
Natufian Settlement and Mobility: A Lithic Perspective from Saaïdé II, Lebanon

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Abstract:

This study is concerned with settlement and mobility patterns from the perspective of the organization of the lithic technology. Radiating mobility patterns in the context of the Levantine Late Natufian are investigated by looking at the intensity of lithic reduction and the use of blanks for tool manufacture. By conjoining the results of the technological and morphological analysis of lithic tools with additional lines of evidence, such as site location, proximity to various resources, seasonal availability of resources, functional use of flint and non-flint artifacts, an integrated view has been reached on the intensity of human occupation at the Late Natufian site of Saaïdé II.

With its large size, thick cultural deposits, varied tool kit and generalized subsistence, Saaïdé II was a residential camp for bands that subsisted on hunting and gathering. What enabled people to reside in this spot for more than one season was the overlap of seasonally available resources. The model of radiating mobility proposed for Saaïdé II illustrates that radiating mobility strategies were not abandoned with the onset of the climatic deterioration triggered by the Younger Dryas around 9,000 BC. Sites located in more marginal areas, beyond the boundaries of the Natufian "homeland", were able to sustain larger agglomerations of people and intensive human occupation.

Introduction

The original definition of the Natufian was based on a restricted set of attributes that emphasized techno-typological characteristics shared by a small number of archaeological sites in the southern Levant. As new sites have been discovered within and around this region, it became a necessity to replace this narrow definition with a broader one that includes a wider set of characteristics from a somewhat larger geographic area. The Natufian is generally seen today as a cultural, chronological and regional entity or complex that developed in the southern Levant between 10,300 and 8,500 BC. (Bar-Yosef 1983). It is characterized by a uniform lithic industry and a site inventory that often includes ground stone objects, bone artifacts

and decorations, architectural remains and burials (Henry 1989). Geographically, this culture is confined to the Mediterranean and Irano-Turanian vegetation belts in the Levant (Bar-Yosef 1981, Bar-Yosef and Belfer-Cohen 1992).

The Natufian is the best known and the richest of the Epi-Palaeolithic complexes of the Levant (Henry 1989a). A greater level of complexity has been inferred for this culture on the basis of settlement characteristics, such as large size and thick cultural deposits, the presence of a more elaborate lithic industry, sophisticated bone workmanship, decorative art and stone architecture, and a greater reliance on plant resources, reflected in the proliferation of ground stone implements and sickle blades. Some researchers believe that the changes seen with the Natufian represent sudden shifts in economy, demography and social organization (Bar-Yosef 1981, Henry 1981, 1989a), while others maintain that the use of the concept of "Pre-agricultural revolution" in the context of the Natufian understates the importance of the gradual cumulative changes that took place throughout the Epi-Palaeolithic (Kaufman 1986, 1992). In spite of differences in opinion about the intensity of change that led to the appearance of the Natufian culture, there is a general agreement on the role played by the Natufian in setting the stage for incipient food production and sedentary village life.

Sustained excavations at some of the large Natufian sites located on the Mediterranean coast and highlands, such as Ain Mallaha, Nahal Oren and El-Wad, and research initiated at Natufian sites located outside the Natufian "homeland", have added a wealth of new findings and enabled a more profound understanding of some aspects of the Natufian adaptation. The chronological subdivision of the Natufian into early and late phases has improved with the widespread application of radiometric dating techniques and the seriation of assemblages containing lunates (Bar-Yosef 1981:399, Bar-Yosef and Valla 1979, Henry 1989a:110-114). The conditions that led to the emergence of the Natufian culture, complex village life and food production are also better understood today in the light of recent excavations at Neve David, Hefziba and other large Geometric Kebaran sites (Kaufman 1986, 1992). Climatic changes leading to the Natufian adaptive shift are well documented by recent pollen core studies (Baruch and Bottema 1991). New discoveries of Natufian art objects and exotic items, in addition to the study of human burials have contributed to a more profound understanding of the symbolic behaviour of the Natufian people and the complexity of their social life (Bar-Yosef 1983:22-23, Henry 1989a, Wright 1978). Reconstructions of dietary changes and the role of plant food in the Natufian diet have received added impetus from biological studies of skeletal remains (Sillen and Lee-Thorp 1991, Smith 1991), as well as from use-wear analyses on Natufian blades (Unger-Hamilton 1989, 1991).

These advances, however, did not dispel controversies and acrimonious debates on some aspects of the Natufian culture. Chief among them is the issue of Natufian settlement organization and residential permanence. Most researchers agree that Natufian sites were not equal in size and complexity, but disagreement persists on how these differences can be quantified and described. It has been proposed that with the appearance of the Natufian complex, two different site types emerged; one characterized by larger size, large catchment area and a radiating mobility pattern, often referred to as "base camps", and a smaller site type, described as ephemeral non-residential exploitation camps (Henry 1981:428). More recently, others have

suggested that the proposed dichotomy between large, intensively occupied settlements, and small, ephemeral camps is too simplistic (Olszewski 1991), and it may ignore the role played by seasonal population aggregations and dispersals (Bar-Yosef 1983:25, Bar-Yosef and Belfer-Cohen 1992:31). Some believe that there was not one single type of base camp, but more, and their complexity may have varied (Byrd 1994:230, Kaufman 1992:184, Olszewski 1991:326-333).

Characterization of Natufian settlements has further been hampered by a still limited understanding of the Late Natufian adaptation. It has been suggested that Late Natufians returned to more mobile, seasonally scheduled life-ways after approximately 9,000 BP (Bar-Yosef and Meadow 1995), yet archaeological data from sites like Rosh Zin, Rosh Hoesha, Nahal Oren, Ain Rahub, Hayonim Terrace B and Mallaha middle phase indicate that large sites remained a prominent feature of the Late Natufian settlement system.

This paper deals with Late Natufian settlement patterns from the perspective of Saaïdé II, a Natufian site from Lebanon, located close to the margins of the Mediterranean zone and outside the Natufian "homeland", as defined by Bar-Yosef and Belfer-Cohen (1992:29). The goal of this paper is to bring together morphological typology with technological analysis of the inventory of stone tools and debitage from Saaïdé II, in order to investigate the nature and intensity of activities carried out at this site. This will lead to a more refined understanding of the subsistence and settlement characteristics of Saaïdé II and the formulation of a model of site use and settlement pattern. On the basis of contextual information from this site and inter-site comparisons, I propose a model of radiating mobility for the Late Natufian people who occupied Saaïdé II. This supports the idea that radiating mobility strategies were not abandoned during the time of increased drought and climatic stress that started around 9,000 BC. Sites located in more marginal areas, beyond the boundaries of the Natufian "homeland" often had favourable microenvironmental niches suitable to support intensive human occupation and to sustain larger agglomerations of people in base camps.

