

# An Ice Age Oasis in Jordan

Pleistocene hunter-gatherers in the Wadi al-Hasa region

By Deborah I. Olszewski and Nancy R. Coinman



Pleistocene lake marls (the whitish sediments in front of distant hills) in the eastern Hasa region.

If you visited the Wadi al-Hasa region of west central Jordan today, you would probably find it hard to picture it as an attractive place to make a home. But during the last Ice Age (the Pleistocene epoch), it looked very different. Some 20,000 years ago and earlier, an expansive lake filled the eastern section of this major drainage system, and large ponds were scattered down the length of the main channel like a series of glittering jewels. The abundance of fresh spring water that fed the lake and ponds created an oasislike setting that teemed with plant life and attracted both animals and people. In the arid highlands east of the Dead Sea, Pleistocene Lake Hasa was a rare natural resource, and ancient hunter-gatherer groups visited frequently to set up camps and other living sites.

Sites researched in this area are from the Middle Paleolithic (about 250,000 to 45,000 years ago), Upper Paleolithic (45,000 to 20,000 years ago), and Epipaleolithic (20,000 to 10,300 years ago) periods. Many have been well preserved either because they are protected in rock shelters or because they were buried relatively rapidly by lake or pond sediments as water levels rose and fell over the years. Remains may include animal bones, charcoal, pollen, and phytoliths (inorganic opaline silica bodies that form around plant cells and harden into characteristic shapes for some plants), as well as stone artifacts and occasional hearths. Good preservation of a suite of remains is often rare for sites of great antiquity. The fact that a number of these exceptionally preserved sites are

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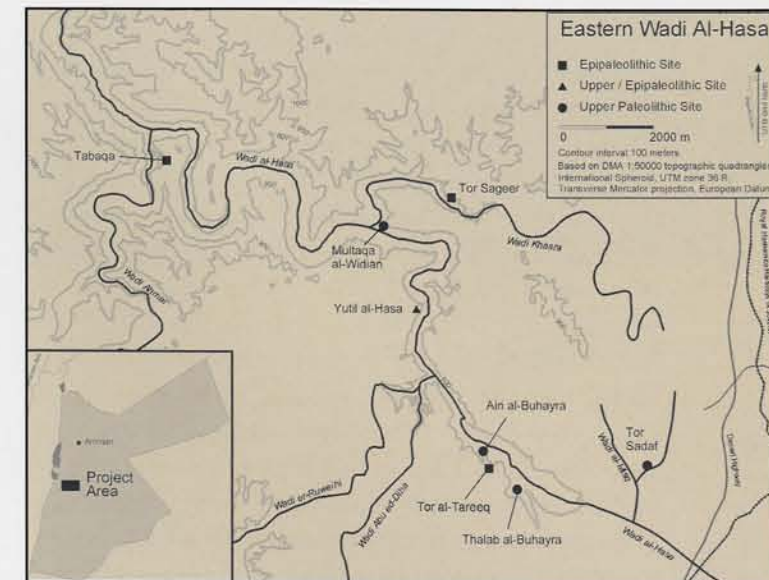
present in the Wadi al-Hasa, combined with the Pleistocene lake and ponds that were a feature of the landscape, meant that we had the opportunity to explore how ancient hunter-gatherers made use of such a resource, unusual in the Near East.

## NEW DIRECTIONS

Several interesting discoveries about the Upper Paleolithic and Epipaleolithic periods (45,000–11,000 years ago) have come to light as a result of our research. It was originally thought that occupations in the Wadi al-Hasa mainly dated to either the Middle Paleolithic period or to the very late Upper Paleolithic and Epipaleolithic (from about 23,000 years ago and later). It appeared that there was a significant time gap in the use of the Hasa area by ancient peoples. We now know, however, that we have almost a complete sequence of occupation, especially in the vicinity of the Pleistocene lake. This finding is important because it allows us to study long-term changes in how people hunted animals and how they used other resources of this landscape over a period of tens of thousands of years, including the period when people began to experiment with plant foods in ways that led to the development of agriculture.

## SIGNIFICANCE OF THE EARLIEST SITES

The earliest sites, probably dating to the transition from the Middle Paleolithic to the Upper Paleolithic (approximately 45,000 years ago or slightly later), are the rock shelter at Tor Sadaf, which is in a tributary wadi about four kilometers from Lake Hasa, and the site of Multaqa al-Widian, which is buried in pond sediments at the confluence of a major tributary with the Wadi al-Hasa. Tor Sadaf also has evidence of



TOP LEFT: An overview of the Tor Sadaf rock shelter. Stone artifacts at the Tor Sadaf site provide clues to the evolution of human behavior. TOP RIGHT: A map of the Wadi al-Hasa region showing a number of archaeological sites.

