

THE WADI BAYIR PALEOANTHROPOLOGICAL SURVEY

A first Season Report
by
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(I)

The Wadi Bayir Paleoanthropological Survey was begun on a limited budget in May of 1981. Field work continued, as often as other archaeological commitments would allow, into the autumn and will be resumed in the spring of 1982. The goals of the survey are as follows:

- A. To discover the physical remains of fossil hominids and pre-hominid primates in the eastern desert region of Jordan.
- B. To collect and classify a representative sample of the lithic artifacts of all the prehistoric and early historic periods represented in the Wadi Bayir.
- C. To gather information concerning the paleoenvironment.
- D. To record whatever later cultural remains are to be found, chiefly through examination of rock inscriptions and ceramics.

The Wadi Bayir and its tributaries (A.M.T.V. series K737, sheets 3351 IV, 3351 I, 3451 IV, 3452 II; Bayir Wells grid BQ 777057, scale: 1:50,000) are part of the generally eastward drainage of the Eastern Plateau into the Wadi Sirhan in northern Arabia. This land tilt resulted from tectonic shifts of the Rift Valley, especially during the Lower Miocene (Burdon, 1959, p. 59), the Oligocene, and the Late Pleistocene (Bender, 1974, p. 21-22). The limestone and chert stratigraphy of the region are sea deposits of the Tertiary, probably Paleocene and Eocene. After emergence during the Lower Pliocene followed by a re-emergence at an undetermined time, the soil of the Quarternary was removed by the prevailing westerly wind, leaving a broken chert cap over sedimentary

deposits which are almost uniformly Tertiary. This state of affairs makes the first aim of the survey very difficult to attain, as the physical remains of pre-human hominids disappeared with the wind blown soil. It is hoped that intact Plio-Pleistocene deposits will be found in the lee of such substantial landforms as Jebel Waqf as Suwwan, as well as in the low-lying areas of the eastern reaches of the wadi. In the case of *Homo sapiens neanderthalensis* and laterals, remains in the protected environment of caves have been attested elsewhere (Garrod and Bates, 1937; Garrod, 1962, p. 541-546), and it is therefore hoped that terrain containing rock shelters will be encountered closer to the Saudi Arabian frontier.

The second aim of the survey saw the greatest amount of progress during the 1981 season. The Wadi Bayir is prolific of lithic artifacts. Several isolated bifacial tool finds from the Lower Paleolithic give us cause for optimism. The area around Bayir Wells was visited by Henry Field in 1928 (Field, 1960, p. 77 and 118), who reported the discovery of numerous stone artifacts. We found that lithics from a wide range of periods were represented in the inventory of our first season. Neolithic material was well represented though no permanent habitation sites were found.

Our strategy has been to divide the Wadi Bayir and its tributaries into phases, each of which is scheduled for intensive survey during one season. The widest range of terrain types is being sought in the first two seasons in order to allow model building for likely site locations in the less accessible areas to the east. During 1981 the

