A PPNB BURIN SITE ON JABAL UWEINID, EASTERN JORDAN

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Jabal Uweinid "Site A" was located by accident during emergency tire repairs on the main track between Azraq and Qusayr Amra in 1979. Attention was drawn to one of us (B.F.) by the existence of human bones near a robbed out cairn-burial near the track, and similar cairns-burials were visible on the hilltops to the southeast. Around one of the undisturbed cairns, dense numbers of flint artifacts were noted on the ground surface, many of them belonging to the burin variety of tools. Because of the lateness of the hour and the necessity to keep a schedule, the site was noted in mind for future investigation.

"Burin sites" (Betts n.d.) are a notable feature of the eastern deserts of Jordan (Betts 1981; Rollefson and Sauer n.d.), but recently such sites have also been located in Jordan's western highlands in Amman (Rollefson *et al,* 1982) and in the Wadi el-Hasa area (MacDonald *et al,* 1982). Presently, these sites are ascribed to the Pre-Pottery Neolithic B phase of cultural development (Copeland in Garrard and Price 1977: 118) on the basis of typologically similar burins from Wadi Dhobai (Waechter *et al* 1938). While this chronological placement of the burin sites is not inconsistent with the current assessment of the culture history of the area, the lack of specifically diagnostic elements (which the burins are not) leaves the temporal status of these unique artifact assemblages in some appreciable degree of uncertainty. Furthermore, in environmental circumstances as divergent as these sites are now emerging, the question of intersite variability according to geographical/geophysical associations arise. Because of its size, location, and artifact density, Site A[1] seemed to be a good candidate to establish a major foundation block for understanding this highly specialized work camp.[2]

Site Location and Setting

Site A is situated on a small knoll between two relatively shallow drainages that empty into an unnamed tributary of the Wadi el-Butm. The site is located at the extreme western margin of the basalt-covered Jabal Uweinid, placing it at an interface between the volcanic territory of this prominence with the Qa el-Azraq to the east and the Wadi el-Butm to the south (Fig. 1). The Azraq qa, a major Pleistocene pluvial lake (Rollefson 1982), had withdrawn to a probably densely vegetated marsh at the end of the Pleistocene, and its swampy margins must have been a lucrative microenvironment for macro-and microfauna. The Wadi el-Butm, probably a seasonal water channel in the early Holocene, would have been a major migration route for herd animals that moved east and west in their seasonal rounds. Although there is no specific extant evidence to support the notion, the prolific number of artifacts at Site A and at other sites on this part of Jabal Uweinid (cf. Garrard and Price 1977: Map 3) indicate that the unnamed tributary of the Wadi el-Butm was profitable location for exploitation.

The site is easily reached by car and foot. Travelling on the main track from Azraq to Amra, a major fork is encountered only five to six kilometres from the tarmac, signalled by an RAF conical pylon with a metal rod extending from the top; adjacent to this maker is a small cubical piece of concrete with an Arabic "9"

1. Because local features in the Jabal Uweinid area are unnamed, "Site A" was chosen as the site name for the sake of convenience.
2. The crew consisted of Gary Rollefson, Bruno Frohlich, Christopher Albert, Jane Isaac, and Charles Parry. The authors would like to express their gratitude to the crew members for their excellent work under the harsh climatic conditions.