TABLE 1. THE UPPER PALEOLITHIC AND EPIPALEOLITHIC SEQUENCE IN THE WADI AL-HASA, JORDAN

PERIOD	TIME FRAME	SITE NAME
Late Epipaleolithic	(ca. 12,800 to 10,300 years ago)	Tabaqa, Yutil al-Hasa (Area D)
Early Epipaleolithic	(ca. 23,000 to 12,800 years ago)	Tor al-Tareeq, Yutil al-Hasa (Areas C and E), Tor Sajeer
Late Upper Paleolithic	(ca. 25,000 to 20,000 years ago)	Yutil al-Hasa (Areas A and B), Ain al-Buhayra
Early Upper Paleolithic	(ca. 45,000 to 25,000 years ago)	Thalab al-Buhayra, Tor Sadaf
Transitional Middle-Upper Paleolithic	(ca. 50,000 to 45,000 years ago)	Tor Sadaf

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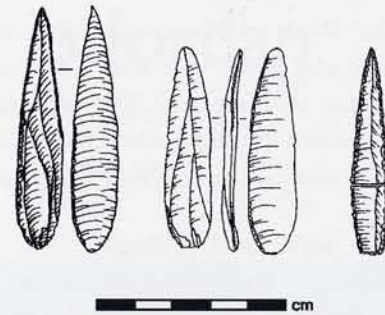
habitation during the early part of the Upper Paleolithic (a period known as the Early Ahmarian, which dates from about 38,000 to 25,000 years ago).

Many researchers believe that the transition from the Middle to the Upper Paleolithic, as it is recorded in the change in stone artifact technology and tool types, is important because it signals one aspect of the behavioral shifts that led to the development of what we recognize as “modern” human behavior. The sites of Tor Sadaf and Multaqa al-Widian have stone artifact assemblages that provide insight into this behavioral shift. By closely studying features of cores (the parent blocks of stone from which flakes and blades, for example, are made) and removals from the cores, we can reconstruct the ways that ancient people reduced the cores to obtain removals of predetermined shape. For example, the Middle Paleolithic in the Near East is characterized by specialized preparations of cores to strike off flakes (removals that are relatively wide compared with their length), pointed flakes, and blades (long, linear pieces).

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This method for shaping cores is called the Levallois technique (named during early discoveries in France), and the removals have striking platforms that exhibit many small preparation scars.

In contrast, the technology of the early Upper Paleolithic is geared mostly to the production of blades and bladelets by shaping the core to create a surface that needs less preparation between each removal. The Upper Paleolithic core technology is called prismatic blade technique. Not only do the Upper Paleolithic cores have a different shape than those of the Middle Paleolithic, but the striking platforms present on the blades have no small scars, a reflection of how prismatic cores are reduced. One of the advantages of using prismatic blade technique is that the amount of cutting edge and the number of



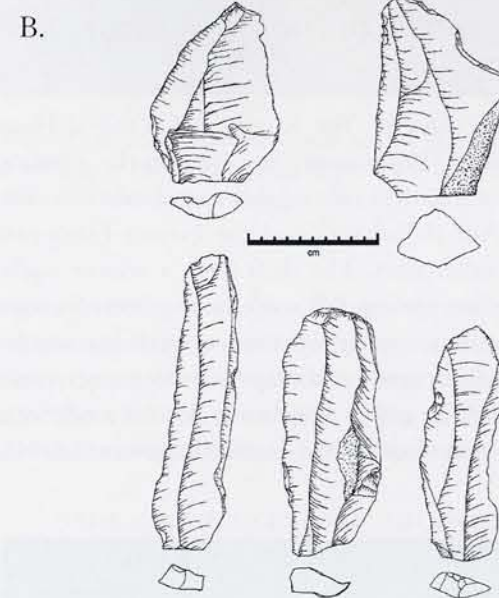
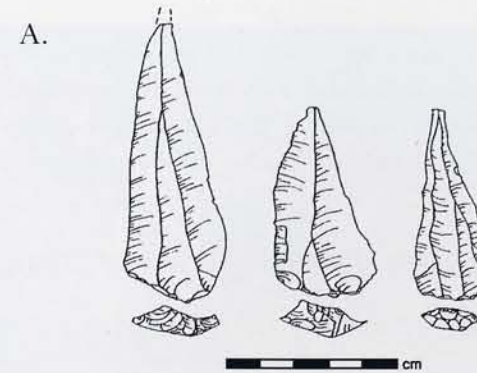
Examples of el Wad points, an Early Upper Paleolithic (about 45,000 to 25,000 years ago) tool type

useful removals from each core are maximized. Many of the blades and bladelets were later modified so that they had a pointed end. This may be an indication of a different type of projectile point system than that used in the Middle Paleolithic period and could thus be a clue to changes in hunting strategies through time, such as a shift from spears to arrows. The main animal hunted by people using the site of Tor Sadaf was likely the goitered gazelle, an open steppe inhabitant, as the animal bones from the occupations here are in its size range.