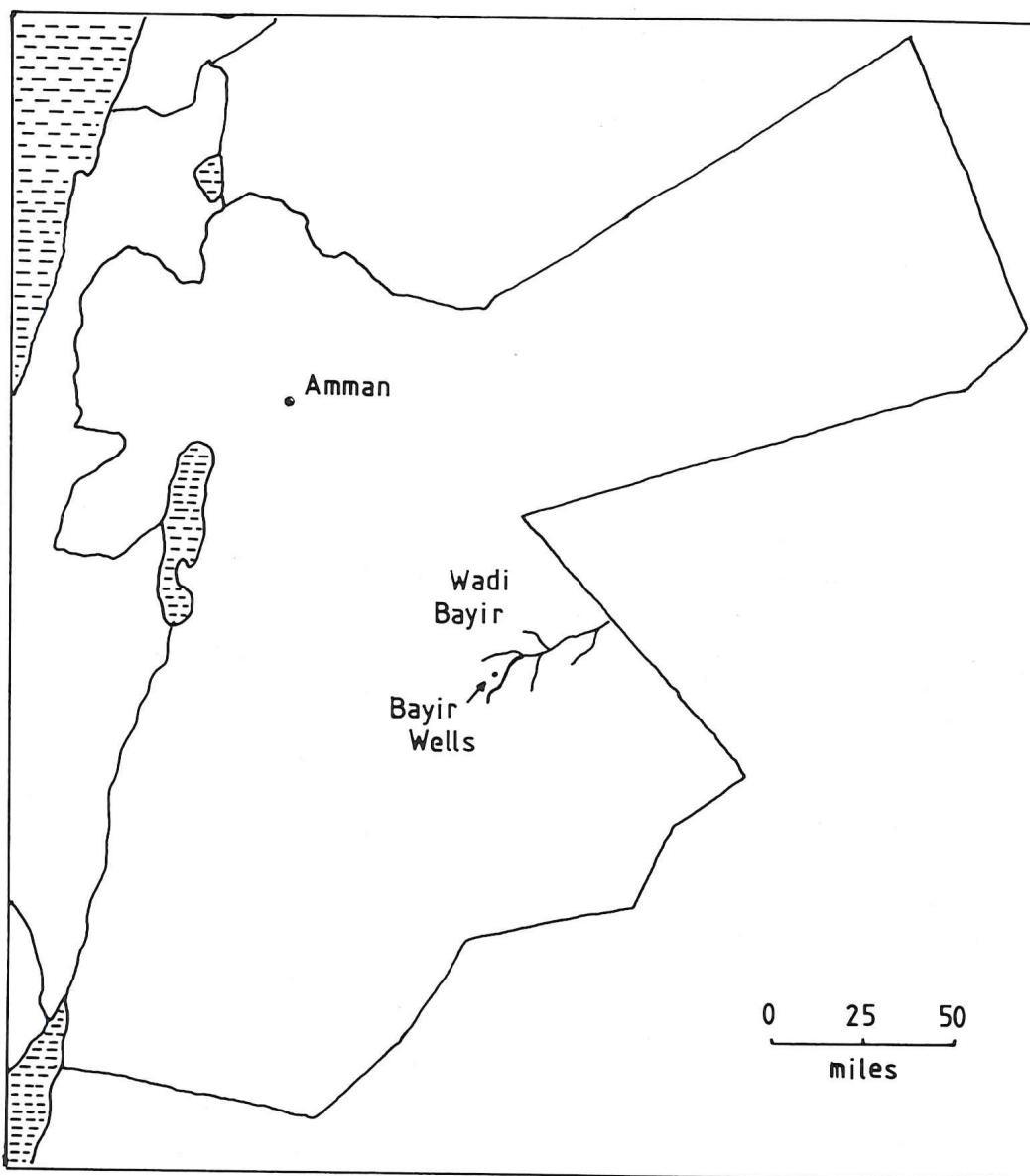


Fig. 1: Map showing the location of Wadi Bayir.

Jebal er Raha (northern boundary, BQ673205; southern boundary BQ665101) was covered. The territory was walked off on line and triangulation azimuths were made to landmarks from sites or prolific scatters. Twenty meter square samples were then taken from each. A report of the lithics by Dr. G.O. Rollefson follows this introduction.

The third aim, a reconstruction of the paleoenvironment, is proving difficult but attainable. In this, the assistance of Dr. Fritz Helmdach of the Department of Geology, Jordan University, has been of the utmost value. Early speculation on my part about a lake environment in the Bayir Basin during latter Tertiary and Qua-

terinary times has not been confirmed or disproved. Soil and rock samples were taken at grid reference BQ659121 at 10 meter intervals in a line moving downward from an escarpment ridge at the foot of Jebel er Raha (elev. 960). Most of the samples proved to be consolidated deep water Tertiary deposits cut through by later wadi water action. The terrace was covered with unconsolidated sediments apparently laid down by relatively still, shallow water and may be the remains of a lake bed. Dr. Helmdach examined these sediments for microfossils and found them to be sterile. This was discouraging but it was pointed out that the samples had been too superficial and that rainfall often decomposes such mat-

erial. It is also possible that the water was highly saline. Next season will see settlement of the Plio-Pleistocene lake question by intensive sampling of the escarpment.

The fourth aim was furthered by two sherdings of the only historical period feature in the Jebal er Raha area, the ancient fort at Bayir Wells. A preliminary random sherd collection produced a 95% Nabatean count in a inventory of 59 indicators. The remainder were Ottoman with a small nondescript additional group of 6 Early Byzantine body sherds, possibly representing a single pot break. A second intensive sherding yielded 149 indicators which were all Nabatean.¹ The building described by Field (1960, p. 99) is no longer standing, its stone having been used to build the present Desert Police fort. Taken alone, however, the pottery suggests that Gluck (1959, p. 201) may have been correct when he suggested that there was a Nabatean caravan route through Bayir and up the Wadi Sir-

han. Such a route would have offered a safe alternative to the Kings Highway and the Jordan Valley in the event of a deterioration of relations with the people in the area of the Decapolis.