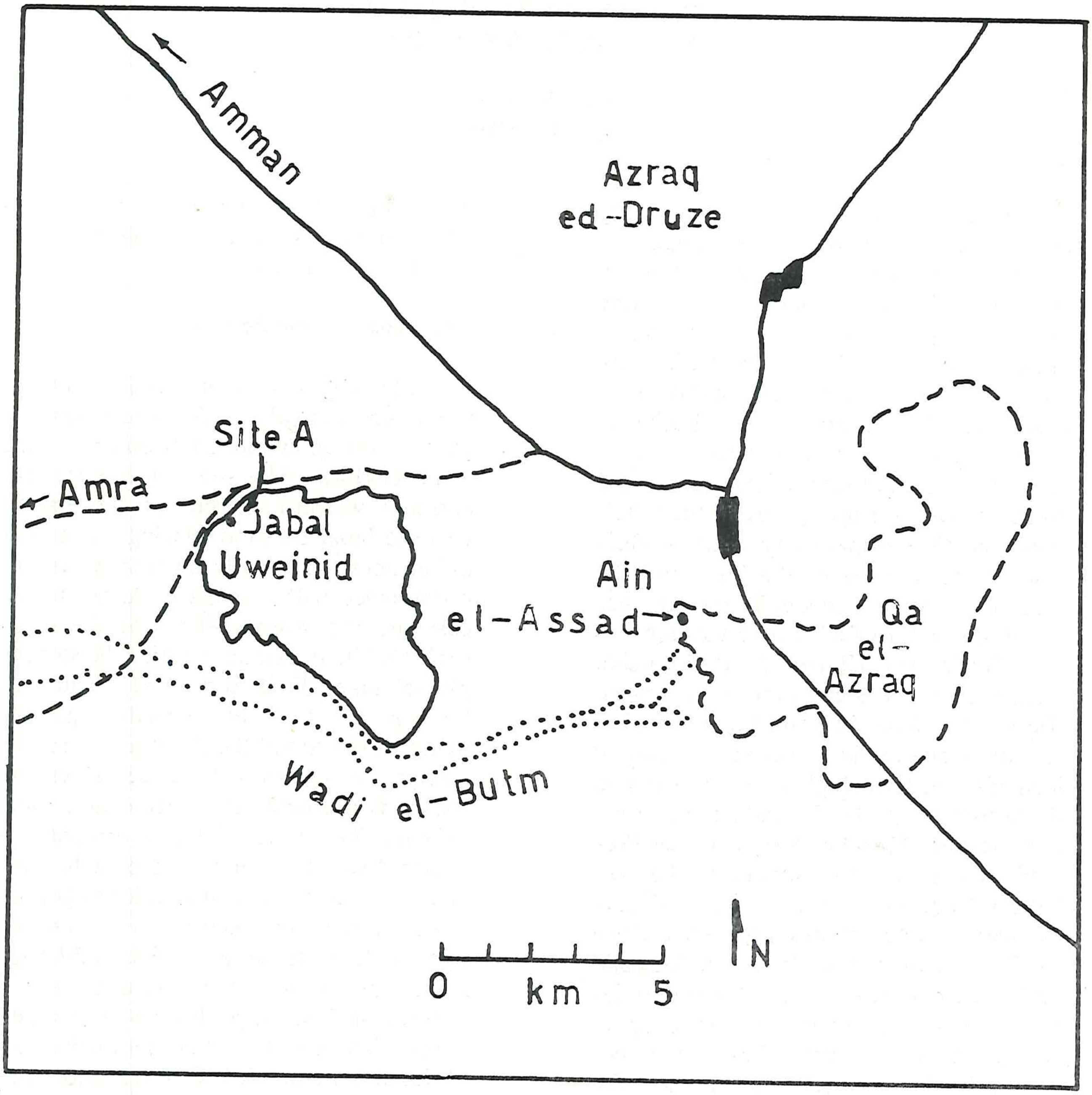

Figure 1. Map showing the location of Site A on Jabal Uweinid.

painted in red. The fork which passes to the SE passes to the east of a large cairn on a hilltop devoid of basalt. Immediately across the track, to the east, is a low hill sloping to the SW which is covered with basalt and distinguished by a single low cairn of basalt at its apex.

The boundaries of Site A are difficult to fix since the SW part of Jabal Uweinid appears to be an immense series of overlapping occupations. The major concentration at Site A, however, occurs from just NE of the hilltop to the SW, measuring 70 paces (NE-SW) by 35 paces (NW-SE). From this teardrop-shaped concentration artifact densities drop off dramatically.