Conceptual Framework

The introduction by Binford (1980) of the forager-collector model to characterize hunter-gatherer resource procurement has had an instrumental role in the more recent research on the subsistence and settlement of hunting and gathering societies. Foragers are interpreted as people living at residential bases who disperse daily to procure food. They are also characterized by limited investment in storage and frequent residential moves from one seasonal camp to another. Collectors, on the other hand, are more likely to reside at one location, usually a base camp, over a longer period of time, and to send out special task groups to procure desired resources. While away from the base camp, task groups often establish temporary operational centres of varying complexity, such as field camps and stations. Processing and consumption of food, preparation of food for storage, tool maintenance, as well as other domestic activities take place at base camps (Binford 1980). Collectors therefore rely on logistical mobility to acquire, store and distribute resources (Lieberman 1993:600).

An extension of this model defines mobility as the core organizing principle of collectors and foragers. Circulating mobility is an alternative designation used for

the residential mobility practiced by foragers (Lieberman 1993:600). Seasonally scheduled movements from one residential base to another allow foragers to exploit a greater variety of high quality resources than would otherwise be available at one location. Resource depletion is avoided by frequent residential moves, and therefore this is a strategy that best suits non-food producers. In rich environments where abundant resources are available year-round or people can benefit from the overlapping seasonal availability of key resources, radiating (or logistical) mobility is a more likely alternative (Lieberman 1993, Rowley-Conwy 1983). Generally, hunter-gatherers who practice radiating mobility establish their base camps in the centre of the foraging area, near ecotones, where resources can be easily obtained in the vicinity of the site (Kelly 1983). The base camps of radiating hunters and foragers are multi-seasonal, but opinions differ on whether sedentism should be viewed as an extension of radiating mobility (Lieberman 1993), or as a generically distinct way of life (Kelly 1992, Rowley-Conwy 1983).

A model of Natufian radiating settlement cycle, consisting of a sedentary base camp with transitory camps located around it was originally suggested by Bar-Yosef (1981) and Henry et al. (1981). A characteristic of the Natufian settlement cycle is for larger sites to be positioned in ecotones, at the boundaries between wooded slopes and open areas, surrounded by several ephemeral non-residential exploitation camps. In this radial settlement pattern, people residing at large base camps had access to a large catchment area around these camps, as well as the exploitation area around the satellite encampments (Henry 1981:428). Most of the Natufian base camps are confined to the Mediterranean vegetation belt, where the seasonality of both the faunal and vegetal resources is less acute, and resources are less likely to fluctuate with changes in the climate (Bay-Yosef and Belfer-Cohen 1992).

The precise criteria for distinguishing between “base camps” or “hamlets” and “exploitation camps” have varied somewhat in the literature (Bar-Yosef 1981:401, Henry 1985:372), but the main characteristics of base camps and transitory camps listed by various scholars are similar. Definitions of these site types emphasize site size and complexity, including site area, thickness of the cultural deposit and the presence or absence of architectural features. Large sites with structures, burials, numerous heavy ground stone tools and a rich bone industry are labeled “base camps”. Although the term “hamlet” or “village” is used occasionally as a synonym for “base camp” (Bar-Yosef 1981, Henry 1989a), the word “hamlet” is usually reserved for base camps with dwellings (Olszewski 1991). Seasonal camps lack architectural features, but have a rich lithic industry and they are located within a reasonable distance from a base camp, usually not farther than 30-50 km (Bar-Yosef 1983:12).

The definition of Natufian “base camps” fails to recognize the impact of two important factors. First, the phytogeographical characteristics of a region, manifested in the quantity and seasonality of the plant and animal resources have certainly influenced ancient life-ways, but did not constrain the possibility for adopting a more logistical form of mobility if available resources were efficiently utilized. Second, the use of the notions of “base camps” or “villages” as absolute categories, primarily on the basis of their size and thickness of the cultural deposits, has created an impasse that paradigmatically structure the way in which we look in the

archaeological record for those sites. This leaves little room to recognize the variety of forms those base camps may have taken. The problems associated with an overly simplistic definition of the concept of “base camps” were addressed by Olszewski (1991). Using data from fourteen Natufian sites, Olszewski was able to differentiate between three main types of Natufian “base camps”, base camps with dwellings, those with burials and/or structures other than dwellings, and those lacking structures but having thick cultural deposits. In many cases, it is unfortunately difficult to classify a site, for reasons that have to do with sampling, excavation and preservation biases. An analysis of Natufian settlement systems should consider the possibility that there are several different types of Natufian base camps that differ in size and complexity.

Archaeological Evidence from Saaïd II, Lebanon

Saaïd II is one of the few known Epi-Palaeolithic sites in Lebanon. This is an open-air site located on the eastern end of the Jebel that projects into the central Béqaa valley from the foothills of the Lebanon Mountains (Copeland 1991:Figure 1). It is located at an elevation of 35 m above the valley floor, at an altitude of 1,035 m above sea level (Schroeder 1991:46). The site of Saaïd II was located and surveyed in 1969 by Bruce Schroeder and a team from the University of Toronto (Schroeder 1991). Due to unfavourable political circumstances in Lebanon, the site was never fully excavated, only tested over a very small area. In 1970 three trenches were opened in various parts of the site, exposing a total area of 9 square meters that represents only about 4% of the site. On the basis of surface scatter of displaced artifacts and ground stone, the size of the habitation area was estimated to be between 2000 to 3000 square meters (Schroeder 1991:52).

Three stratigraphic layers were identified on top of the bedrock. These layers were variably affected by postdepositional disturbance due to natural factors, primarily erosion, and human action related to building and terracing activities. Archaeological material was recovered from all three stratigraphic layers, A, B and C, but the highest concentration occurred in the lowermost cultural layer. This dark stony layer, layer C, contained the remains of the Natufian occupation. This is described as a “semi-primary” deposit by Schroeder (1991:52), due to the near absence of features and the lack of charcoal fragments. Near the center of the occupation, the average thickness of this layer varied between 60 to 100 cm.