Although historical period remains are not the primary goal of the Wadi Bayir survey, it is expected that a number of sites and a sample of Safaitic inscriptions will be found. These will be reported upon as they are discovered.

Our thanks are due to Dr. Adnan Hadidi, director of the Jordanian Department of Antiquities and the staff of the Department, who have been very helpful. We also thank Alison Betts, Dr. James Flanagan, Be and Jameely Moore, Laura Hess, Dr. Geoffry King, Charles Perry, Jane Issac, James Deemer, and Dr. David and Mrs. Linda McCreery of A.C.O.R. for their participation.

Scott Laird Rolston

1. Our thanks are due to Dr. James A. Sauer, the former director of the American Center of Oriental Research in Amman, Jordan, for taking the

time to read our pottery during his last hectic night in Jordan.

THE CHIPPED STONE ARTIFACTS FROM JEBEL ER RAHA

(II)

The 1981 survey season produced a total of 1749 artifacts from the Jebel er Raha area (see Table 1). The preliminary analysis of these materials stressed the sorting of cores, flakes, blades, and tools and the assessment of probable major cultural/temporal ages of the artifacts.

Temporally diagnostic elements were very rare among the artifacts, and in many cases the age determinations are admittedly tentative because of the lack of definitive reference criteria. For most of the lithic concentrations, cultural associations were determined on the basis of the specific technological features of the artifacts and the relative degree of patination and surface alteration (rolling and wind erosion) within each artifact cluster. However, since

many technological aspects of lithic manufacture are shared across developmental stages, some age assignments had to remain more vague than we ideally would like to achieve. For example, where differential patination/alteration was not present among a group of flakes and blades, the cluster conceivably could have been produced anytime within the later Upper Paleolithic period or later, since no other defining parameters existed to allow for a more precise age.

In table 2, therefore, there are four categories which serve to separate the artifacts in only a very general manner, including Lower and Middle Paleolithic (L/M), Middle Paleolithic or later (M+), Upper Paleolithic or later (U+), and Neo-

Table 1 Absolute frequencies of artifacts in major artifact classes from the Jebel er Raha.

<i>Area</i>	<i>Tools</i>	<i>Flakes</i>	<i>Blades</i>	<i>Cores</i>	<i>Total</i>
North Bottom	3	33	25	8	66
East Bottom	5	21	21	16	58
South Bottom	28	89	57	53	199
West Bottom	3	56	24	33	113
Total Bottom	39	199	127	110	436
Total Top	27	653	442	218	1313
Grand Total	66	852	569	328	1749

Table 2 Absolute frequencies of artifact from cultural periods in the Jebel er Raha Survey collection.

L = Lower Paleolithic, M = Middle Paleolithic, U = Upper Paleolithic, N = Neolithic, and UNK = Undeterminate

<i>Area</i>	<i>L</i>	<i>L/M</i>	<i>M</i>	<i>M+</i>	<i>U</i>	<i>U+</i>	<i>N</i>	<i>N+</i>	<i>UNK</i>	<i>Total</i>
North Bottom						50		2	14	66
East Bottom			1	8	3	22	8	4	12	58
South Bottom	2	2	17	8	30	69	9	18	44	199
West Bottom	—	—	4	2	3	37	8	11	48	113
Bottom Totals	2	2	22	18	36	178	25	35	118	436
Top Totals	—	19	18	21	63	285	614	211	82	1313
Grand Total	2	21	40	39	99	463	639	246	200	1749

lithic or later (N +). There were those inevitable isolated artifacts or groups of non-descript elements for which no general age assessment could be made, and these are included in the "unknown" column. Since Jebel er Raha is a long (ca 8 km). butte formation, with associated butte outliers to the north and south, it seemed logical to divide the survey area into the Jebel top and the plains below. The artifacts in tables 1 and 2 are arranged by the general location of the survey area. Each of these areas will be discussed briefly.

The Lowlands around Jebel er Raha

The plains below the butte can be arbitrarily divided into four basic localities: the north, east, south, and west bottomlands. Most of the northern portion remains unsurveyed and will be completed early in 1982. In the western part of this locality is a relatively dense concentration (66 pieces) of primarily Upper Paleolithic or later chipped stone artifacts, including an endscraper on a flake, a bifacial tool, and a Neolithic to Early Bronze tabular scraper (site 9 in figure 2). Cores from the 20 sq.m. collection area contributed ca. 12% of the artifacts.