Although basalt boulders are the dominant feature on the knoll where Site A lies, the boulders do not form a "pavement" as they do on the higher elevations to the east and southeast. In large part this is probably due to the relatively recent (Bedouin? earlier?) cultural disturbances which have created not only the prominent cairn on the hilltop, but also burial coverings which dot the eastern slopes of the knoll. Several instances of boulder alignments for small windbreaks for campfires and other reasons

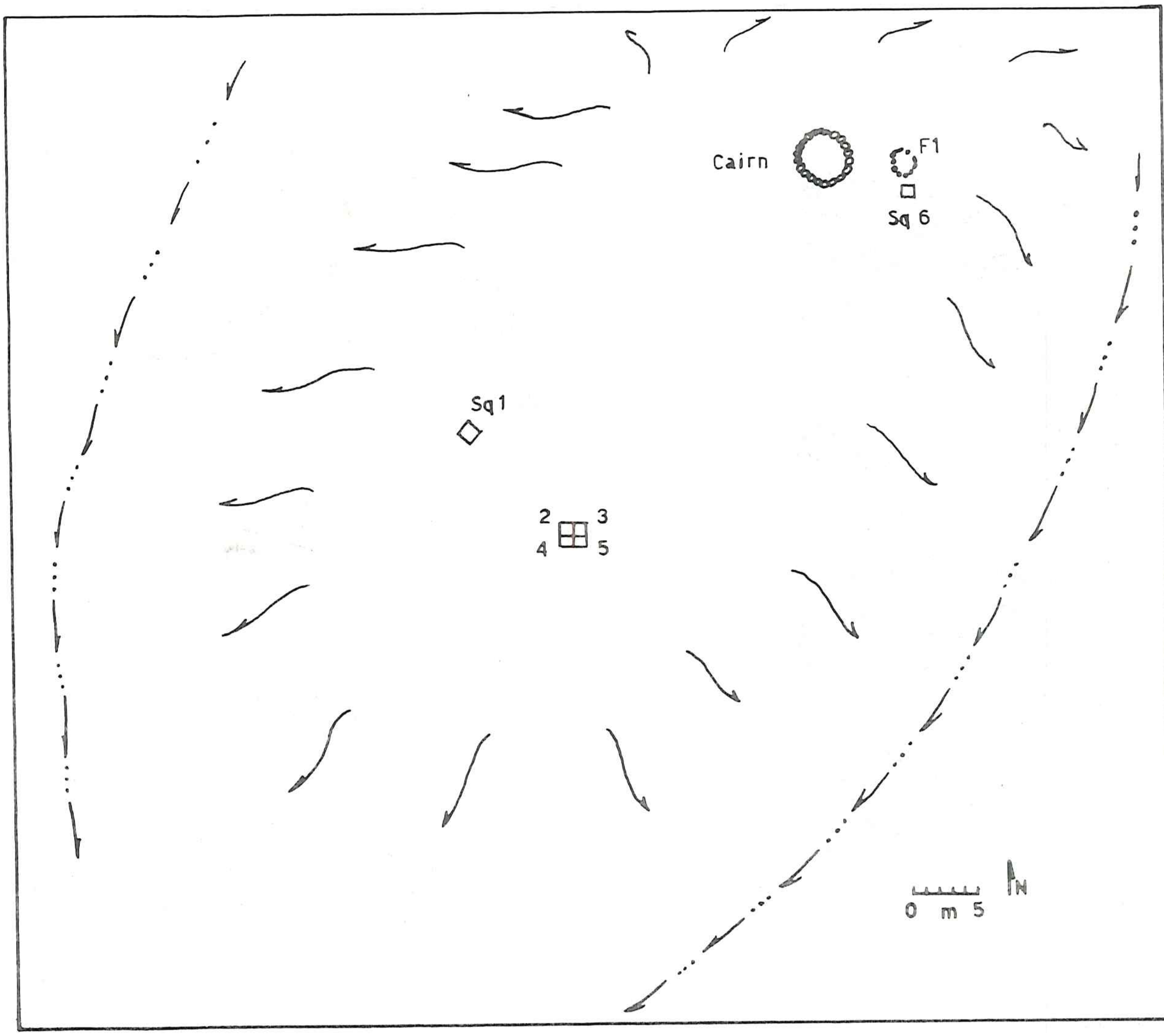

Figure 2. Schematic diagram of the main collection areas on Site A.

are evident, but one structure (Feature 1) may be a very ancient hut foundation (Fig. 2).