The ecological position of Saaïd II is advantageous due to its proximity to a variety of natural resources. Water was easily accessible in the vicinity of the site. Two of the longest rivers of Lebanon, the Litani and Orontes, originate nearby. Cobbles useful for knapping were abundant in the gravels of the nearby wadi bed. The mix of Mediterranean and Irano-Turanian vegetation in this part of the Central Béqaa valley resulted in a unique environment dominated by a variety of different plant and animal species. Above the site, the dense Mediterranean forest provided a variety of oak, wild almond, pear, plum, and probably cereal grasses and legumes. At the foot of the Jebel, seasonal lakes and marshes offered suitable habitat for a variety of plant and animal resources, including migratory birds. The steppic landscape around the site, dominated by Irano-Turanian plant types, including *Pistacia atlantica* and *Artemisia herba-alba* (sage), provided habitat for savannah

dwelling species (Schroeder 1991:46). The location of the site is typical of that of large, open Natufian sites. These are usually located in ecotones, at the boundary between lowland zones, dominated by grasslands, and wooded slopes covered with Mediterranean plant species. Water sources and flint deposits were always located nearby, allowing the people who occupied these locations to exploit a variety of essential resources, without traveling over long distances (Henry 1985:373).

Radiocarbon dates obtained on bone fragments indicate that the site could have been occupied several times during the time span of the Natufian period (Churcher 1994). One human bone yielded a calibrated date of 9,400±350 BC, and another bone, probably from a wild cattle provided a calibrated date of 7,838±352 BC. The former falls in the middle of the Natufian period and the latter could fall at the very end of the Natufian period. Lunates, which are common Natufian microlithic moon-shaped artifacts retouched along the curved edge, are frequently used as chronological markers. This type of implement underwent changes in the style of retouch from bifacial (Helwan) to normal abrupt retouch, and its size decreased over time. Early Natufian assemblages (between 10,300 and 9,000 BC) have preponderantly bifacially retouched lunates with an average length greater than 21 mm. Around 9,000 BC abrupt retouch replaced bifacial retouch, and the average length of lunates decreased to less than 20 mm (Bar-Yosef and Valla 1979, Olszewski 1986). Of the twenty-three complete lunates recovered from trench I at Saaïdé II, all have normal abrupt retouch, and their average length is only 12.3 mm (Horvath 1999). The results of the seriation, in conjunction with the available chronometric dates indicate that human occupation of Saaïdé II was largely confined to the end of the Natufian sequence.

Several thousands of lithic tools, debris and debitage were uncovered in the three test trenches dug in 1970. A thorough morphological analysis of the stone tools from Saaïdé II was accomplished by H. B. Schroeder (1991). The second largest artifact class at Saaïdé II is ground stone tools. Seven mortars, several flat grinders, and a variety of handstones and pestles were found on the surface and in the excavation trenches. There are also two shaft straighteners, only one of which was found *in situ*, and three finely grooved limestone pebbles that were found eroding out from one of the terrace profiles. Bone artifacts and exotics are rare at Saaïdé II. Several awl fragments and the end of a bone spatula were found on the surface or in disturbed deposits. Three dentalium shells were recovered from undisturbed occupational deposits. The only bead, made of variscite, was found in a primary context, approximately 40 cm above the skeletal material in Unit I (Schroeder 1991).

No hearths, storage pits, or structural remains were found at Saaïdé II, but this may have resulted from the limited extent of the excavation. During test excavations, tightly packed concentrations of fist-sized rocks were found in various places in the Natufian layer C. It is unknown whether these are random non-cultural agglomerations of rocks, or the remains of some kind of structure, possibly collapsed walls, platforms or pavements (Schroeder 1991:53). The only secure feature identified at Saaïdé II is a single burial, possibly of an older woman (Schroeder 1991:54, Soliveres 1975-77). The bones were deposited in a pit apparently dug into the soft bedrock and filled with red earth. Artifacts, boulder-sized rocks and a longitudinally split limestone mortar were found in association with the burial (Schroeder 1991:54).

One shaft straightener and the single variscite bead were also found in proximity, and may have been associated with the interment of the body.

No botanical remains were recovered from Saaïdé II, but there is a varied collection of fauna. The faunal material is in advanced stages of taphonomic attrition. Fragmentation, dry breaks and weathering, in addition to heat alteration, have variably contributed to the poor state of preservation of the bones and scarcity of micromammals. Churcher (1994) identified 371 animal bones to species level. The 22 vertebrate taxa identified in the collection include reptiles, birds, insectivores, rodents, carnivores and artiodactyls (Figure 1).

Materials and Methods

I have analyzed a subset of the lithic collection housed at the University of Toronto, consisting of 1,286 specimens. This represents the total number of the artifacts retrieved from Unit I, a 1 x 2 m excavation unit (Shroeder 1991:Figure 2). While most of the material comes from the Natufian layer C, that is approximately 70 cm thick, some of the artifacts were found in overlaying layers (Schroeder 1991:54). The reasons for selecting the material from this excavation unit have to do with its location and the selection factors involved. Due to its higher position on the hill, colluviation and slope wash may have played a lesser role in the deposition of the archaeological material, allowing the material to remain in a primary context. This excavation unit is also positioned in the core area of the site, yielding therefore, a sample that is rich and more representative of the site. Another important factor has to do with the selection of the artifacts following excavation. In compliance with Lebanese regulations, excavators are entitled to borrow only one half of the artifacts from Lebanon at a time (Schroeder 1991:58). The material from all three units of excavation was divided on the spot into two parts, one to be kept in the country and one to be transported overseas for analyses. The sample from Unit I sent to Toronto includes all the material collected at the screens, but none of the individually uncovered artifacts, "typically the obvious tools and large flints" (Schroeder 1991:58). Because of the higher percentage of the debitage category in the sample from Unit I, this subset was thought to be more suitable for a technological analysis.

