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EARLY MOUSTERIAN SETTLEMENT PATTERNS IN THE CENTRAL NEGEV, ISRAEL: THEIR SOCIAL AND ECONOMIC IMPLICATIONS

by

A. MARKS *

In spite of considerable excavation, information relating directly to Mousterian social and economic adaptations in the Central Negev has been few and far between. One site, Rosh Ein Mor (D15), produced a small number of *Equus* bones and a rather sizable amount of ostrich egg shell (TCHERNOV, 1976) but, otherwise, the remains of Mousterian meals had disappeared. Close examination and testing of eleven sites in the Avdat/Aqev area of the Central Negev (CREW, 1976; MUNDAY, 1976, 1977, 1979; MARKS and FREIDEL, 1977) also failed to uncover any evidence for structures or other possibly man-made features which might throw light on Mousterian social organization. However, some data relating to Mousterian organization were recovered but from settlement pattern studies and from intrasite patterning (MARKS and FREIDEL, 1977; MARKS, 1981a; HIETALA and MARKS, 1981; HIETALA, 1983). Although both of these sources only indirectly reflect social and economic patterns, the information they give, tentative though it may be, points to some possible conclusions and to some specific directions for future research.

The information to be discussed below comes from survey and excavations undertaken in a 55 sq. km. area of the Central Negev, Israel, from 1969 through 1980, and supported by the American National Science Foundation. The Central Negev is a relatively high area of small plateaux and deeply incised drainages, the largest of which is the Nahal Zin which flows from high ground at over 900 m. northward to about 500 m. and then cuts sharply to the east, dropping over a 100 m. cliff, and flows into the Jordan Valley at an elevation below sea level. The Avdat/Aqev area includes the major bend of the Nahal Zin and the surrounding terrain (Fig. 1). Thus, the area incorporates a number of quite different elevational zones, as well as three present important perennial springs: Ein Avdat, Ein Mor, and Ein Aqev. There are three major elevational levels in the area; the highest stands at 600 m. and includes a number of small inselbergs in the center of the area but is mainly restricted to larger surfaces which enclose the Avdat/Aqev area on the south and west. The largest level is a 500 m. and consists of the Divshon Plain and the northern and southern rims of the Nahal Zin. Finally, there is a level at 400 m. and below which consists of the floors of the Nahal Zin and the Nahal Aqev, the two major canyons which cut through the area. During early Mousterian times the basic topography would have been about the same; the knick point of the Nahal Zin, where it drops over the 100 m. cliff, would have been some 600 m. down stream (GOLDBERG and BRIMER, 1983) and the canyon floors would have been some 20 m. higher than they are today (GOLDBERG, 1976).

* Southern Methodist University, Dallas, Texas. U.S.A.

Within this 55 sq. km. area, there are three major resources which would have been of high priority during the Mousterian occupations; water from perennial springs of considerable size, one located just above the knick point of the Nahal Zin at 500 m. elevation and one at about 400 m. at the edge of the canyon floor in the upper Nahal Aqev (Fig. 2); good grazing area on the Divshon Plain which, presumably, brought herds of herbavors to the area; and, abundant flint outcrops, mainly located along the southern edge of the Nahal Zin and the eastern edge of the Nahal Aqev. The flint outcrops, however, are not evenly or consistantly distributed and there are many localities where flint is present but where its quality is too low to permit controlled flaking. Thus, while the Avdat/Aqev area is rich in resources, their distribution is patchy and often spatially segragated from one another.

Paleoclimatic reconstruction of the area during the Mousterian occupations is based on both pollen (HOROWITZ, 1976, 1983) and geomorphological studies (GOLDBERG, 1976, 1983; GOLDBERG and BRIMER, 1983). While pollen counts were marginal, it is still clear that during the occupation of site Rosh Ein Mor (D15), the local vegetation was essentially Mediterranian; mainly annual grasses with stands of oaks and almonds in the better watered areas. Based on pollen samples, this environment was the richest vegetationally of any period since the Mousterian and, as such, the Mousterian occupation took place during a climatic optimum.

