Qataf mesas on the horizon (© D. Kennedy).

7. REES 1929.
8. MAITLAND 1927.
chambers that led the pilot to equate the mesa as a hillfort based on parallels in his homeland of Wales. Since then, recent aerial photography has greatly increased the resolution of M-4, not only in terms of the structures on the summit of the mesa, but also the noticeable concave surface of the summit (fig. 5), which would have captured winter rains for use by shepherds and flocks alike. Aerial photography has also shown the relationship of the structures on the southern, western, and northern slopes of the mesa (fig. 6).

The top of Mesa M-4 is intriguing for several reasons. Across its surface, which measures c. 275 m SW-NE by 165 m NW-SE, there is a large number of structures and features: 262 were mapped in the 2010 field season (including the 53 tail piles and chambers). The larger structures appear to be animal enclosures, more than 50 of them. The much smaller ones (well over 50 of them) are probably one- or two-room huts (which we have named “Ghura huts”) used by shepherds; the size of each cell is about 1.5 x 2 m, and this would seem to be appropriate for an individual shepherd and perhaps his family. The walls of the Ghura huts were only one or two stones high, and it is improbable that they were ever higher in antiquity (fig. 7). There are also U-shaped arrangements of walls; the open side is oriented in several directions, so it is unlikely they represent “desert mosques” post-dating the 7th cent. AD. However, at the moment it is still unclear what the temporal (and even functional) implications of these stone alignments are.

The slopes of M-4 also bear numerous structures. On the western and northwestern sides our survey mapped 56 one- and two-celled huts, with cell dimensions ranging between 1.5 to 3 m; walls of these structures were preserved to a greater height compared to the Ghura huts on top of M-4, reaching a

Figure 5. View towards the north of the top of Mesa M-4, showing the concave nature of the summit. The southern edge of the mesa is in the foreground, and adjacent are some of the rectilinear chambers of the tower tomb tail (© D. K.).

9. We would like to express our keen appreciation to D. Kennedy for providing us with numerous aerial photos he has taken of M-4 and the rest of the mesas, as well as the Wisad Pools area. We also express our gratitude to I. Ruben for the use of her photos.
Figure 6. a. View of Mesa M-4 from the west showing the arrangement of the structures on top of the mesa (© I. Ruben); b. View towards the WSW showing the tower tomb at bottom left and the tail of 53 stone piles and chambers leading towards the west (© I. R.).

Figure 7. A two-celled “Ghura hut” on the summit of Mesa M-4 (© Y. Rowan).
meter or more in some cases. The northern slopes are also the location for 81 burial cairns, including 12 double-chambered tumuli. Most of these appear to have been looted a very long time ago, although several might be intact.

The southern and western slopes have entirely different structures. Resembling the *nawamis* (singular *namus*) of the Sinai Peninsula\(^9\), eleven well-built looted tombs occur amid twelve lower circular graves and three other structures (fig. 8a). All of the nawamis, which range from 3 to 6 m diameter and preserved in some cases to ten courses of basalt slabs (fig. 8b), appear to have been looted in antiquity, as have many of the smaller cairns. Two structures are huge circles (10 m diameter for one, c. 15 m for the other) of good masonry work preserved to eight course; at the center of each there is a small tumulus. One structure stands out from all the others: it is a two-room rectangular structure about 10 m long N-S and 5 m wide E-W; no entrance into the building could be detected (fig. 9).

The looting of the nawamis structures often severely disturbed the architecture, and in only one case was there clear evidence for a ground-level entrance into the namus, and as was the case for the nawamis from the Sinai and for the tower tombs in Yemen\(^11\), the entry faced the southwest (fig. 10). The corbelled roof of the namus had collapsed inward, leaving a “rosette” of spiky basalt slabs ringing the exterior of the tomb.

The looting of the nawamis and smaller graves, although severe, was not completely destructive. The backdirt of several of the more recently (i.e., within the two years previous to the 2010 season) looted graves included chipped stone artifacts and human remains. One of the graves produced many Late Neolithic truncation burins, although the original context of the artifacts might have been disturbed by the burial that took place hundreds or even thousands of years later. Nevertheless, we intend to have the retrieved teeth analyzed for stable isotope analysis, possible DNA recovery, and radiocarbon dating.