All artifacts were first divided into three technological categories: debris, debitage and tools, using the definitions provided by Henry (1973:58-61). The debris category includes all irregularly broken, usually angular pieces of flint on which the ventral and dorsal surfaces cannot be clearly identified. This category includes chips (small pieces, under 1 cm in length), and chunks (more massive pieces). The debitage category includes cores and core fragments, core trimming elements, primary elements, unretouched and unmodified flakes and blades/bladelets (fragmented or complete), pièce esquillées, and burin spalls. The category of tools includes all retouched and modified pieces, whether complete or fragmentary.

All artifacts were then sorted into classes within the defined categories. In the classification of the formal tools I employed the type list of Bar-Yosef (1970), with some minor modification. Side scrapers were added to the list, and pièce esquillées were dropped, placing the latter in the debitage category, instead. The class of multiple tools has been expanded to accommodate not only burin-scrapers, but other types, as well. Three tool types were refined to include sub-types, and in two cases, very similar types were joined into one. These modifications bear mostly a

methodological significance, and they have not significantly altered the identification of any of the major tool groups. The analyzed assemblage is made up of 682 pieces of debitage (Figure 2), 594 formal tools belonging to 13 different tool groups (Figure 5), and 10 debris items.

Results of the Technological Analysis

Ratios of the major artifact categories were determined in order to obtain information on the intensity of lithic reduction and tool manufacture at Saaïd II, and to aid in drawing parallels between this site and other Natufian sites. Most informative are the debitage/tool (D/T) ratio, the tool/core (T/C) ratio, and core density per cubic metre (CD). The D/T ratio provides information on the intensity of the formal tool manufacture. Intensively retouched assemblages, where extensive tool manufacture took place, are characterized by low D/T ratios (Byrd 1989b:186). The T/C ratio indicates the intensity of core reduction and the efficiency of blank utilization for tools. A strong emphasis upon formal tool manufacture results in high T/C ratios (Byrd 1989b:186). CD is an indicator of the intensity of core reduction. In expedient core reduction where cores were frequently discarded in a still viable form, CD is usually high. More intensive utilization of cores results in a low CD value (Byrd 1989b:196).

In the assemblage from Saaïd II the D/T ratio is 1.1:1, the T/C ratio is 15.6:1, and the CD is 2.1:1. In order to evaluate the results, a comparison was made between the measurements from Saaïd II and those from other Natufian sites. In a comparative study, Byrd (1989b) has analyzed the material from 38 assemblages representing 25 Natufian sites and established that, from the perspective of the percentages of formal tools, these assemblages cluster in three main groups. The assemblages that fall in Cluster 1 are characterized by a high percentage of non-geometric backed tools, indicative of a greater emphasis on the processing of plant material. Geographically, these are mostly confined to the Mediterranean forest and coastal areas. The sites that fall in Cluster 2, generally have a higher percentage of notches, denticulates, scrapers and simple retouched pieces, and they can be correlated with steppe and desert areas. In Cluster 3, assemblages are high in geometrics, but low in burins. Geographically, the latter type of assemblages mostly occur in the desert and steppe areas of the Levant, as do Cluster 2 assemblages (Byrd 1989b:179-181).

These clusters also differ in the intensity of occupation. Thick cultural deposit, abundance of architectural features and longer residential permanence separate Cluster 1 from the rest. Cluster 2 assemblages are typified by a broad range of activities, as well as a moderate settlement permanence and intensity of human activity. Although confined to the same environmental region, Cluster 3 assemblages are characterized by an ephemeral occupation and specialized subsistence activities, focused primarily on hunting (Byrd 1989b).

It has also been shown that these clusters have different mean values for the D/T, T/C and CD measurements (Byrd 1989b), as summarized in Figure 3. Low D/T ratio, high T/C ratio and low CD value characterize the coastal and forest area sites grouped into Cluster 1, indicating a higher intensity of core reduction and tool production. The assemblages in Cluster 2 have a similar mean value for the T/C ratio, but the D/T is higher and the CD is lower than among Cluster 1 assemblages.

The ephemeral exploitation camps grouped into Cluster 3 are very much unlike the first two types of assemblages: both core reduction and formal tool manufacture lack intensity in the former.

Saaïdé II shares closest similarities with Cluster 1 sites, with its very low, 1.1:1 D/T ratio (Figure 3). The presence in the assemblage of almost as many formal tools as debitage indicates intensive formal tool manufacture. The 15.6:1 T/C ratio calculated for Saaïdé II falls outside the range shown by other assemblages, indicating a very intensive process of formal tool manufacture. Saaïdé II shares similarities once again with the most permanently and intensively occupied coastal and forest area sites. With a CD value of 7.6:1, Saaïdé II is intermediate between Cluster 1 and Cluster 2 assemblages. This value was obtained by dividing the total number of complete and fragmented cores from the assemblage by the volume of the excavation unit 1 (5 cubic metres). This value suggests that the Natufian knappers who worked at Saaïdé II were engaged in moderately intensive core reduction. They used the available cores efficiently to extract as many blanks as possible, but access to good raw material in the immediate vicinity of the site may explain why the number of cores per cubic metre is higher than in most Natufian sites in the coastal and forest areas.

It is important to remember that sampling biases may have altered the proportion of the various artifact categories at Saaïdé II, raising the possibility that the latter two measurements, T/C and CD are not exact. As previously stated, the sample sent to Toronto from Unit I consists of artifacts and debris collected at the screens only (Schroeder 1991:58). It is very possible that several cores were also among the "large flints" that were excluded from this sample. This could lead us to believe that the number of the cores was actually higher than that implied by the CD value computed for the analyzed sample. The same bias could have altered the T/C value; however, in this case, selection factors may have played a lesser role, as both lithic categories are proportionately underrepresented in the analyzed assemblage.

The import of tools and cores from outside has been ruled out. Several varieties of locally available flint were used and these show up proportionately across all lithic categories. There is no indication, therefore, that finished tools were made elsewhere and introduced later in the assemblage. This is also suggested by the presence of primary elements and core trimming elements, although these two classes of artifacts represent only 7% of the debitage category (Figure 2). The cores indicate various stages of reduction; 53% of the cores have some trace of cortex present, and nearly one third of the cores and core fragments have cortex that covers 30% or more of their surface. Even among formal tools, cortex is present on 7.1% of the tool assemblage.