Geormorphological studies show clearly that it was also a period of terrace aggradation, the accumulation of loess on the flatter surfaces, and of high water table. Although radiocarbon dating cannot reach sufficient age to date this occupation, Thorium/Uranium dating, combined with cross-dating to cave sequences farther north in the Levant, suggest that the Central Negev was occupied by Mousterian groups during the early last Pluvial (early Würm). Two Th/U dates from a travertine containing a typical Levallois point from a spring located at the edge of D35, a large *in situ* Mousterian site (MUNDAY, 1977), gave readings of 85,200 BP ± 10000 and 74,000 BP ± 5000 (SCHWARCZ *et al.*, 1979), while the climatic optimum seen in the Negev must correlate with the cold/wet phase seen at Tabun D (JELINEK, 1982), both because of parallel patterns and because of striking similarities in the artifactual assemblages. Taken together, these avenues of evidence all suggest that the Central Negev was occupied by the Mousterian sometime around 80,000 ± 7000 BP. The total duration of Mousterian occupation is unknown. However, there is ample evidence for a period of marked climatic deterioration equivalent to the later Mousterian occupation of the central and northern Levant, with signs of climatic amelioration beginning only about 49,000 BP (GOLDBERG, 1983). Since this was also the point at which the local Middle to Upper Paleolithic transition appears at Boker Tachtit, it is likely that the Central Negev was not occupied consistently, if at all, during the period of severe climatic deterioration.

The Mousterian occupation of the Central Negev, with the exception of the terminal Mousterian level at Boker Tachtit (MARKS, 1983a), is limited to what has been defined typologically and technologically as the Early Levantine Mousterian, or Phase 1 Levantine Mousterian. This assemblage type is best known from the cave of Tabun, Level D (GARROD and BATE, 1937; JELINEK, 1975, 1981a). In fact, it is likely that only this form of Mousterian existed in the southern, climatically marginal zones of the Levant (JELINEK, 1981b) and that, temporally, it lasted longer than it did in the central and northern Levant, where it was seemingly replaced by a Phase 2-3 Levantine Mousterian (COPELAND, 1975; JELINEK, 1982). While the Central Negev was probably essentially unoccupied during this later Mousterian period, the higher elevations of the southern Jordanian plateau still supported Mousterian groups with Phase 1 type typology and technology (HENRY, 1982; LINDLY, 1986).

It is probable, therefore, that the Mousterian sites located in the Central Negev all fall into the temporally early phase of the southern Early Levantine Mousterian and that their variability in location, artifact content, and intrasite patterning all reflect differential

utilization of the landscape within a single settlement system.

Technologically and typologically, the Early Levantine Mousterian may be characterized by a tendency to produce elongated blanks from unidirectionally and bidirectionally flaked cores, a tendency not to produce classic ovoid Levallois flakes, but to produce many elongated Levallois points (up to one third of all Levallois pieces). Core reduction strategies were numerous – from occasional classic Levallois flake to actual bladelet producing cores and true blade core reduction. Typologically, there are relatively few typical Mousterian tools – sidescrapers and Mousterian points – and relatively many Upper Paleolithic tool types. When present, sidescrapers tend to have very flat retouch and multiple edge scrapers are not common, particularly at the Negev sites (CREW, 1976; MUNDAY, 1976, 1977). The ratio of Middle to Upper Paleolithic tools varies, depending possibly upon both activity intensity and type, so that at Tabun, for instance, there is a Middle to Upper Paleolithic tool ratio of 2.21:1 (JELINEK, 1982), while at Rosh Ein Mor in the Central Negev, the overall Middle to Upper Paleolithic tool ratio is 1:3.56 (CREW, 1976).

In the Avdat/Aqev area, a total of twenty-one Mousterian sites were located, of which eleven were studied in some detail (Fig. 2). The others were either heavily mixed with later occupations or were so scattered that no meaningful samples could be obtained. Of the eleven which were studied, extensive excavations were carried out at two, D15 and D35, while systematic surface collections were made at the others.

The specific locations of the Mousterian sites can be tied directly to flint outcrops, to perennial springs and, by inference, to optimal hunting areas. The two largest sites, D15 and D35, occur almost adjacent to large fossil springs in locations well away from flint outcrops. In fact, the location of D35 (Fig. 2) is isolated from easy access to **both** flint and hunting areas, while D15 is on the edge of good hunting terrain. A number of other sites, D29, D2, D42, D44, are located on or directly adjacent to outcrops of good quality flint in locations far removed from predictable water sources and, often, from other potential resources. Finally, a third group of sites, D51 and D52, was located well away from both predictable water sources and flint outcrops. The two studied sites lie on the Divshon Plain, but others were present on the slight raises along the edges of the plain. Presumably, these latter sites, including D51 and D52, were close to both good hunting areas and to areas of plant resources.