Figure 2 shows the major areas selected for intensive collection. Squares 1 and 2-5 were chosen because of the high density of tools which could be seen by casual inspection. All artifacts in these five square meters were collected. During the collecting efforts here, Feature 1 and a relatively dense scatter of lithics a meter to the south of it were noted, so additional total collections were made in these areas. Feature 1, which measures 1.70 m in interior diameter, constituted ca. 2.27 m^2 in area; with the other collection squares, a total of 8.27 m^2 is represented from the site area. In addition, five isolated flint artifacts were picked up, including a broken fanscraper, a broken "tile knife"[3], a diverse combination tool (Fig 4a), a bidirectional blade core, and a microblade core. (In the following discussion, these five artifacts will not be considered). Finally, one potsherd of probable Late Neolithic or Chalcolithic age[4] was collected from the site, but its location in relation to the collection squares was not noted by the crew member.

Typology

A total of 407 lithic artifacts was col-

3. The term "tile-knife" is borrowed from Copeland, in Garrard and Price 1977.

4. We would like to thank Ms. R. Brown for the reading of this sherd. The extreme poverty of the "ceramic sample" must be kept in mind.

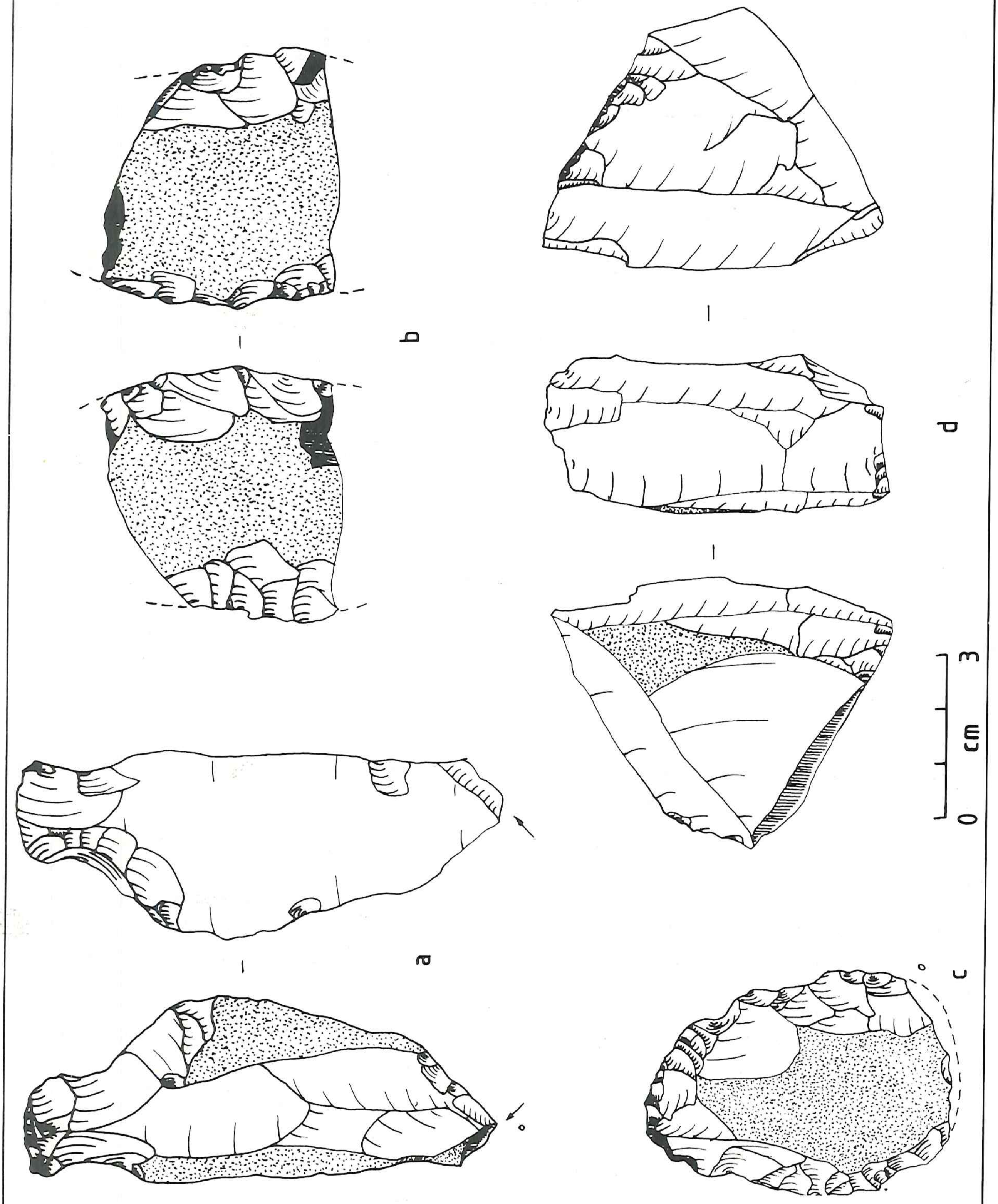

Figure 4. Tools from Site A, Jabal Uweinid. a: diverse combination tool, b: broken tile knife; c: broken fan scraper; d: bidirectional tabular blade core.

lected from the primary collection areas, including 17 cores, 144 flakes, 205 blades, and 41 pieces of debris; of these artifacts, 130 had been fashioned into implements of a very restricted nature. Artifacts densities were higher in Sqs. 1-5 (54 per sq. m) than near the top of the hill in Sq. 6 and Feature 1 (40 per square meter). As will be discussed below, features of tool typology, lithic technology, and post-depositional alterations of the artifacts all indicate that disturbance of the artifacts down the slight slope of the site is not a major factor contributing to this disparity in artifact densities.