On the eastern bottomland fringes of the jebel, only 58 artifacts were found on the transects, and no major concentrations of material occurred in this part of the survey area. Although nine of the pieces may date as early as the Middle Paleolithic, the bulk of the specimens evidently come from sometime between ca. 30,000 to 3,000 B.C. One small cluster of primarily Upper Paleolithic and/or Neolithic elements included a borer and two endscrapers, and not far from this cluster there were found a Middle Paleolithic Levallois point and a chopper of roughly the same age. Cores from the eastern bottomlands constituted nearly 28% of the artifacts.

On the western plain, 113 artifacts were scattered widely along the transects, and even small clusters were rare. Once again the later periods are most heavily represented, with only 5% of the artifacts possibly dating to earlier than 35,000 B.C. The three tools included two Neolithic

choppers and a steep scraper on a natural chunk, possibly as old as the Middle Paleolithic. Cores are relatively numerous, accounting for nearly 30% of the cultural material.

In absolute terms the south lowlands, including the areas around the South Promontory (cf. figure 2), produced the most material (although the unexplored northern area might be as rich). The South Promontory area in particular is rather densely populated with artifacts, and although it is once again true that the last 30,000 years are the most predominantly represented, several pieces are Late Acheulian, perhaps more than 125,000 years old. Site 1 in figure 2 is the center of a large, diffuse array of cultural remains, and it evidently reflects repeated visits to the same area over a rather long period of time. The tools from the South Promontory alone account for 44% of the entire tool sample from this season's survey, suggesting that it was a favorable area for exploitation of the available resources. Four choppers, two burins, and a core scraper date from Upper Paleolithic or later times; one chopper and a bifacial scraper and Middle Paleolithic; and three scrapers and a pick are uncertain as to date. No tools were found in the southern area except on or near the South Promontory. Cores are numerous in the southern area, making up 44% of the local inventory.

Generally, the three transect lines along the base of Jebel er Raha suggest that prehistoric occupations tended to hug closely to the butte: in the western area and eastern areas there is an evident general cline towards lower artifact densities that correlates with increased distance from the cliff faces.

Alternatively, this reduction in relative artifact frequencies away from the butte may be a reflection of natural forces which have disturbed original artifact/site distributions in two ways. First, the rare yet very real cloudbursts in this otherwise arid region could have created severe erosion over thousands of years, causing possible originally dense sites to be dispersed down slopes. Secondly, the same natural agencies may have operated to completely obscure