A fourth location, on the terraces along the major drainages, within the canyons, is probable as a traditional site location but it could not be confirmed securely because of massive post-Early Levantine Mousterian erosion. However, a few scattered remnants of Middle Paleolithic sites, such as D10 (Fig. 2), were found in positions derived from the eroded Mousterian terrace and it is likely that during the Early Levantine Mousterian such terrace edge sites were common.

Based upon assemblage characteristics, it is possible to define three types of sites and, because each type is more often than not associated with a different resource, to infer general functions to them: workshop/quarries, ephemeral hunting and gathering camps, and base camps. It is certainly recognized and accepted that some of the sites might have been used at different times for different primary functions (BINFORD, 1982), but the marked differences in the content of these sites argues for, at least, one dominant, habitual activity or group of activities at each site type.

Not surprisingly, the workshop/quarries are spatially associated with outcrops of good quality flint. Although large areas of **hamada** flint are present in the area, they never were used by Mousterian groups. The base camps are adjacent to large perennial springs but also are at the edge of streams. Although the streams may not have supplied as predictable a supply of water as did the springs, both base camps are *in situ* in substantial overbank

stream deposits. The ephemeral camps tend to be spatially segragated from both predictable water and flint outcrops. This is not fully consistant, however, and it is likely that what is recognized here as ephemeral hunting and gathering stations may well have served as workshop/quarries too when they were fairly close to flint outcrops (e.g., D46).

Each site type and its associated assemblages may be broadly defined, as follows:

a) ***Workshop/quarries***. These sites tend to be small but their surface areas, when not artificially enlarged by deflation and sheet wash, relate directly to the size of their associated flint outcrops. All these sites are essentially surface sites with very little *in situ*. Partly, deflation has played some role but, more importantly, the base of these sites tends to be outcroping flint and their locations are usually so exposed that loess buildup would be very unlikely even under optimal climatic conditions. Artifact densities, per square meter, tend to be rather uniform and moderate (Table 1). Cores are common and, usually, form a fairly high percentage of all lithic items. In addition, core size is relatively large. There tends to be a high number of struck Levallois cores but a lower number of Levallois blanks. Most striking, on average there are almost five Levallois point cores which have been struck and then abandoned for every complete or broken Levallois point found at these sites (Table 1).

b) ***Base camps***. While there are only two known in the Avdat/Aqev area, D15 and D35, both are very large – well over 1,000 sq. m. each – and both have significant depths of *in situ* cultural deposits. Artifact densities are high in all areas of the sites which were tested, although the percentage of cores is low. On average, core size is small and cores tend to be exhausted (Table 1). There is a high ratio of Levallois blanks to Levallois cores and there are over seventeen Levallois points for every struck Levallois point core. Although one might expect that retouched tools would be relatively more common at these base camps than at the workshop/quarries, this is not the case (Table 1). However, the percentage of tools at all Central Negev Mousterian sites is well below that found at Early Levantine Mousterian cave occupations further to the north (JELINEK, 1982). This suggests that even at the base camps, raw material was more readily available than was the case in the cave sites of central and northern Israel.

c) ***Hunting and Gathering camps***. When relatively intact, these sites are about the same size as the workshop/quarries (Table 1), although the two from the Divshon Plain, D51 and D52, were so heavily deflated and scattered that present site and artifactual densities are both meaningless and could not represent the original conditions. At more intact sites, artifact densities are still rather low; however, there are a good proportion of sizable cores, particularly at those sites near flint outcrops. The ratio between Levallois blanks and Levallois cores falls between those of the base camps and those of the workshop/quarries (Table 1) but is closer to the latter. Again, the same pattern pertains to the Levallois point to Levallois point core ratios.

It is clear that a number of the assemblage attributes do not overlap between site types and, when distance from raw material and water are combined with these discrete attributes, the real differences between workshop/quarries and the base camps are striking. While the hunting camps fall in between, their overall patterns do stand out from those of the other site types.