Dimensional attributes were also used to investigate *in situ* stone tool manufacture. Comparison between core facet dimensions and the maximum length of primary elements and tool blanks provides information about the degree of core exhaustion, levels of production efficiency and the role of imported materials in the assemblage. When the mean of these three measurements fall very close, it is likely that *in situ* core reduction took place, and that cores were still viable when abandoned (Henry 1989b:141). Intensive core reduction and exhaustion are suggested by an average blank length that is greater than the maximum dimension of primary elements and core facets. Short primary elements, relative to the size of the tool blanks and

core facets imply importation of raw material that has been decorticated elsewhere (Henry 1989b:147). Figure 4 shows a decline in size from core facets to tool blanks at Saaïdé II. The very close average length of core facets and primary elements suggests that cores were still viable when abandoned and no importation of pre-shaped cores took place at Saaïdé II. The sharp drop in the size of blanks could indicate intensive retouching and re-working of some of the tools, but it is also important to remember that some of the larger, individually collected artifacts are missing from the sample.

The comparison between Saaïdé II and the three clusters of Natufian assemblages contributed to a more profound understanding of the intensity of manufacturing activities, site characteristics and intensity of site occupation. With respect to all three measurements, Saaïdé II exhibits closest similarities with the more intensively occupied Cluster 1 and 2 sites, where a broader range of activities took place, residential permanence was more pronounced, and intensive or moderately intensive core reduction and tool manufacture took place. Both ratio and dimensional measurements suggest that the knappers at Saaïdé II experienced no shortage of usable raw material and all steps of the lithic reduction and tool manufacture took place locally. Low D/T and high T/C ratios, in concert with relative dimension of tool blanks indicate efficient use of the blanks removed from cores and intensive manufacture of formal tools at Saaïdé II.

Given how little is known at present about the Natufian occupation at Saaïdé II, the technological analysis has proved to be an important tool of research that opened new possibilities for interpretation. While inter-assemblage comparison has been successfully employed in this case to corroborate the findings from Saaïdé II, these results should not be, however, seen as absolute statements, but preliminary conclusions that await more rigorous testing once future research will bring to the fore new findings from this site. Recovery techniques, sampling factors, levels of aggregation and the definition of categories are all potential sources of bias that reside in the differences between lithic analysts and can hardly be eliminated from any inter-assemblage comparison. Potential problems stemming from recovery techniques and sampling strategies have been acknowledged in this research, but unknown remain the discrepancies between analysts in the way the aggregation level for analysis was selected and the exact attributes employed to separate the different lithic categories. The aggregation level at Saaïdé II was one excavation unit and it is the task of more extensive future analyses to verify the results obtained for this sample.

Functional Implications of Morphological Tool Groups at Saaïdé II

Functional interpretations of chipped stone tool assemblages provide valuable information for the reconstruction of the range and intensity of activities at archaeological sites. This section draws upon the results of microwear research on prehistoric Near Eastern assemblages of chipped stone tools, as well as ethnographic analogy, to learn about subsistence activities that took place in the context of the Late Natufian occupation at Saaïdé II.

The list of morphological tool groups from the analyzed sample from Saaïdé II is presented in Figure 5. This summary shows that burins, microburins, retouched pieces and the multiple tool group are the most common tools manufactured and

employed at this site. Similarly important were the notched and denticulated tool groups, which together, make up over 15% of the tool assemblage. Limited emphasis was placed on the production and use of scraping tools, backed pieces, truncations, geometric microlithic implements and the perforator and borer tool groups. Leaving microburins (which are generally interpreted as intentional or possibly accidental by-products of retouch of backed blades) and multiple tools (most of which are some combination of burins with another type of tool) aside, burins, notches and denticulates and retouched pieces were the most frequently employed tools at Saaïdé II.

Based on use-wear and experimental data, analysts have proposed a variety of different uses for burins. Microwear analysis has shown that burins were suitable to working a range of soft and hard organic and inorganic materials. Burins at Mallaha, El Quad and Arjouné, Syria are known to have been used to cut meat, ligaments and even vegetable matter, and to work wood, bone, limestone and ochre (Unger-Hamilton 1988, Valla 1984:186). Hide working was suggested for burins utilized in the Natufian and the Late Upper Palaeolithic in France (Moss 1983, Valla 1984:186). Burins may have been also used to cut reeds, a plant material that has played a significant role in the subsistence economy of pre-agricultural and agricultural people (Moss 1983). Ethnographic evidence suggests that baskets, mats and trays for oily seeds in oil presses were made from this material (Unger-Hamilton 1991:493). The manufacture of large baskets was possibly linked to the harvesting of grains by beating (Moss 1983). Arrow shafts are also known to be manufactures from the culms of this plant (Unger-Hamilton 1991:493).

The popularity of the burins at Saaïdé II may likely be linked to the versatility of this type of implement. The cutting and processing of meat with burins may have been an important task at Saaïdé II. These could also be employed in bone working, although the number of worked pieces of bone is very small at this site, especially in comparison with most Natufian sites, where bone workmanship was prolific and sophisticated. Burins were probably employed to transform limestone pebbles into shaft straighteners and incised artifacts, and possibly to shape mortars. No artifact made of perishable material has been preserved at Saaïdé II, but it is possible that some wood working and processing of fibrous grasses, such as reed or *Stipa* spp. also took place at the site. Reed is a plant that proliferates in the marshy environment and riverbanks of the Near East. Whether this plant was harvested and used by the Natufian settlers of Saaïdé II cannot be asserted with certainty at this point in time, but this was certainly a type of resource accessible to them in the marshy valley bottom.

Experimental studies have shown that notches and denticulates were also multi-purpose tools, usually designed to work harder materials. Notches can be used to scrape or shave wood and bone, and possibly to perforate wood (Unger-Hamilton 1988). Denticulates can fulfill the same function, in addition to their use for scraping hide and stone, combing fibrous materials and engraving wood and stone (Unger-Hamilton 1988). Denticulates have been shown to be unsuitable for the harvesting of wild cereals with thin and fragile stems (Unger-Hamilton 1991:491). The high frequency of these tool types in the assemblage attests an emphasis placed on the processing of wood, bone and stone material. The development of woodworking

may be connected to the high demand for making hafts for projectiles and cutting implements.