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Wisad Pools

Wisad Pools are the center of a large expanse of a number of several kinds of structures that cover an area of roughly 2 x 1.4 km (fig. 11). The pools at Wisad are natural depressions in a short wadi that has eroded through bedrock basalt from one plateau to a slightly lower one (c. 8 m lower) over the course of about one kilometer. There are nine pools that trap water during the rainy season, sometimes of considerable volume (fig. 12). In 2008 we measured the volume of Pool #1, one of the larger depressions, based on the length, breadth, and depth based on the silt line that remained on the basalt blocks that bordered the pool (fig. 13a). The calculations for this pool alone resulted in a capacity for storage of more than 2,100 cm$^3$ (well over a half million US gallons). Pools 2-8 are of variable size, but Pool #9 is almost half a kilometer long, although its depth is never more than 35-40 cm. Nevertheless, when we arrived for the 2011 season, just two weeks after a major rainfall, there was water in all of the pools, including Pool #9 (fig. 13b-c). We stayed at the site for four weeks, and there was still considerable water in Pool #1 when we left, six weeks after the rainfall.

The enormous size of the Wisad Pools site is daunting, and the approach to developing a research strategy is difficult as a consequence of the extent of just the core of the site. We began mapping the site in 2008 using hand-held GPS devices, but in the next season in 2010 we used a total station to locate the hundreds —if not thousands— of structures. This procedure was still very slow, so in the 2011 season we utilized a kite aerial photography approach developed by Abu-Azizeh in his research in southeaster Jordan. To date, we have covered more than 30 ha of structure/feature documentation (fig. 14), although this still remains a small percentage of the core of the site.

The pools were attractions over a considerable amount of time. “Late Neolithic Hill” (fig. 12) received its name from an extensive dense scatter of cores, debitage, and occasional stone tools characteristic of the LN, although there are also concentrations of Early Epipaleolithic cores, flakes/blades/bladelets, and tools as well, especially endscrapers. On a terrace high above Pool #1, looters’ pits have brought up substantial quantities of Middle and Late PPNB artifacts. Scattered Late Neolithic

12. The number of pools has been artificially increased by the construction of barrage dams at the downstream ends of Pools #2, 4, 5, and 6.
13. By the end of the 2011 field season, water in Pools 2-8 had almost entirely evaporated. It is uncertain about the fate of the water in Pool #9, for Bedouin tank trucks began to pump water out of the pool by the fifth week after the rainfall. As we left at the end of the season, Bedouin tank trucks began to pump water from Pool #1.
14. The tumuli and residential/pastoral structures continue well outside the arbitrary lines of fig. 11. Our survey in 2008 covered an area of 4 x 7 km, and even these boundaries were arbitrarily defined.
Figure 11. Satellite image showing the extent of the Wisad Pools site core, extending over an area of c. 2 x 1.4 km (© Google Earth).

Figure 12. The pools in Wadi Wisad leading from one plateau to another just 8-9 m below it (© D. K.).
arrowheads were found as isolates over much of the site, although one structure (see below) produced more than 40 in situ arrowheads of Late Neolithic types. At the southeastern end of Pool #9 is a small village, probably semipermanent (Wisad 1, fig. 12) that can be dated to the later Late Neolithic by virtue of several arrowheads from the surface of this part of the site. But for the most part, it seems that the bulk of mortuary, ritual, and domestic/pastoral structures are assignable to the Chalcolithic and/or Early Bronze Age.

The number of structures on the site is very large, and we estimate that more than a thousand buildings and features occur within the site core itself. The structure types are varied, including probable animal pens, tower tombs (with and without chambered tails), small and large (and multi-chambered) tumuli, ritual structures and platforms, and a variety of walls 17, including some that may be associated with kites and other animal-drive objectives. Three “wheels” (or “jellyfish”) are located just a few hundred meters south of the extended site boundaries, and a number of large kites are also nearby. A small one is located within the core itself, but it is unlikely that it was a hunting trap (fig. 12, above and between Pools 1 and 2). It is more likely that this structure was used for managing herds of sheep and goats, allowing access to water in the pools, but providing protection from predators at night.