The breakdown of the major artifact classes in the collection samples is provided in Table 1. In Chi-Square comparisons, all of the classes differ significantly in terms of relative frequency. The higher frequencies of cores and debris in Sq 6 and Feature 1 (F1), as well as the low tool counts there, suggest that this area was the locus of more intensive initial flint knapping compared to the lower area, where cores and debris are rare and where tools account for nearly half of the artifacts. Although different activity areas are to be expected in a site of this size, the reasons for the differences in Table 1 are most probably due to different cultural/temporal occupations and not to contemporary diversity of task loci. Substantiations of this interpretation are presented below.

The most striking contrast between the two collection areas is evident in the tool inventory, presented in Table 2. Very briefly, only two tool types are shared between the two areas. The outstanding feature, however, is the very high preponderence of burin types in Sqs 1-5, where they account for 93.4% of the tools (n = 113 of 121 total). Since truncation burins make up 97.0% of all the classifiable burins (99 of 102, excluding unclassifiable burin types), there is the possibility that the five truncated blades, as well as the end-notched blade, may represent "unstruck burins". In any event, the focus on burin production and use in Sqs 1-5 signals a highly specialized activity set on the lower slope (Fig. 3). On the other hand, the group of tools from the hilltop area reflects a less specialized and less intensive focus of implement use.

Core types in the collection areas are not as diverse. In Sqs 1-5 there are one single-face (flake) core, two double-face bidirectional tabular blade cores, one double-face unidirectional tabular blade core, and one core fragment too small to be typed confidently. For the hilltop area, there are one single-face (flake) core, one core on a thick flake, one double-face unidirectional blade core, and five core fragments (three of which produced blades).