In addition to the differences already noted, there are marked variations in artifact size and average scar pattern complexity between the workshop/quarries and the base camps (MUNDAY, 1976). This is seen clearly in mean core weight, which is strongly tied to distance from raw material (Table 1). In all cases, however, cores and flakes from workshop/quarries are larger than they are at base camps, while artifact size at hunting and gathering stations appears to be a function of the distance to the nearest source of raw material.

Given the number and the size of the sites located significantly away from raw material sources, it is obvious that a huge amount of flint was imported into them. This probably involved the movement of both blanks and pre-shaped cores, although unmodified blocks of raw material might have been carried in, as well.The important factor here is that the base camps could not have existed, as such, without the workshop/quarries, as is the case, as well, for the ephemeral sites on the Divshon Plain. These ephemeral sites are so far from flint and predictable water sources that it is highly unlikely that they could have functioned as the only site type for any settlement system. Only the workshop/quarries might have stood alone, with the exported Levallois blanks having been scattered individually across the landscape as they were used and discarded in isolated and spatially unique activities. Yet, even this scenario is not appealing because many of the workshop/quarries are located in places which had little access to other resources (Fig. 2).

In this regard, it might be true that in some circumstances the acquisition of raw material "would generally be obtained within the context of normal subsistance procurement schedules" (BINFORD, 1979: 270). In fact, it may have followed that pattern many times during the Early Levantine Mousterian occupation of the Central Negev. However, it does not seem to have been the only pattern utilized and, certainly, it was not the dominant pattern. The flint outcrops closest to the two base camps were heavily exploited and both are located on narrow promontories, isolated from the rest of the landscape by what were then 80 m. high cliffs! While the views from these workshop/quarries are and undoubtedly were wonderful, these locations are not even reasonable for any other activity but flint aquisition and, perhaps, very minor hunting and gathering.

The pattern of site types and their distribution through space points clearly to traditional base camps and workshop/quarries which were both habitually utilized. Although it is hardly clear whether people stayed at the base camps for a matter of days or months per visit, it is clear that they focused their habitation adjacent to the perennial springs, disregarding the spatial distribution of other primary resources. In fact, site D35 is situated in a narrow canyon with no view, only narrow terraces and, at the time of occupation, an 80 m. climb up a cliff to the nearest source of flint, as well as a several kilometer walk down the canyon before it opened sufficiently to afford even relatively good hunting potential. In the immediate area of the site, only *Capra ibex* would have been available.

It is also obvious that those people of the Early Levantine Mousterian who occupied the Avdat/Aqev area knew it well, exploiting the sources of the best flint even when they were not located in otherwise favorable places. Main residential locations were well away from the better hunting locations. In short, the settlement pattern can be described as radiating (MARKS and FREIDEL, 1977), as opposed to circulating and beyond that, it is far from randomly or evenly distributed across the landscape. This pattern strongly suggests that during the Early Levantine Mousterian the Avdat/Aqev area of the Central Negev was being intensively exploited, particularly relative to the rest of the Negev (S. ROSEN, personal communication). While it is likely that groups from the Avdat/Aqev area traveled to such places as the Ramat Matred or even to the Maktesh Ramon, they probably did so only during periods of unusually high rainfall, when surface water would have been abundant, if only temporary. The lack of habitual usage of these areas by Early Levantine Mousterian people is amply shown by the comparatively meager remains in those areas which can be attributed to this period.

In order to have survived in the Avdat/Aqev area for even relatively short periods under even optimal climatic conditions with the apparent radiating settlement system of habitually occupied base camps, the occupants must have exploited a whole range of edible resources and exploited them intensively. Although the faunal evidence is weak, indicating the hunting of *Equus* and the collection of ostrich eggs only, the limited size of the potential grazing areas could not have supported sufficient herds of *Equus* to have permitted a specialized hunting strategy emphasizing these ungulates. Thus, the inhabitants must have

exploited a wide range of edible plants and animals. The only other option is for very limited occupational durations in the Avdat/Aqev area, which does not fit with the available settlement pattern data. In particular, the habitual occupation of the two base camps, although probably not contemporaneously, indicates that the local inhabitants valued proximity to predictable surface water over proximity to flint and good hunting stations. Also, since the period was one of climatic optimum, there must have been many ephemeral sources of water during the year; particularly during the rainy season. While these were obviously exploited and permitted the exploitation of their surroundings, the present distribution of Mousterian material does not correlate well with a seasonal but generalized occupation of the area, with countless overlapping ephemeral camps around every topographic low. Rather, the sites are quite discrete and suggest a rather fixed settlement system.