The utilization of the simple retouched pieces is much more difficult to assess, due, primarily, to the variety of morphological shapes these tools exhibit and the many different ways in which a retouched edge can be employed. Microwear studies suggest that retouched blades and flakes were mainly used in the cutting and processing of soft organic material. At Arjoune, Syria, flakes and blades with lateral retouch were chiefly used for wood working and plant processing, and for the cutting of soft material, such as hide, meat, horn or feather, as well as fibrous materials, possibly wool (Unger-Hamilton 1988). Many of the flakes and retouched blades from Mureybet, Syria exhibit lustre deriving from plant processing, whether this involved the cutting of materials for thatching, basketry and fuel, or the gathering of cereal grains (Anderson-Gerfaud 1983). The frequent use of simple retouched pieces at Saaïdé II indicates a preference for expediently manufactured tools that could be successfully used in the cutting and processing of soft materials. The number of retouched tools suggests that activities associated with the working of plant, hide, meat, horn, and wood materials played an important role in the subsistence of the people from this site. It remains a possibility that perishable materials were also processed and used in the building of residential structures and the making of baskets, in spite of the lack of direct evidence for these activities. The use of wood for roofing is indicated at Mallaha and other Natufian sites by the presence of post-holes (Bar-Yosef 1983:14-15, Bar-Yosef and Belfer-Cohen 1992:29).

Although not counting as formal tools, unretouched blades/bladelets and flakes make up 41% of the analyzed sample. Of the 537 pieces of flake and blade debitage some exhibit macroscopically visible signs of use, including microchipping, rounding of edges, and occasional striations. Use-wear analysis on lithics from Saaïdé II has not been accomplished, however, in order to estimate the potential use-value of this class of artifacts, the number of usable edges was recorded for each piece. The category of usable edge was defined on the basis of the sharpness and suitability for use of an edge. For instance, a piece of unretouched debitage, that has two separate edges that have an acute angle and are sharp, has a usable edge value of 2. Unretouched blades and bladelets ($n=90$) have a mean usable edge value of 2.1, and unretouched flakes ($n=447$) are very similar, with a mean usable edge value of 2.0. What these numbers suggest is that many unretouched flakes and blades were potentially suitable to perform some kind of function. Use-wear analyses of unmodified blade debitage in other archaeological assemblages has shown that some were used to butcher and cut meat, and to work hide (Moss 1983). Others suggested that unretouched artifacts and laterally retouched tools were equally suitable for cutting and whittling on soft and medium-soft materials, particularly wood (Byrd 1989a:76). As use-wear was observable on some unretouched pieces from Saaïdé II, it is possible that this class of lithics was used for various tasks, chiefly to cut and process soft and medium-soft materials.

It has been suggested that borers and perforators were mainly utilized for perforating and engraving soft and medium-soft organic materials, including wood, antler, pottery, hide (Moss 1983, Unger-Hamilton 1988). These two types occur in low frequency at Saaïdé II, but this does not necessarily indicate that these activities were uncommon at the site, mostly because the large selection of notched and

denticulated implements could be utilized for the same tasks. Incisions on harder materials, such as bone, shell or limestone could easily be performed with burins (Unger-Hamilton 1988). Much more significant, however, is the low percentage of geometric microliths, relative to the higher proportion of non-geometric microlithic tools. Since tools made on geometric microliths are generally interpreted as components of hunting projectiles, their frequency in an assemblage is often interpreted as an indication of the role played by hunting in the subsistence economy of a community (Bar-Yosef 1987, Byrd 1989b, Henry 1989a:190, Valla 1984:185). Lunates, the most frequently occurring type of geometric microliths at Saaïdé II have been linked to hunting activities by different sources of evidence. Their use in hunting projectiles, both as barbs and tips, has been suggested on the basis of use-wear analysis and ethnographic evidence from Predynastic and Dynastic Egypt (Anderson-Gerfaud 1983, Clark 1975-1977, Clark *et al.* 1974, Valla 1984:185). Non-geometric implements made on bladelets are typically interpreted as plant processing tools, and their frequent occurrence in an assemblage is seen as an indication for plant processing activities. In most cases, the prevalence of geometrics over non-geometric tools in Natufian assemblages has been linked to the use of particular sites as ephemeral hunting camps, whereas more non-geometric microliths generally imply a greater emphasis on processing activities and the use of sites as more permanent residential camps (Byrd 1989b).

The variety of morphological types included under the generic of non-geometric microliths make this assumption rather uncertain. Backed pieces that are listed as a separate group in Figure 4, but included by some in the non-geometric tool group, have been shown by microwear studies to be used in a similar manner as lunates. These may have been hafted as transverse arrow tips, as indicated by the presence of meat polish on their acute working edge and traces of mastic found along the backed margin (Anderson-Gerfaud 1983). Another problem is posed by the inclusion of several types of pointed bladelets among non-geometric microliths. Bar-Yosef's type list (1970) contains six different types of pointed implements under the generic of non-geometric microliths, the morphology of which more readily implies that these were used as projectile points, rather than plant processing implements. In the analyzed assemblage, nearly half (20) of the identified set of non-geometric microlithic tools (42) are points of various types. I suggest that these 20 pieces were used as components of hunting projectiles, and only about half of the non-geometric group of tools were used for cutting and processing cereals, reeds, or rushes, as suggested by Unger-Hamilton (1989).

The evidence I have discussed indicates that processing activities, involving plants, meat and hides, as well as harder materials, such as bone, antler, wood and stone, are well represented in the assemblages. The large number of burins, notched and denticulated implements, and simple retouched flakes and blades, in addition to numerous unretouched pieces of debitage exhibiting one or more sharp and potentially usable edges illustrate that a variety of subsistence-related tasks were being performed at Saaïdé II. The composition of the tool assemblage does not suggest specialization of subsistence activities at this site, as no single tool group dominates the assemblage.

A link may be made between the diversity of the technological inventory and decreased mobility. Ethnographic data from prehistoric North America suggest that as mobility increases, a smaller number of more flexible tool classes will be employed.

With fewer residential movers per year, and shortened travel distances, the diversity of the tool kit has been shown to increase (Shott 1986). This is in concert with the archaeological evidence from the Levant. In the majority of ephemeral Natufian hunting camps geometric tools employed as hunting weapons dominate the assemblage, whereas other types of formal tools account for less than 50% of the tool kit (Byrd 1989b). Larger Natufian sites, where the site inventory suggests a greater degree of residential permanence, the composition of the tool assemblage is more varied, with a greater number of tool types being present and a more balanced distribution of tools in those types.