Technology

The figures in Table 1 indicate that different technological methods were used in the major collection areas, with an emphasis on flakes in the hilltop area and a focus of blades downslope. Among the

Table 1. Absolute and relative frequencies of major artifact classes in the two primary collection areas of the Site A.

	Squares 1-5				*Square 6, F1*		
	n	%	%'	X^2	N	%	%'
Cores	5	1.8	1.9	.02	8	6.1	7.8
Flakes	88	32.7	34.1	.001	54	40.9	52.9
Blades	165	61.3	64.0	.0001	40	30.3	39.2
(Tools)	(121)	(45.0)	(46.9)	.0001	(6)	(4.5)	(5.9)
Debris	11	4.1		.0001	30	22.7	
Total	269	99.9	100.0		132	100.0	99.9

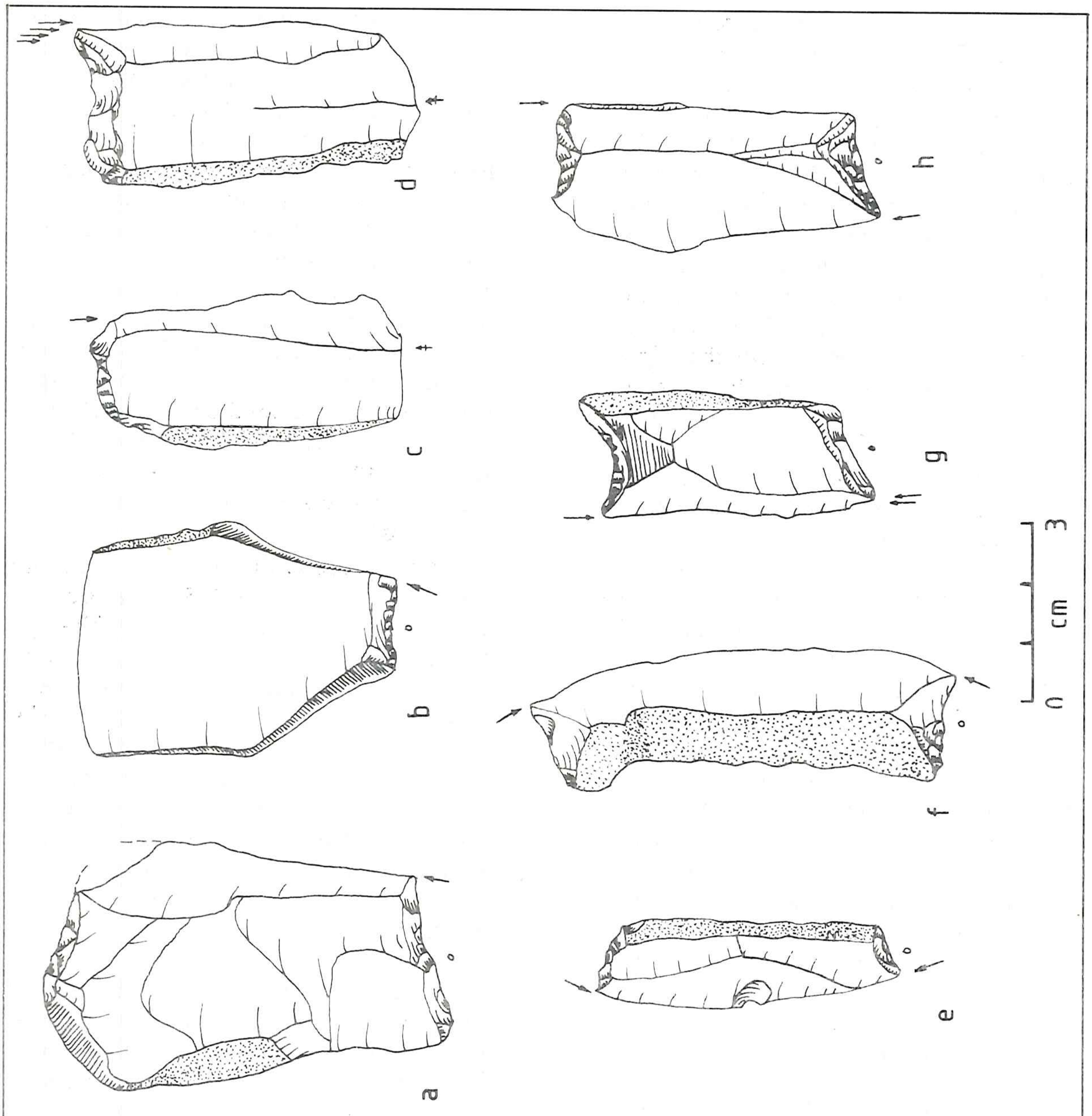

Figure 3. Burins from Square 2, Site A. a,b,d: Burins on concave truncations: c: burin on convex truncation: e: burins on opposed truncations (convex/concave): f,g: burins on opposed truncations (concave/concave): h: alternating burins on opposed truncations (concave/concave).

cores, three of the downslope pieces are on tabular nature. The relative thinness of tabular pieces of flint lends itself as an excellent medium for the consistent production of blades (although elsewhere tabular flake cores are also popular). One frequent product of the use of tabular blade cores is a naturally-backed blade, with one vertical lateral margin covered with cortex (sometimes both laterals are vertical and cortical). Erring attempts to produce blades from such cores can also result in naturally-backed flakes, especially overshot (or "plunging") pieces. Table 3 reveals a major distinction between the two collection areas in these respects. More than half of the knapping products (excluding debris) are naturally-backed blades in Sqs 1-5 while less than a fifth of these elements occur in Sq 6 and F1, a difference that is highly significant. Although naturally-backed flakes do not differ significantly, the much higher incidence of flakes and blades without natural backing