17. Rollefson et al. n.d.
The tower tombs at Wisad are impressive and number from 8-10. At least five of them have tails of stone piles or built rectangular chambers (fig. 15). There are hundreds of tumuli, some of which have two to seven or eight internal chambers; almost all of the larger tumuli appear to have been looted in antiquity.

The tower tombs on the western side of the pools (Tower Tombs 1-3 in fig. 15) are all re-used mortuary structures that Safaitic groups built on top of earlier (Ch/EB?) basalt platforms. Safaitic inscriptions at Wisad are very restricted in their distribution. Over the entire side of the site west of the pools, there are many tower tombs in the lower part of fig. 15.

There are many tower tombs in the lower part of fig. 15. The Tower Tomb 1 in fig. 15 was, according to the local Desert Police station, looted the week before the 2011 field season began. It should be noted that the tomb had also been looted earlier, probably around the Safaitic period. The looter left a bundle of bones behind, including some of the clothing that the person was wearing when buried.

The map inventory numbers for the tower tombs are W-110 for Tower Tomb 1, W-117 for Tower Tomb 2, and W-119 for Tower Tomb 3.

Tower Tomb 1 appears to have been constructed on a CH/EB platform that in turn was placed above a Late Neolithic occupation level in view of LN artifacts that wound up in the looter’s backdirt.

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18. The problems of looting and tectonic disturbance make it difficult to distinguish some of the piles of basalt blocks. There are many tower tombs in the lower part of fig. 15.

19. The Tower Tomb 1 in fig. 15 was, according to the local Desert Police station, looted the week before the 2011 field season began. It should be noted that the tomb had also been looted earlier, probably around the Safaitic period. The looter left a bundle of bones behind, including some of the clothing that the person was wearing when buried.

20. The map inventory numbers for the tower tombs are W-110 for Tower Tomb 1, W-117 for Tower Tomb 2, and W-119 for Tower Tomb 3.

21. Tower Tomb 1 appears to have been constructed on a CH/EB platform that in turn was placed above a Late Neolithic occupation level in view of LN artifacts that wound up in the looter’s backdirt.
pools, Safaitic inscriptions and rock art are restricted to Tower Tomb 1 (14, including a depiction of a camel on one of the tower walls); Tower Tomb 2 has 32 Safaitic inscriptions and rock art within 20 m of the tower, including an incomplete one on a broken basalt block on the tower; and Tower 3 has 44 around the tower, including several on the blocks used to construct the tower, one of which had been broken before the construction.

In all three cases, the Safaitic tower constructed on top of the earlier platform was circular and included an entrance chamber on the eastern edge of about 2 m length by 1 m height and width. The entrance to the eastern chamber of all three was blocked by an enormous standing stone, up to a weight of 1,240 kg for Tower Tomb 2 (fig. 16)\(^22\). The interior diameter of Tower Tomb 2 was 2.70 m and measured 4.60 m from outside edge to outside edge. The interior diameters of Tower Tomb 1 are 4.0 m N-S by 4.5 m E-W, much more cavernous compared to Tower 2. The top of the Tower 1 appears to have been corbeled, although this could not be determined for Towers 2 and 3 due to the significant damage they suffered. Inside Tower 1, near its center, was a large standing stone 115 x 54 x 33 cm (estimated weight of 758 kg) that appears to rest on a Late Neolithic occupation level in view of the

![Figure 16. a. View to the north of Tower 2 (W-117) in fig. 15. The circular tower is built on top of an earlier (Ch/EB?) platform. On the right side of the meter stick is a rectangular entry chamber (© G. O. R.).; b. View to the west of the entry chamber, closed at the eastern end by a large basalt standing stone (© G. O. R.).](image)

\(^{22}\) Measurements were not taken for the blocking stones of Tower Tombs 1 and 3. The calculation of the weight of the standing stone is based on a measured sample of basalt (weight and volume) that produced a figure of 3.7 gm/cm\(^3\).
sudden appearance of dense amounts of chipped stone artifacts and animal bones (fig. 17). It is not clear if the standing stone was erected during the Late Neolithic period or during the Chalcolithic/EB; it is unlikely that Safaitic period people moved the stone into the chamber.