**THE EARLY UPPER PALEOLITHIC**

Another window into the past occurs about 25,600 to 24,900 years ago, late in the sequence of the Early Upper Paleolithic. The occupations at the site of Thalab al-Buhayra are situated along the shoreline of ancient Lake Hasa. They are buried in lake sediments (or marls), indicating that the lake level rose and fell on numerous occasions. Three aspects of this site are particularly striking. The first is that there are more than a dozen hearths, suggesting that this was a favorite spot, which saw repeated visits. A second concerns the evidence of the animal remains, many of which are teeth and other diagnostic elements. These indicate that the favorite prey animals were an open-ground, horselike equid (probably onager or wild ass) and moist habitat-dependent aurochs (an extinct form of wild cattle).

Finally, the stone artifacts from the site include many examples of scrapers and truncations. Truncations are tools that have a straight, relatively narrow modified edge, whereas scrapers have a longer, more convex modified edge for task use. Especially remarkable is the presence of Ksar ‘Akil scrapers, which have



A: Examples of Middle Paleolithic flakes with small preparation scars on the striking platforms. B: Examples of Upper Paleolithic flakes (top) and blades (bottom) with plain or minimally prepared striking platforms

a serrated edge similar to a modern circular saw or a serrated knife. This type of scraper is rare, known from only a handful of sites in the Near East, such as Ksar ‘Akil in Lebanon and Boker BE in the Negev Desert of Israel. The combination of numerous hearths, large animals, and many unusual scrapers and truncations indicates that Thalab al-Buhayra was likely used as a place where animals were butchered and processed in a manner that was quite different from other sites in the Hasa area. Based on the contrast between the main animals hunted at sites located away from the ancient lake, both prior to and after the occupation of Thalab al-Buhayra, we can say that equids were more



Overview of Thalab al-Buhayra. The site is in the center foreground, in the whitish lake marls.

commonly hunted at sites along the lakeshore than elsewhere in the Hasa system.

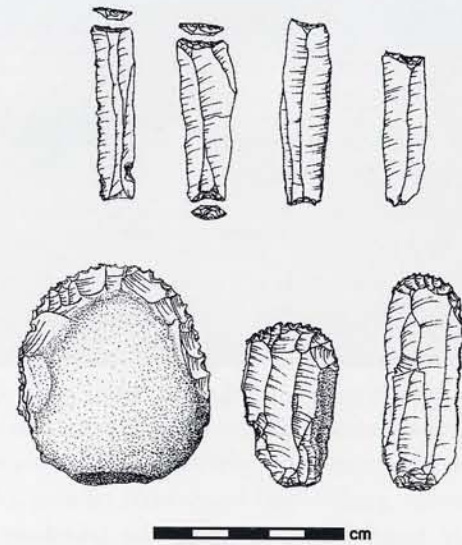
**CHANGES IN THE LATE UPPER PALEOLITHIC AND EARLY EPIPALEOLITHIC**

In the period from about 23,500 to 19,000 years ago, a major shift in how the Wadi al-Hasa region was used seems to have occurred. We studied cultural materials from four occupations in this interval. Two of the sites, Ain al-Buhayra and Yutil al-Hasa Areas A and B, have stone artifact assemblages representative of the Late Upper Paleolithic. The archaeologically contemporary occupations at Tor Sageer and at Yutil al-Hasa Areas C and E yielded stone tools of the Early Epipaleolithic period. In both cases, ancient hunter-gatherers used microliths (small blades of flaked stone), probably as parts of arrows, stone points, or barbs. The shift in types of stone tools from the Upper Paleolithic to the Early Epipaleolithic is consistent with what we know from other areas of the Near East, although the Hasa sites are among the few well-dated examples that demonstrate how fast this change occurred.