Table 2. Absolute and relative frequencies of tool types from the primary collection areas on Site A.

	Squares 1-5		*Square 6, F1*	
	n	%	*n*	%
Atypical grattoir	1	0.8	. .	0.0
Burins:				
on concave truncation with opposed convex truncation	1	0.8	. .	0.0
on a break	2	1.6	. .	0.0
on straight truncation	4	3.3	. .	0.0
on oblique truncation	11	9.1	. .	0.0
on concave truncation	48	39.7	. .	0.0
on convex truncation	9	7.4	. .	0.0
opposed multiple	26	21.5	. .	0.0
angle	1	0.8	. .	0.0
unclassifiable	11	9.1	. .	0.0
Straight truncation	0	0.0	1	16.7
Oblique truncation	1	0.8	. .	0.0
Concave truncation	3	2.5	. .	0.0
Convex truncation	1	0.8	. .	0.0
End-notched blade	1	0.8	2	33.3
Denticulate	0	0.0	1	16.7
Convex racloir	0	0.0	1	16.7
Tile-knife	1	0.8	1	16.7
Total	121	99.8	6	100.1

in Sq 6 and F1 underlines a major difference in the method of blade and flake production.

Additional technological disparities between the two collections is evident in specific features of relative cortex cover and location on flakes and blades (debris is not considered). Platforms of flakes and blades in Sqs 1-5 are more frequently entirely covered with cortex than in sq 6 and F1, and the relative number platforms with no cortex is significantly higher in the uphill location. This significant consistency is maintained in terms of the relative amounts of cortex on the exterior surfaces of flakes and blades: more cortex remains on flaking products in the lower collection area than in the hilltop region.