Another aspect of this apparent spatial conservatism on the part of the Early Levantine Mousterian can be seen in intrasite patterning. Although only a single site, D15, has been studied for this in detail (HIETALA and STEVENS, 1977), a temporally terminal Early Levantine Mousterian occupation, Boker Tachtit, Level 1, has also been studied (HIETALA, 1983) and, together, they provide some similar patterns, in spite of the 30,000 years or so which separate them.

At D15, six five centimeter excavation levels, covering 36 sq. m. and divided into 1 x 3 m. units, were studied for spatial distributions of commonly recognized Mousterian tools (HIETALA and STEVENS, 1977). These studies showed that certain tool types – Levallois points, burins, endscrapers, and notches all not only clustered in the general sense but also clustered in relative space throughout the six levels. On the other hand, denticulates and sidescrapers seemed to have their own, independent spatial distributions (HIETALA and STEVENS, 1977: 555). Without question, this suggests a very conservative and consistant pattern of intrasite spatial utilization but, as with any preliminary study, there must be considerable evidence for similar patterns at other sites before it is possible to accept this as normal for the Early Levantine Mousterian. In the case of D15, these patterns may have been retained because of the consistant, low energy, overbank aggradation which tended to bury occupational surfaces rather quickly. Under other geomorphic conditions, it is likely that habitual occupation of a stable surface would have blurred such patterns.

Although there are no other major data bases to use for comparison to that from D15, a single living floor has also been studied and shows some interesting parallels (HIETALA and MARKS, 1981; HIETALA, 1983). The lowest level at Boker Tachtit, Level 1, has been referred to as terminal Early Levantine Mousterian because of the consistant but highly specialized Levallois point technology (MARKS, 1983b). Although by this time traditional Mousterian retouched tools had virtually disappeared, there were still large numbers of Levallois points. The other tools were mainly of Upper Paleolithic type – endscrapers and burins – but the normal range of denticulates and notched pieces were found (MARKS and KAUFMAN, 1983). Here, although there was only a single ephemeral occupation floor with three concentrations, two of which were clearly visible, the spatial patterning of the tools in some ways seems comparable to that at D15. In one concentration, 75 % of the tools were Levallois points, while they represented only 12 % in the other. In the latter concentration endscrapers, notches, and denticulates together accounted for 48 %, while in the former they amounted to only 2.3 % of the tools (HIETALA, 1983). Although some of the tool associations have changed there is still evidence for a very strict spatial relationship between presumed different activities. While additional data are needed, this type of pattern is not seen in the Upper Paleolithic sites of the Central Negev (MARKS and FREIDEL, 1977; MARKS, 1981b).

In sum, the Central Negev data indicate that the Early Levantine Mousterian settlement system depended upon a series of different site types, centering around a base camp adjacent to perminant surface water. This type of system suggests an intensive exploitation of a

relatively small area for periods of time, as opposed to a surficial exploitation of a large area, with differential seasonal exploitation taking place in markedly separated geographic localities. The Central Negev pattern indicates periods of considerable residential stability and, by inference, given the small size of the Avdat/Aqev area, a rather intensive and broad spectrum economic adaptation. It must be borne in mind, however, that this pattern probably reflects only that during the climatic optimum of the early last Pluvial and that, again, it may have been operational only in areas of greatest resource potential. Thus, it would be unwise to generalize this pattern to the rest of the Levantine Mousterian or even to the rest of the Early Levantine Mousterian in other regions of the Levant. It does stand, however, as a base from which other studies of settlement patterns may be compared.

The apparent conservatism in intrasite spatial patterning needs confirmation but, again, may point to a particularly Middle Paleolithic pattern, suggestive of a low level of tool sharing between people and a strict sense of spatial organization within and/or between groups.