Among the other mortuary architecture west of Wadi Wisad was W-120, a multi-chambered tumulus (four or five, it is not clear due to damage) whose walls were constructed of upright basalt slabs ranging between 70 and 90 cm high (fig. 18). In some respects the tomb resembles the manner of mortuary construction at Area C in Qulban Bani Murra 23, which is evidently Chalcolithic/Early Bronze in age. The looter of W-120 left behind a small pile of sherds of a single pot that so far has not been identified diagnostically (fig. 19). Similar combinations of paint and handle forms occur at Pre-Halaf Sabi Abyad (6106 ± 54 to 5599 ± 76 24), Tell Assouad 25, Jericho IX and Middle Chalcolithic 26, from Chalcolithic Grar 27 and Shiqmim 28, and in the Early Bronze Age 29. A larger sample would have been useful in this case.

The section of the site east of the wadi is densely covered with a variety of architectural types 30. Many of the large mounds are tower tombs (although there is no evidence of Safaitic re-use of them in this part of the site); we have found a total of two Safaitic inscriptions/graffiti in this part of Wisad Pools. It is likely that most of these towers (the numbers are speculative at this point since the structures are surrounded by basalt blocks that were thrown down during looting episodes) are circular: several walls of the towers have enough exposure to confirm the geometry. Nevertheless, there are at least two rectangular towers, one of which has an elaborate platform in front of it to the west in addition to a “tail” of 44 hollow chambers leading towards the west (TTT 3 in fig. 15). In the 2011 season one of the

Figure 17. Interior of Tower Tomb 1, view towards the southwest. The standing stone (top center) rests on a Late Neolithic surface; notice the ash concentration to the left of the standing stone (© M. Perry).

23. MAHASNEH & GEBEL 2009, p. 473 and fig. 5.
25. LE MEERE 1986, fig. 30, 42.
26. GARFINKEL 1999, fig. 49, 102 and 112.
27. GILEAD 1995, p. 186; cf. fig. 4.19: 1-9 and 11-12, although there is no painting here.
28. LEVY 1987, fig. 12.18: 3-4.
30. ROLLEFSON, ROWAN & PERRY 2011; ROLLEFSON et al. n.d.
chambers was excavated (W 13-8) and found to be completely devoid of anything, including aeolian deposits, reinforcing the notion that these chambers were cenotaph-like memorials constructed probably at set intervals of time, as appears to have been the case on Mesa M-4 (see above).

Just a few tens of meters to the east of TTT-3 is a low mound that seemed to be a small tower tomb (W-66a) that appeared to have been looted in antiquity; adjacent to it to the east was a built circular platform (W-66b, fig. 20). Expecting to recover discarded human bone from the looting event, we dismantled the top of the mound of basalt and excavated to the original surface equal to the elevation of the ground surface outside the structure. In fact, it turned out to be not a tower tomb, but what may have been a Late Neolithic dwelling. W-66a was circular, about 5 m in diameter, and built with a corbeled roof at one time. The earliest phase of construction included a floor paved with gypsum plaster (although this was patchy when exposed); in addition, there was a raised alcove on the northwest edge of the single-

Figure 19. Potsherd from the backdirt of W-120 (© G. O. R.).

Figure 18. a. Multi-chambered mortuary structure W-120. View to the west of two looted chambers; note the upright stones that form the walls of the chambers (©); b. View towards the north of one of the looted chambers (©).

Figure 20. Aerial view of W-66a and W-66b, located to just the lower left of TTT-3 in fig. 15 (© W. A.-A.).
room structure, and this section had been paved with gypsum plaster at least four times, with several centimeters of aeolian (?) silt deposit between the plastering episodes. To the east of the alcove, at floor level, was an elliptical basin that measured 58 cm NW/SE and 44 cm SW/NE, probably the coating of a depression dug into the original floor of the building (fig. 21a).

Dominating the center of the circular room was a large basalt pillar 102 x 44 x 30 cm, estimated to weigh 500 kg. This stone probably served as a central pillar to support the corbeled roof. Evidence of the corbeled geometry is evident in fig. 21b, where the walls are clearly sloping inwards. Against the eastern wall is a relatively thin basalt slab standing on end that has natural “shoulders” (i.e., the stone was not intentionally shaped), lending an abstract anthropomorphic character to it. The slab is 80 cm high, 93 cm wide, and 18 cm thick on average (weighing c. 260 kg). Short columns of small basalt slabs helped to support the lower corbel stones, creating niches in the building; the shortness of the central pillar indicates that the residents 31 would have literally had to crawl inside the structure.