The meaning of these extremes in variability in lithic technology cannot be understood without additional information, however. Mitigating against these contrasts, for example, are factors that tend to indicate a sharing of lithic technologies between the two areas. The blade core samples from both collections are too meager to allow for much interpretation, but the blades (and flake mistakes) that came from blade cores are more telling. Products from bidirectional blade cores are in almost the same relative frequency in both areas as were unidirectionally produced blades and flakes, and no significant Chi-Square differences exist. Furthermore, platform angles on blades are "statistically similar" in the high angle (greater than 110^{0} between the platform and the interior surface), low angle, and punch platform variations.

Patina Variability

Although much of the variation seen in

Table 3. Absolute and relative frequencies of a variety of technological aspects of the artifacts from the primary collection areas on Site A.

	Squares 1-5		*Square 6, F1*		
Natural backing	n	%	n	%	X^2
Naturally-backed blades	137	54.2	18	19.1	.0001
Naturally-backed flakes	41	16.2	7	7.4	—
No natural backing	75	29.6	69	73.4	.0001
Total	253	100.0	94	99.9	
Surface cortex					
None	30	11.9	33	35.1	.0001
1-10%	11	4.4	5	5.3	—
10-50%	154	61.1	45	47.9	.05
50-90%	48	19.0	8	8.5	.05
90-100%	9	3.6	3	3.2	—
Total	252	100.0	94	100.0	
Platform cortex					
Completely cortical	29	21.0	6	9.8	.05
Partially cortical	15	10.9	1	1.6	—
Non-cortical	94	68.1	54	88.5	.001
Total	138	100.0	61	99.9	
Blade scars					
Unidirectional	184	88.0	52	82.5	—
Bidirectional	18	8.6	8	12.7	—
Indeterminate	7	3.3	3	4.8	—
	209	99.9	63	100.0	
Platform angle					
Greater than 110°	65	66.3	12	46.2	—
Less than 110°	23	23.5	7	26.9	—
Punch	10	10.2	7	26.9	—
Indeterminate	(88)		(26)		
	98	100.0	26	100.0	
Desert Varnish patina					
Present	264	98.1	50	37.9	.0001
Absent	5	1.8	82	62.1	
Total	269	99.9	132	100.0	

Tables 1-3 might be viewed in terms of varying requirements for specific task objectives, with the consequent possibility that technological options were needed to meet those objectives, one basic explanatory factor remains to be investigated: that the differences that are apparent in the artifacts are due to different cultural means of using the locality at different times (both in terms of alternative seasonal exploitation and diachronic cultural development). The surface nature of both collections does not permit any confident physical stratigraphy, but one aspect of post-depositional alteration of the artifacts is sufficiently remarkable to suggest a temporal distinction of some magnitude between the two collections.

One of the characteristic features of patination in many desert environments is the development of "desert varnish" on artifacts: a glossy (wind polished?), generally brown-to-black change of the surfaces. Variations can develop, however, due to local environments and the amount of time of exposure to patinating elements.In some basalt areas, colors can be stained in a variety of red shades, for example; this is the case for the artifacts from the higher hills to the east of Site A. Extremely prolonged exposure seems to reduce the glossy texture of artifact surfaces with the onset of sand-pitting, although this feature appears to depend on the amount of available suitable materials for the pitting effects. One aspect that seems certain, however, is that artifacts which have been exposed only recently (by recent discard or erosion of overlying, protective sediments) have not developed desert varnish.

In the restricted area of Site A on Jabal Uweinid, it would seem that variations in the local environment can be disregarded, and any variation in the development of desert varnish can be ascribed primarily to the amount of time the artifacts have been exposed to the elements. In Sqs 1-5, almost all of the artifacts manifest desert varnish (Table 3), while in the hilltop location fewer than 40% are so patina ted.

In conjunction with the radical differences in tool typology and lithic technology, therefore, it is logical to propose two major cultural and temporal periods of occupation which differed significantly in terms of how the locality was used by the occupants.

Final resolution of these differences requires more research, and plans are underway to carry out a more intensive and extensive survey of the site with hopes to locate potentially rewarding areas for excavation to determine cultural and paleoenvironmental stratigraphy.

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