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TABLE 1

Characteristics of Early Levantine Mousterian Sites in the Central Negev

	Size (sq.m.)	Artifact density (sq.m.)	Percent Cores	Lev./ Lev.Cores	Lev. pt./ Lev. pt. core	Mean Core weight	Round trip to flint (km.)
A. Base Camps							
D15	1,200	68.9	6.5	16:1	17.5:1	46.9 grm.	1.2
D35s[1]	ca. 2,000	17.6	5.3	19:1	18.7:1	78.4	1.38[2]
D35, c[3]	ca.2,000	97.0	3.2	96:0	46:0	49.8	1.38
B. Workshop/quarries							
D2	-[4]	11.7	26.9	1:1.8	1:7	154.9	0
D42	270	25.6	13.7	1:1.2	1:2.5	124.7	0
D44	750	36.3	13.2	1.3:1	1:5	159.6	0.15
C. Hunting camps							
D51	-	-	9.3	2.4:1	3.5:1	108.9	1.8
D52	-	-	12.7	4.2:1	1:1	43.7	2.4
D46	450	2.8	17.3	2.9:1	2.3:1	156.0	0
D40	650	5.0	23.9	1.9:1	1.6:1	190.0	0.02

[1] D35s is the surface collection from D35.

[2] This includes going up and down an 80m. cliff.

[3] D35c is one *in situ* level, given as an example. See MUNDAY, 1977 for complete data.

[4] – indicates excessive deflation and artifact scattering, making these observations meaningless.