The faunal assemblage also lacks evidence for specialized exploitation of one particular resource. With 14 mammalian taxa identified in the faunal assemblage (Figure 3), Saaïdé II has a diversity of species that is comparable to the faunal assemblage of some of the largest Natufian sites, including El-Wad Terrace, Mureybet and Hayonim Terrace (Churcher 1994:55). Of these, only Hayonim Terrace has more mammalian species identified in the faunal assemblage (16 all together). Although caprines (wild goat or ibex), followed by red deer were the preferred game of the people who lived at Saaïdé II, the proportion of these two species is not as high as the frequency of some ungulate species at a large number of Natufian sites. The majority of the Natufian sites located in a similar environmental setting have a faunal collection in which one ungulate taxon is the most common, accounting for over 60% of the total number of large mammalian bones (Figure 6). At Saaïdé II the proportion of wild goat does not exceed 53% of the large mammalian assemblage. A more generalized resource base, with one or two key resources and a wide range of other faunal species exploited, has been linked to the changes that took place in human adaptation at the end of the Epi-Palaeolithic. The broadening of the dietary spectrum has been shown to be indicative of a shift from ephemeral and seasonal occupation to long-term occupation of Natufian sites in the Levant (Tchernov 1993).

Conclusions

This research has shown that intensive human occupation and long-term (multi-seasonal) use of one particular spot may characterize the Natufian people who were confined to the more arid interior of the prehistoric Levant. Saaïdé II is positioned outside the largest cluster of Natufian sites in the southern Levant, and is at the periphery of the more densely vegetated Mediterranean zone. Although limited excavations have not yet provided clear information on settlement characteristics at Saaïdé II, the available lithic data have indicated the possibility that this site was a base camp for a band of people who subsisted on the hunting and gathering of wild foods and intermittently returned to this spot to take advantage of the variety of resources available year-round.

As suggested by the low debitage to tool and the high tool to core ratios, the Natufian people from Saaïdé II utilized their tool blanks efficiently and engaged in intensive manufacture of formal tools. The tool assemblage is varied, and there is no single class of implement that dominates the tool kit. The proliferation of such versatile implements as burins, simple retouched pieces, notches and denticulates, and multiple tools reflects a wide range of subsistence activities. Activities associated

with both the acquisition (harvesting, hunting) and processing of resources are represented in the tool assemblage. There is a great degree of similarity between the tool assemblage from Saaïdé II and the inventory of larger Natufian sites in the Mediterranean and the steppe zone, characterized by greater intensity of habitation. Lack of specialization is further attested by the small number of task-specific implements, such as hunting projectiles.

From the perspective of the traditionally accepted definition of a "base camp", Saaïdé II can hardly be characterized as a member of this group of sites. Securely identified architectural features, such as buildings, storage facilities or stone pavements are missing. The bone industry is poorly developed, the quantity of traded exotic items is very low, and ground stone implements are far less numerous than expected at any base camp occupied over a longer time period. Except for a still poorly understood and partially excavated burial feature, there is no indication for intentional internment of the dead at the site. What Saaïdé II shares, however, with more complex Natufian sites classified as base camps is the size of the habitation area, estimated to be in excess of 2000 square meters (Schroeder 1991:52), the thickness of the cultural deposit and the diversity of the tool industry, made *in situ* from locally available stone material. It remains, however, a possibility that structures of any sort and richer site inventory may have existed, but these may have been partially destroyed by the recent use of this land for human activities or may still be hidden in the ground in areas of the site not yet excavated.

More importantly, what Natufian base camps and Saaïdé II have in common is the location in an ecotone type of environment. The people who choose to settle on the Jebel Saaïdé did not only benefit from the altitudinal zonation of resources, that included level grassland settings, springs or wadis, wooded or partially open slopes, but they also took advantage of the mixture of Mediterranean and Irano-Turanian biotic zones, each with its own floral and faunal resource base. All these lines of evidence suggest that groups of Natufian hunters and gatherers who intermittently returned at Saaïdé II did not stay for a short period only, but remained at this location for a number of seasons at least. What allowed people to secure their existence over more extended periods of time was the overlap of seasonally available resources. Cereals in late spring and early summer, fruits in the summer and early fall, nuts in the fall and up into the winter, migratory birds and wild goat during the winter, in addition to rich micro- and macromammalian fauna available year-round, represented a complete cycle of resources, sufficient to allow one small community of people to reside year-round or at least for a couple of seasons at this location.

The intensity and diversity of flint knapping activities, in addition to a diversified resource base and generalized subsistence economy at Saaïdé II, conforms with the model of radiating settlement pattern and mobility to this site. What remains unknown, however, is the interaction between this base camp and other, possibly short-lived transitory camps that were part of the settlement cycle. It is expected that a band of people who subsisted entirely on the hunting and gathering required an exploitation territory beyond the immediate vicinity of the residential base. At this environmental setting, the optimum foraging territory needed by a band to procure desired resources was likely in excess of 500 square km (Bar-Yosef and Belfer-Cohen 1992:23-24). The very few known post-Palaeolithic sites in Lebanon are either located very far from the site, or are high up in the mountains in

the opposite side of the Béquaa valley (Figure 2), making them less likely targets for food collecting trips (Copeland 1991, Schroeder 1991). Specialized exploitation camps in the immediate vicinity of Saaïdé II remain unknown because of the lack of adequate research. Several ground stone implements were spotted during foot survey a short distance away from the site, and surface scatter of lithics have indicated the possibility that the foothills of the Lebanon Mountains shelter at least a dozen post-Natufian and possibly Late Epi-Palaeolithic sites (Schroeder, personal communication). It is expected that future research in the surroundings of Jebel Saaïdé will uncover smaller encampments that were connected to Saaïdé II.