At some time, the corbeled roof collapsed, and W-66a became a shelter that possibly had a different kind of covering on top of it. The sequence of layers in the post-corbeled roof structure were rich in animal bone, chipped stone debitage and tools, ground stone, and animal bone. There has not been sufficient time to analyze the animal bone, but it is clear that there are ovicaprids present, as well as gazelle and some form of equid. Among the tools are more than 40 in situ Haparsa, Nizzanim, transverse, and other Late Neolithic types (fig. 22).

**Discussion**

The concentrations of architecture at the mesas and at Wisad Pools indicates that these areas were major attractions for groups that relied on the herding of animals during the seasonal availability of water, something that may not have been reliable on an annual basis in view of the sporadic precipitation across this large area of the badia. Even so, scouts would have been able to relay the information of when these sectors were lucrative in terms of water and local vegetation.

31. We have suggested that this is a “dwelling” (ROLLEFSON, ROWAN & PERRY 2011), although the plaster and the absence of an interior hearth might suggest some non-domestic purpose. But one thing is clear: it was not a tomb, nor was W-66b.
The mesa tops were the places where sizable, monumental mortuary structures were raised to announce to all — within and outside the community — that someone of importance was buried there, social declarations of identity and territoriality for all who passed through the region. But clearly, some mesas were more heavily frequented, both for ritual and for mundane purposes; the summits of most bear only a few architectural remains, whether as tower tombs or as pastoral/residential usage; more was at hand than simply these advertisements of social importance.

Most of the mesas are covered with a dense accumulation of basalt boulders, to the point that movement across there summits was difficult and perhaps even dangerous for humans and beasts alike (fig. 23). M-4, to the contrary, was relatively devoid of the carpet of angular basalt boulders, which would have made its summit more congenial in terms of movement across the surface. The same is true of Mesa M-7, but the area atop M-7 was less than a third of the extent of M-4. Moreover, the concave character of M-4’s surface would have been much more attractive because of the water retention during winter rains, and this would have allowed more than one or two families to take advantage of this resource; larger convocations could assemble more or less regularly to exchange information and gossip, mates for eligible offspring, and to renew social allegiances. The oasis-like setting in an otherwise fragile landscape may also have lent a mystical meaning to the mesa, one that might have figured prominently into the ritual and religious nature of the prominence. There are enclosures on the tops of all mesas, but never approaching the number on M-4, and the presence of almost 100 burial chambers, nawamis, and tumuli on the lower slopes of M-4 is overwhelmingly greater than any of the other mesas.

The circumstances at Wisad Pools are a close parallel to Mesa M-4 in the sense that the enormous potential for water reserves continues to attract herders even in today’s pastoral environment. The topography at Wisad is very different, so that the towers cannot be seen from distances as great as in the area around the mesas, but the announcements are certainly clear in the immediate vicinity of

Figure 22. a. Late Neolithic arrowheads from in situ locations of W-66a and W-66b. Transverse arrowheads (G. O. R.); b, d. Haparsa points (© G. O. R.); c. Other Late Neolithic type (© G. O. R.).
the pools themselves. The establishment of a semi-permanent village at Wisad 1 suggests that rainfall probability in this area may have been higher during the 6th millennium cal BC than today’s climate would indicate, and perhaps many of the tumuli and other ritual structures in the core of the site may be much earlier than we originally assumed, a change of interpretation that is supported by the surprising 7th millennium W-66a structure.

We don’t wish to suggest that the mesas and Wisad Pools are unique in terms of aggregation potentials during the Late Prehistoric period. As technologies have developed over the past decade or so, it is now becoming clear that there are several more “Wisads” in the panhandle of Jordan, even into northern Saudi Arabia. Dense mortuary architecture has been noted at Qa‘ Shubayka, and Kennedy has located another large concentration at Ghussein, only some 45 km to the north-northwest from Wisad Pools. “Alternative Wisads” might reflect the patchy nature of rainfall in this region, and that there was more than one location with ritual importance for the burial of members of the different (ethnic?) pastoral groups.