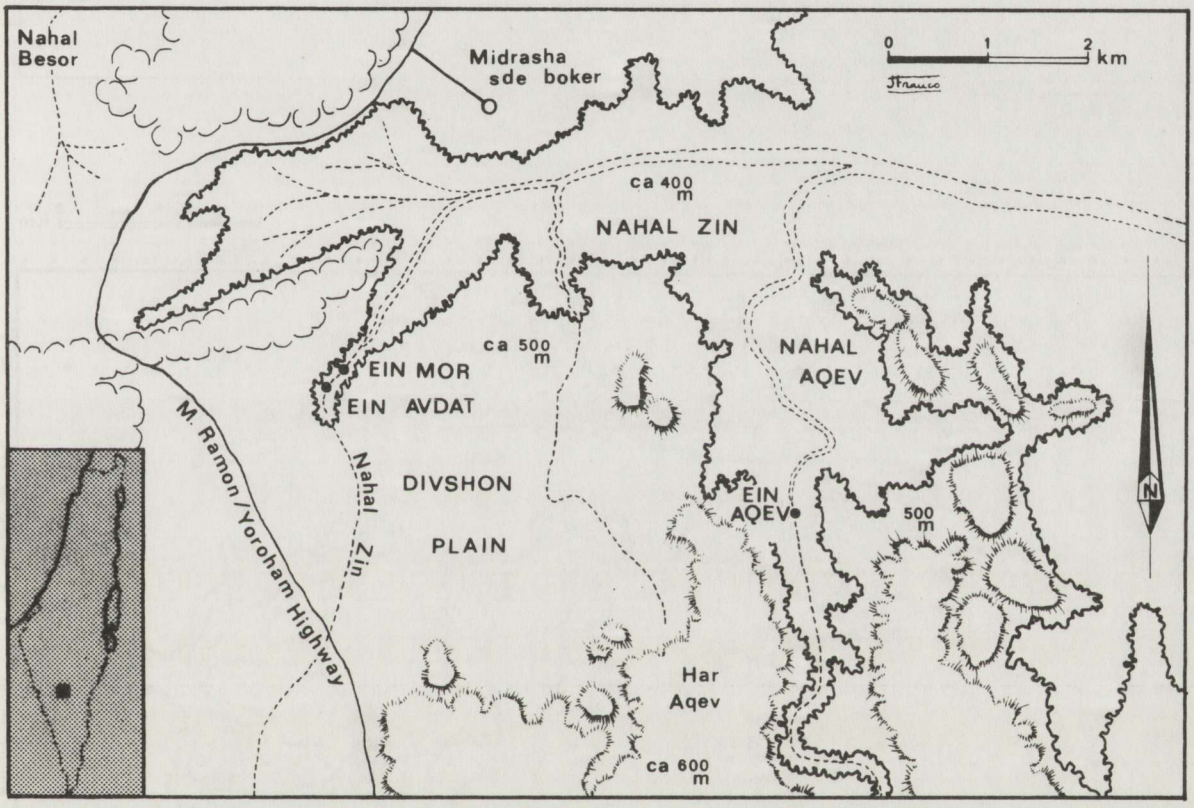

FIGURE 1

The Avdat/Aqev area, showing major features and their elevations

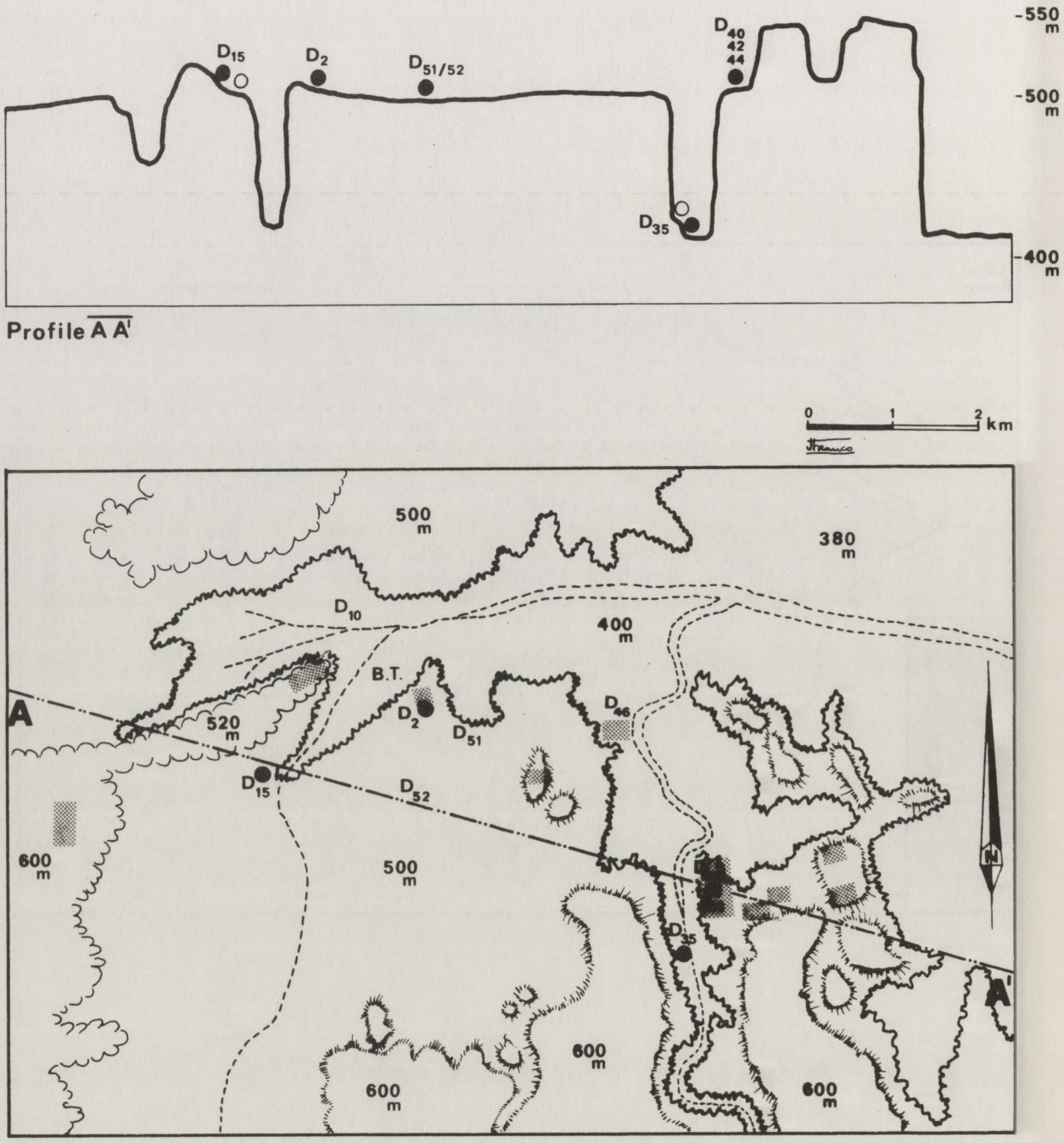

FIGURE 2

Upper: profils through AA' in lower map, showing extreme elevational difference between varions sites and springs (open circles).
Lower: distribution of Middle Paleolithic sites, springs (closed circles) and flint sources exploited during the Middle Paleolithic (lightly shaded areas)