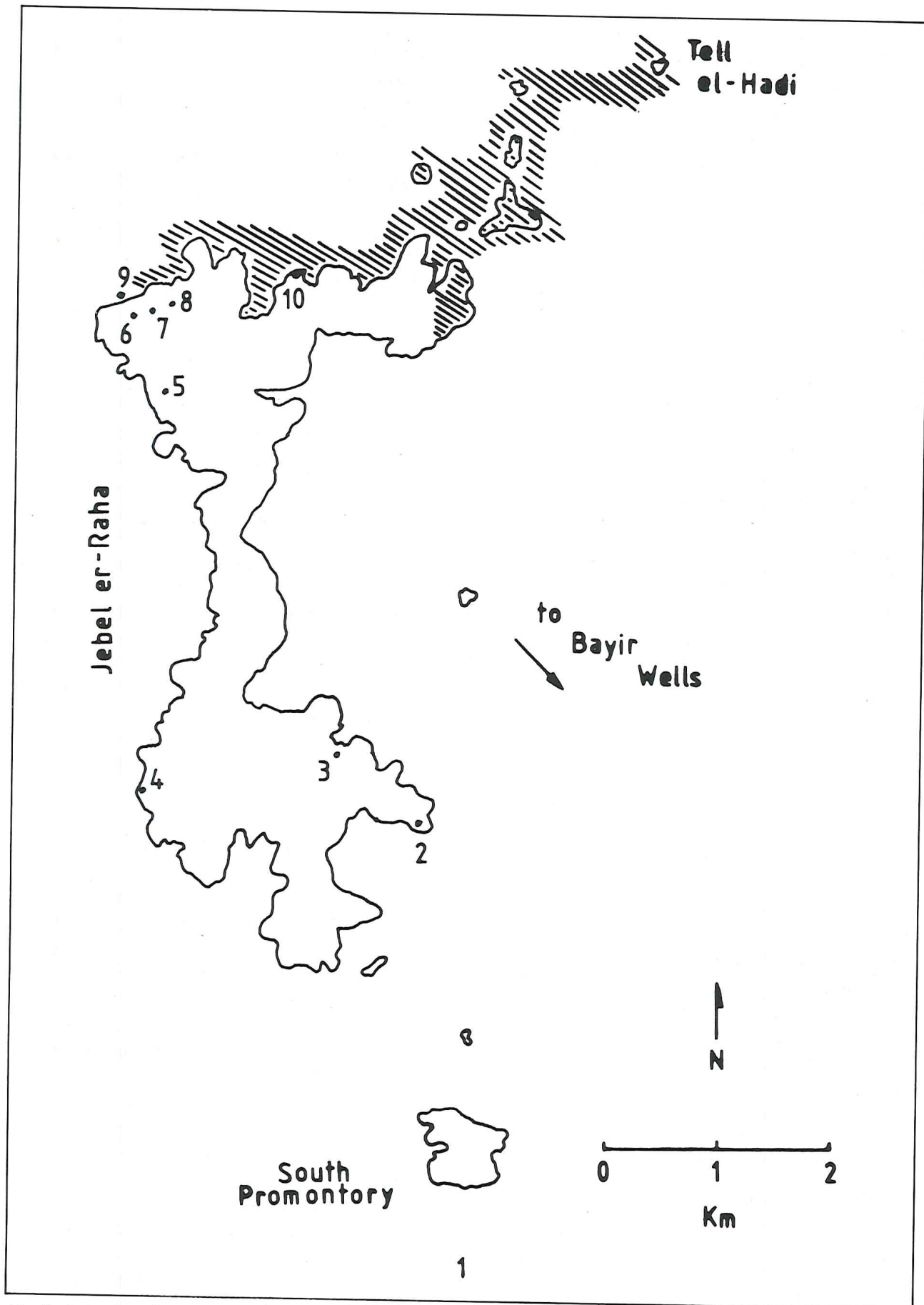


Fig. 2: Location of major artifact concentrations in the Jebel er-Raha region of Wadi Bayir. The shaded area indicates unsurveyed areas.

other sites located farther afield from the base of the butte, covering them with repeated floods of alluvial deposits. Additional survey work, especially in the wadi cuts in the eastern basin, should be able to determine whether the second factor has played an important biasing role in the visibility of prehistoric habitations of the area.

The Top of the Jebel er Raha Butte

Three-fourths of all of artifacts recovered in the 1981 season came from the top of Jebel er Raha. Eight major artifact concentrations were found, and all tended to be located nearer the edges of the butte than towards the center. Three sites are situated on the southeastern (sites 2 and 3 in figure 2) and southwestern rims (site 3) with four sites (6-8, 10) on the northern edge; site 5 is on the northwestern cliff top. The artifacts in and immediately around these eight sites account for 90% of the material from the top of Jebel er Raha, with the remaining 10% scattered more diffusely over the area.

Site 3 is by far the most densely populated site, with 514 artifacts. Of this total, only nine are tools, including a burin, a tabular scraper, three sidescrapers, an endscraper, a notch and two utilized blades, all Neolithic in age. Of the total number of artifacts, 20 came from periods earlier than the Neolithic. Cores account for only 13% of all the artifacts from this site.

Site 10 is a particularly interesting site, located on a terrace below the cliff face overlooking the plains towards the north. There are no tools at the site, and cores account for 28% of the artifacts. All of these cores are large nodules from which only a few cortical flakes have been removed, leaving one or more kilograms of excellent quality flint in each discarded core. This situation is mirrored at Jebel Ghuzeima on the northern border of the Jafr Depression, where large "plates" of thermally fractured flint have been used as cores for the detachment of cortical flakes (Rollefson, 1980: 14). Such selectivity of lithic resources for broad cortical flake production is not well-documented in the literature, but the flakes produced from such cores could have been used for Neo-

lithic to Early Bronze fan scrapers. Of the 43 flakes from this site, eight were completely covered with cortex, and cortex constituted a substantial amount of the surfaces of the remainder of the flakes. This site appears to be a very temporally restricted quarry site for the production of a special kind of flake for subsequent manufacture of tools that were taken away for use elsewhere.