What this research has also shown is that the use of one single definition of Natufian “base camp” is overly simplistic. The abundance of grinding equipment and cereal harvesting tool kit (sickle blades) should therefore not be regarded as a part of the definition of “base camp”. In an environmental setting where winter precipitation was less than in the Mediterranean phytogeographic zone, cereal stands became sparse and their yield decreased significantly. Unconditional reliance on cereal grasses for dietary consumption was not a feasible option for people who, like the inhabitants of Saaïdé II, lived at the peripheries or well outside the Mediterranean vegetation zone. Similarly, the somewhat marginal location of some Natufian sites, such as Saaïdé II, in relatively sparsely populated regions of the Levant, may explain the rarity of exotic items. This region may have fallen outside the routes of long distance trade. The lack of securely identifiable architectural features and storage facilities may also be mistaken for ephemeral use of a site. It has been shown that no such features were detected so far at Saaïdé II, but the use of perishable material, possibly for construction purposes and the manufacture of storage implements, has been suggested indirectly by the large number of burins and of simple retouched flakes and blades. Evidence from Saaïdé II suggests that the lack or sparsity of ground stone objects, blades with sickle sheen, exotic items, and architectural features made of durable materials should not be used as evidence against the characterization of a residential site as “base camp”. The definition of Natufian “base camp” or “hamlet” should be expanded to encompass the variety of adaptations in different environmental settings of the prehistoric Levant.

Class/ Order	Species	Common name	NISP	%	MNI	%
Reptiles	<i>Testudo graeca</i>	Moorish, Mediterranean or spur- thighed tortoise	67	18.1	3	7.1
		Imperial eagle				
Birds	<i>Aquila helica</i>	Pintail duck	1	0.3	1	2.4
	<i>Anas acuta</i>	Teal	2	0.5	1	2.4
	<i>Anas crecca</i>	Red-crested pochard	5	1.3	1	2.4
	<i>Netta rufina</i>	Greylag goose or white- fronted goose	1	0.3	1	2.4
	<i>Anser anser</i> or <i>A. albifrons</i>	Great bustard	1	0.3	1	2.4
	<i>Otis tarda</i>	Rock dove (?)				
	<i>Columba livia(?)</i>	European hedgehog	4	1.1	1	2.4
	<i>Erinaceus europaeus</i>		1	0.3	1	2.4
Insectivores	<i>Lepus capensis</i>	Cape hare	1	0.3	1	2.4
	<i>Spalax kebarensis</i> or <i>S. ehrenbergi</i>	Mole rat				
Lagomorph	<i>Vulpes vulpes (?)</i>		80	2.2	8	19
Rodents	<i>Mellivora capensis</i>	Red fox (?)	8	2.2	3	7.1
	<i>Martes foina</i>	Honey badger or ratel				
Carnivores	<i>Lynx lynx?</i>		6	1.6	1	2.4
	<i>Cervus elaphus</i>	Stone marten	2	0.5	1	2.4
	<i>Capreolus capreolus</i>	European lynx				

Figure 1: Complete list of identified fauna at Saaïdè II. Frequency counts given by NISP and MNI (Based on Churcher 1994).

Debitage type	N	%
Flake	447	66
Blade/Bladelet	90	13
Primary element	22	3.2
Core and core fragments	38	5.6
Core trimming element	25	3.7
Pièce esquillée	13	1.9
Burin spall	47	6.9
TOTAL	682	100

Figure 2: Count and relative frequency of types ofdebitage at Saaïdé II.

SITES	Debitage/Tool		Tool/Core		Core density
	Mean (st. dev.)	Mean (st. dev.)	Mean (st. dev.)	Mean (st. dev.)	Mean (st. dev.)
Cluster 1 sites	5.7 (7.6)	8.1 (4.7)	8.1 (4.7)	1.5 (2.8)	
Cluster 2 sites	6.1 (3.8)	8.1 (6.1)	8.1 (6.1)	14.4 (14.8)	
Cluster 3 sites	16.3 (5.1)	3.2 (1.1)	3.2 (1.1)	58.2 (35.4)	
Saaïdé II, Unit I		1.1	15.6	7.6	

Figure 3: Ratios of the major artifact categories at Saaïdé II, Unit I, compared to the mean values of the site clusters published by Byrd (1989b:Table IV).

CATEGORY	Mean	St. dev.	N
	(mm)		
Length of Core Facets	26.2	9.36	30
Length of Primary Elements	26.76	10.75	17
Length of Blanks	20.28	7.45	112

Figure 4: Summary of core facet dimensions, the length of primary elements and the length of complete unmodified tool blanks (Saaïdé II, Unit I).

Tool Type	N	%
End scrapers	32	5.4
Side scrapers	4	0.7
Burins	90	15
Backed pieces	17	2.9
Truncated pieces	26	4.3
Non-geometric microliths	42	7
Geometric microliths	23	3.9
Microburins	75	12.6
Notches	48	8.1
Denticulates	39	6.6
Retouched pieces	86	14.4
Perforators/Borers	14	2.3
Multiple tools	98	16.5
TOTAL	594	100%

Figure 5: List of the morphological tool groups at Saaïdé II, Unit I.

Sites		Gaz.	Capr.	Cattle	Pig	Red deer	Roe deer	Fall. deer	Horse	N
Beidha ¹	EN	22.1	69.9	5.9	0	0	0	0	2.2	135
Wadi Judayid ¹	EN	18.5	64.7	6.5	0	0	0	0	10.3	184
Rosh Horesha ¹	LN	60.7	37.4	0.1	0	0	0	0	1.8	977
Abu Hureyra ¹	LN	71.4	12.1	0	0	0	0	0	16.4	140
Khallat 'Anaza ¹	LN	25.9	66.7	0	0	0	0	0	7.4	27
Ainal Saratan ¹	EN	24.5	0	38	0	0	0	0	37.6	237
Saaidé II ²	LN	6.4	52.9	3.7	0	31.6	5.3	0	0	187

Figure 6: Relative frequency of large mammal bones at Natufian sites located in the steppe and desert areas. (EN=Early Natufian, LN=Late Natufian, Gaz.=Gazelle, Capr.=Caprines, Fall. deer=Fallow deer, ¹Byrd 1989b:Table II, ²Churcher 1994).

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Acknowledgments

This research was completed as part of my M.Sc. degree requirements while at the University of Toronto. I wish to thank Professors H.B. Schroeder, M.R. Kleindienst and M. Chazan for their guidance and support through various stages of this research. I am grateful for Prof. Schroeder for making this study possible by allowing me access to the collection of stone tools and faunal material from the site of Saaïdé II. Both in presentation and in content, this paper has benefited from the suggestions and comments of two anonymous reviewers. While acknowledging the kind support and helpful advice of all who have contributed to this research and read earlier versions of this manuscript, I assume sole responsibility for the ideas expressed in this paper.