The most intriguing information, however, comes from analyses of phytoliths and animal bones. The phytoliths recovered from the Late Upper Paleolithic occupations suggest that these sites were occupied

PHOTOGRAPH BY NANCY COINMAN; ILLUSTRATION A, BY ANTENA BRYNE; ILLUSTRATION B, BY BRAD EVANS

during the winter to early spring seasons, because there are few phytoliths from the leaves of woody plants. The Early Epipaleolithic occupations appear to coincide with late spring to early fall camps, with many examples of



Examples of truncations (top) and Ksar 'Akil scrapers (bottom) from Thalab al-Buhayra.

phytoliths of woody plant leaves. The main types of animals being hunted are also somewhat different, with a concentration on equids at the Late Upper Paleolithic site at Ain al-Buhayra and on gazelle at the Early

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Epipaleolithic sites of Tor Sageer and Yutil al-Hasa Areas C and E. Preliminary research on the animals also suggests that different equids were hunted — the onager at Ain al-Buhayra and the extinct European half-ass at other sites. The shift from a winter–early spring to a late spring–fall settlement pattern is suggestive of a major reorganization of mobility strategies during this period and may have been a response to the onset of the cooler worldwide climate conditions at the approach of the Last Glacial Maximum (LGM),



View of Ain al-Buhayra. The site is on the right, with the fossil spring area prominently white in the right center foreground. Pleistocene lake marls are visible in the left background.

PHOTOGRAPH BY NANCY COINMAN; ILLUSTRATION BY ANTEA BRYNE



View of the collapsed rock shelter at Yutil al-Hasa. Areas A and B are Upper Paleolithic; Areas C and E are Early Epipaleolithic; Area D is Late Epipaleolithic.

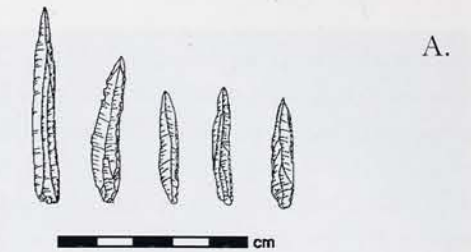
about 18,000 years ago. We are currently studying whether a late spring–fall strategy continued in the Early Epipaleolithic once the climate became warmer after the LGM, for example, at Tor al-Tareeq, which dates to between 16,500 and 15,500 years ago.

**THE LAST PLEISTOCENE INHABITANTS**

The final set of occupations that we investigated dates to the Late Epipaleolithic, which is also known as the Natufian period. The Natufian is important because research has shown that ancient hunter-gatherers of this period began practicing a more sedentary lifestyle. Some of the consequences of this change are the appearance of small villages with stone-walled dwellings in places such as the Mediterranean forest areas of the western Levant, and a greater use of wild cereal grasses that eventually led to the development of agriculture in subsequent periods.

For many decades, it was thought that occupations in the Early Natufian (about 12,800 to 11,000 years ago) were confined to the Mediterranean forest zone. Our work in the Wadi al-Hasa, as well as research in southern and northern Jordan, has shown that this observation was premature. In the Wadi al-Hasa, we found two occupations dating to the Early Natufian — one at Tabaqa and the other at Yutil al-Hasa Area D. The Natufian is characterized by microliths called lunates, which are a different shape from

PHOTOGRAPH BY DEBORAH OLSZEWSKI; ILLUSTRATION A. BY ANTEA BRYNE; ILLUSTRATION B. BY BRAD EVANS



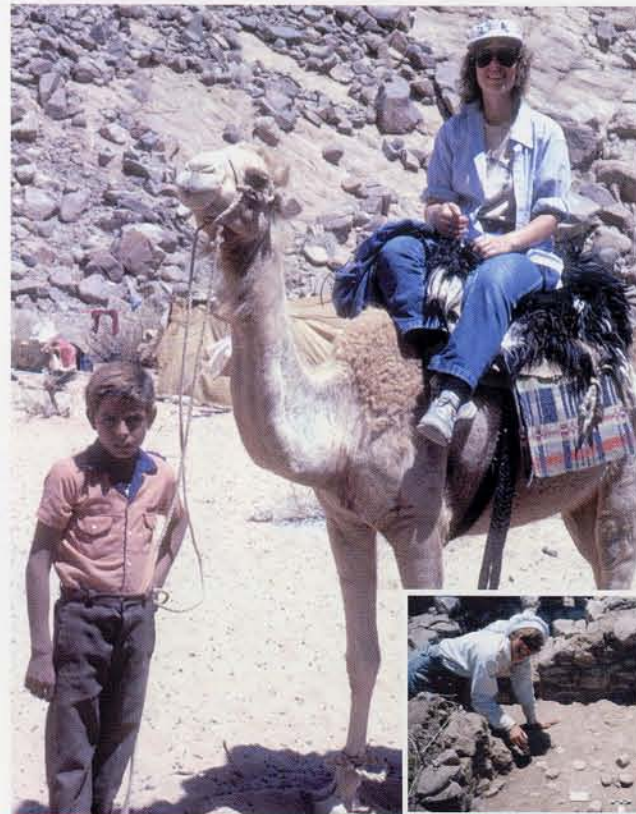
A: Examples of Ouchtata bladelets (points), a tool type characteristic of the Late Upper Paleolithic. B: Examples of Dufour (top) and backed (bottom) bladelets, tool types of the Early Epipaleolithic