Sites 2 and 4-8 are all similar in the sense that artifacts from Upper Paleolithic, Neolithic, and possibly later periods dominate the inventories. Artifacts from earlier periods are also present, but these periods are represented by only a few examples: five pieces from site 2; two from site 4; two from site 5; one from site 6; and 15 from sites 7 and 8. Core frequencies range from 5% at site 2 to 20% at site 4. Tools from site 2 include two scrapers of probable Middle Paleolithic age and a Neolithic or later burin. The only tool from site 4 is an endscraper on a Neolithic blade. Similarly, only a single blade from site 5 has a lateral scraping edge. From site 6 there are an Upper Paleolithic burin and an endscraper of similar age plus three Neolithic or later period scrapers. Sites 7 and 8, which may in fact be two foci of a single site, include two Middle Paleolithic Levallois points and an undatable chopper.

Discussion and Comparisons

The survey collections must ultimately be viewed in terms of the contemporary environmental contexts in which they were deposited, but several factors present formidable obstacles to such an exercise. First, the paleoenvironment of the area is simply a major unknown, and although a few specific investigations (Huckriede and Wiesemann, 1968) and general observations (Farrand, 1971; 1979; and Butzer, 1978) have been published, their utility for interpreting the Jebel er Raha survey data is insufficient. Second, the evident long period of extreme aridity of the area (which need not exceed several thousands of years) has obviously contributed to a mixture of previously distinct occupational episodes in the survey area; on the top of the buttes wind deflation has collapsed discrete

occupational debris into a melange of often confusing admixture, and probably environmental forces have been acting on the lowland areas as well.

Nevertheless, a couple of features suggest that the Jebel er Raha area witnessed some major differences of utilization by prehistoric populations. Although continued survey of the northeastern section of the Jebel er Raha area might alter the present view of the circumstances, it appears that post-Pleistocene occupations on the top of the butte are significantly more important when compared to those artifacts found on the lowlands. Although Lower, Middle, and Upper Paleolithic artifacts are absolutely more numerous on the top of Jebel er Raha, for example, in relative terms these periods are more importantly represented on the plains immediately below the jebel ($\chi^2 = 9.326$, significant beyond the .01 level).

The low percentage of tools on the top of Jebel er Raha is notable (2.8% of the total artifacts), and cores account for 16.6% of the cultural material. This combination is sufficient to indicate that the sites on the butte are primarily chipping stations, areas where flint outcrops were visited to procure sufficient amounts of material for conversion into tools to be used elsewhere. This observation is substantiated by the higher tool percentages on the lower elevations, which at 8.9% is different at beyond the .001 level of statistical significance. Core percentages at the lower elevations are also higher, however (25%), which indicates that considerable flake/blade manufacture took place beneath the butte (significantly different beyond the .001 level).

The activities suggested by the categories among "highlands" artifacts include little importance towards hunting and processing of animal resources; instead, the artifacts indicate brief periods of the manufacture of tools to be used elsewhere, with a few subsidiary and minor processing of materials necessary for the short periods of habitation on the heights.

The higher percentage of tools in the flat areas around Jebel er Raha indicate that procuring and processing the nec-

essities of life were more important. In the absence of supporting information, it might be assumed that water resources were more stable and predictable at the lower elevations at the base of the jebel, which would result in more varied and abundant floral and faunal resources to be exploited. In this scenario, the butte-top artifact clusters would reflect short-period habitations on the heights which overlooked the lowlands. This afforded opportunities to observe the (seasonal) movements of game while selecting perhaps preferable lithic outcrops for tool manufacturing in anticipation of using them for hunting herds of game spotted along the major wadi systems. The higher relative incidence of tools in the lower elevations indicated this is the general location of hunting and subsequent processing, and the high core percentage might indicate that the processing tools, as opposed to hunting implements, were manufactured from "locally" available flint nodules.

The clustering of artifact concentrations in the northern and southern reaches of Jebel er Raha deserves some preliminary comment. The clustering of sites in the northern and southern edges of the survey area (on and below the butte top) perhaps suggest that major animal migrations passed east-west of Jebel er Raha. Although the immediate drainage systems of the local area flow towards the various points of the compass, in general terms the major landforms have an east-west tilt which might relate to the season migrations of grazing animals to and from highlands to the west in the spring and autumn.

All of the implications in the preceding paragraphs are based on a very small area of investigation, and although these inferences we derive are tantalizing, they must remain tentative on the basis of the present evidence. The Jebel er Raha area is only one small section of the Wadi Bayir drainage system. What the potential difference of utilization of this section of Jordan might entail must await future investigation in this region.

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