Braemer and Échallier have argued that the bleak and dismal landscape we see today across the Black Desert was much less depressing and barren in the distant past. The desertification has progressed as much due to human/economic factors (especially overgrazing and fuel collecting) than by climatic change alone. Thousands of years of the effects of sheep grazing exposed the soils in the Black Desert to wind erosion that has significantly reduced the moisture storage potential in the sediments of the area today. What we recovered from W-66 at Wisad Pools (including considerable woody charcoal in the gypsum plaster floor fragments) indicates that the Late Neolithic residents had ample resources to support large-scale investments of labor to construct permanent dwellings, even if they would only be used on a discontinuous basis, and this relative abundance of resources probably continued into the Early Bronze Age at least.

In all of the literature we have investigated concerning the archaeological history of the Black Desert, little mention of post-EB times has been made except for references to Safaitic exploitation of the region. It is difficult to believe that this region was uninhabited from c. 2,500 BC to the 7th cent. AD, but the diagnostic artifacts remain elusive for this span of time except for Safaitic inscriptions and rock art. With the rules for the orientation of graves after the acceptance of Islam by pastoral groups, there emerges a clear image of medieval and more recent Bedouin presence in the area. In the greater Wisad Pools area, which we surveyed in 2008, we came across numerous cemeteries, with cairns

32. E.g. KENNEDY 2011; KENNEDY & BISHOP 2011.
34. We appreciate the information that D. Kennedy has communicated personally in 2011.
35. BRAEMER & ÉCHALLIER 2004, p. 245.
36. REES 1929, p. 389-392, wherein Rees also proposes that tower tombs were guard houses used by Roman soldiers.
37. Covering an area of c. 4 x 7 km. ROLLEFSON et al. n.d.
numbering from c. 15 to more than 80 burials, with the distinguishing characteristic that they were generally oriented ENE-WSW and thus likely to refer to sometime after the Islamic conversion.

These smaller and compact cemeteries raise some points of interest. Does a cluster of, say, 25 cairns reflect the burials of people who died over a certain period of time (during an annual round for instance), or over a long period of time (a cemetery that was repeatedly visited), or who died all at once? Such cemeteries have not (as far as we know) been investigated by archaeologists, although certain clues would help in deciding if one scenario was more likely than another (comparing primary to secondary burials, for instance). One interpretation was suggested 38 that these burials might reflect the consequences of Bedouin tribal warfare.

Lancaster tends to dismiss the bloodiness of warfare among Rwala Bedouins 39, although his references were mostly among people who were not alive in pre-mandate years. Musil, on the other hand, devotes more than 170 pages to vengeance and warfare among the Rwala 40, so that clashes with rival tribes and even internal struggles were probably not so infrequent and more devastating than was the case after the French and British efforts to control intertribal and intratribal conflicts. Wisad Pools would have been lucrative seasonal targets for raids on herds (not just the sheep and goats of the Late Prehistoric period, but of camels and horses in Islamic times). The systematic nature of the geometric pattern of the Islamic burials at Greater Wisad is an argument for simultaneous burial of many individuals. Why so many people would have died at once (or have been brought to a certain locale for simultaneous burial) is not easy to resolve. The effects of epidemic disease at this level is unlikely among pastoral nomads 41, and the likelihood that deaths in battle among warring Bedouin factions should not be dismissed out of hand.

The investigations at Wisad Pools and at the mesas are still at very early stages, and there remains an enormous amount of work to pursue in the coming decades. But we look forward to the difficult challenges of removing the prehistoric and ahistoric veils that cover the long evolution of the traditions that led to the emergence of the economic success and romantic allure of the Bedouin exploitation of the steppes and deserts of the Levant, despite the challenges that confront such investigations. There are tremendous sources of information out there, and we invite our colleagues to join our search in areas we cannot even begin to tap.

38. And by whom, embarrassingly, I do not recall.
39. Lancaster 1997; the Rwala have inhabited this area until recent times.
40. Musil 1928. Also see Burckhardt 2011, p. 173.
41. But see Rollefson et al. 2003.
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