microliths typical of the Early Epipaleolithic. There are also common tool classes such as scrapers and burins (gravers).

Our two Early Natufian sites do not appear to have been village settlements, as we did not find structures such as dwellings. The occupation at Yutil al-Hasa Area D was in a rock shelter. Interestingly, there are a number of bedrock mortars used for grinding in the ridgetop above this site, and it is tempting to think that they might date to this occupation, when concentration on cereal grasses is thought to have been a major focus of food-gathering activities. The site of Tabaqa, on the other hand, is an open-air site buried in pond sediments at the confluence of the main channel of the Wadi al-

Hasa with one of its major tributaries. This site has produced typical stone tools of the Early Natufian, but unfortunately, preservation of animal bone is very poor. Tabaqa did, however, yield moderate numbers of grinding stones such as would be used for processing cereals, and some fragmentary grass grains.

BELOW: Olszewski (on the camel) and Coinman (inset) in Jordan



AUTHORS' NOTE

**W**e first worked in the Wadi al-Hasa in 1984 on an archaeological project that was designed to determine the potential for future research of Paleolithic (or Old Stone Age) sites located during a series of surveys of the south bank of the Wadi al-Hasa drainage in the late 1970s and early 1980s. The project that we codirect (the Eastern Hasa Late Pleistocene Project) began in 1997 and has focused on sites of the Upper Paleolithic and Epipaleolithic periods, from about 45,000 to 11,000 years ago (Table 1). During three summer seasons, we excavated anew at three sites that we worked on prior to 1997 and began testing at five additional sites. Our research in the Wadi al-Hasa region is an ongoing process.

LOOKING AHEAD

Currently, we are working with specialists in pollen and animal bone analysis to better understand the paleoclimates that influenced hunter-gatherer groups in their use of resources associated with Pleistocene Lake Hasa and the downstream ponds. We are also continuing our examination of how the technology of making stone tools changes over time and of the relationship that these changes have to decisions ancient groups made about where to live, what hunting techniques to use (for example, spear versus bow and arrow), and how far to travel to obtain stone raw material for tool making. Such analyses will lead us to a more informed picture of the everyday life of our ancestors.

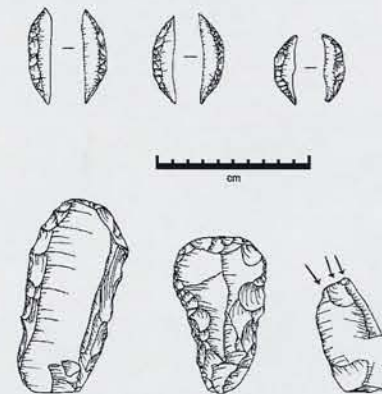
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*Nancy R. Coinman is Associate Professor in the Department of Anthropology at Iowa State University where she teaches courses in archaeology. She has done archaeological work in Jordan since 1984. She has also done archaeological work in the American Southwest. Her research has concentrated on the Upper Paleolithic, with an emphasis on changes in stone tool-making technologies during that period. Her current research is focused on the geoarchaeology of Upper Paleolithic sites found in Pleistocene lake sediments in the Hasa and elsewhere in the Levant.*

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Bedrock mortars above the site of Yutil al-Hasa



Tools of the Late Epipaleolithic: TOP: Helwan lunates, BOTTOM LEFT AND CENTER: Endscrapers, BOTTOM RIGHT: A burin

the hospitality and graciousness of the Jordanians we had the pleasure to either work with or meet in other contexts. The Eastern Hasa Late Pleistocene Project was funded by the National Science Foundation (SBR-9618766), the Wenner Gren Foundation for Anthropological Research (Grant No. GR-6278), the National Geographic Society (Grant No. 6695-00), the United States Information Agency/American Schools of Oriental Research, and the Joukowsky Family Foundation. This is EHLPP Contribution No. 21.

FOR FURTHER READING

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