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Recent Discoveries Relating to the Neolithic Periods in Eastern Jordan

Recent work in the steppic areas of eastern Jordan (Betts 1982, 1983, 1984, 1985, 1986; Garrard and Stanley Price 1975; Garrard *et al.* 1985, 1986, in press; Rollefson and Fröhlich 1982; Muheisen 1983) has brought to light a wealth of new information on man's exploitation of these marginal areas during the 7th, 6th and possibly the 5th millennia BC. Fieldwork is still in progress, but in the light of the quantity of information now available, it is proposed here to give a preliminary summary of the evidence to date from the author's own survey work in the Black Desert, the basalt hammada to the north and east of the oasis of Azraq. The evidence discussed here comes from extensive area surveys at selected locations within the basalt region, together with soundings at two sites and full-scale excavation at a third.

There is little evidence for the early stages of the Neolithic period; no Pre-Pottery Neolithic A site has yet been found in the survey area. The earliest Neolithic material comes from site 2402, an occupation site lying on a col between two basalt-capped hills just east of Jebel Qurma, in the southwest of the survey area. Finds include a notch-based arrowhead, a 'T' shaped piece, a number of burins of various types and a collection of miscellaneous retouched pieces. The notch-based point suggests that site 2402 might be roughly contemporary with Jilat 7 (Garrard *et al.* 1986), which has two C14 dates of 8,810 \pm 110 (Ox A 526) and 8,520 \pm 110 bp (Ox A 527).

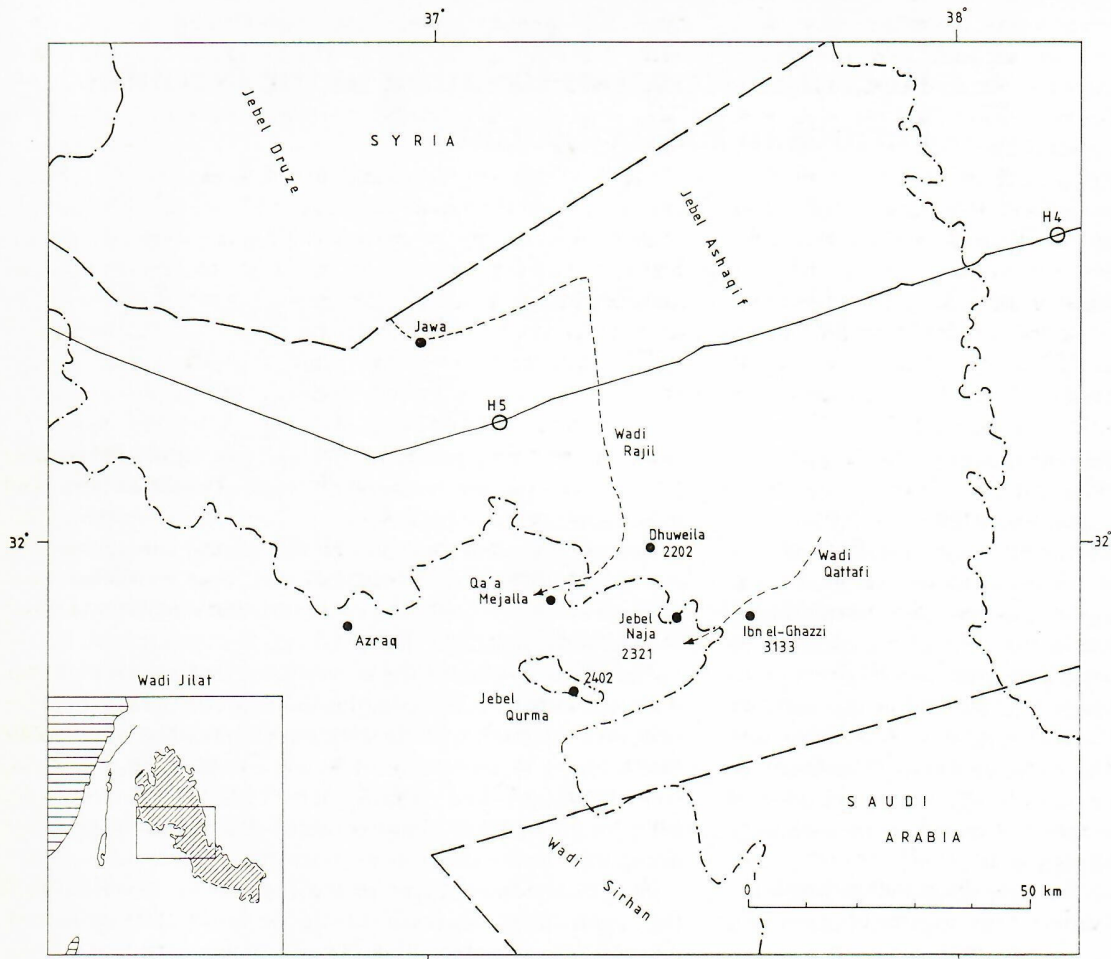
The later aceramic Neolithic, Pre-Pottery Neolithic B, is very well represented in the area. Sites of this period include knapping stations on hilltops, isolated flint scatters, animal traps and occupation sites. The knapping stations are normally on hilltops or high ground where a clear view can be had of adjacent wadis and mudflats. Raw material was carried from its source up to these stations to be worked, presumably so that knappers could observe the movements of game as they prepared their tools. Some sites were in use in pre-PPNB times, as small scatters of Epipaleolithic material can testify, but a large proportion produced bipolar blade cores, some of them naviform, blades, points of Beidha type (pressure-flaked and leaf-shaped or tanged but without the triangular cross-section

of the true Amuq point) or Byblos type, bifacially worked knives or projectiles, occasionally various kinds of burin and miscellaneous waste pieces.

Among the numerous sites of this period encountered on the survey, two have been excavated. Test soundings were made at 3133, the site of Ibn el-Ghazzi, and major excavations at Dhuweila, site 2202. Ibn el-Ghazzi lies on a flattish hilltop in the southern part of the survey area, in a region of highly dissected terrain. It is a complicated site, comprising a scatter of ruined structures, some irregular corrals, a series of large cairns and a water-system including canals, a pool and two stone-lined corbelled cisterns (Betts 1985, 1986; Helms and Betts, in preparation). How much of this relates to the PPNB occupation at the site is as yet unclear. The flint industry was typical of the later stages of the Pre-Pottery Neolithic B in the region. Blade cores were mostly bipolar, often heavily reduced. Arrowheads of Beidha and Byblos type and various kinds of burin dominated the retouched pieces. There were some scrapers, bifacially worked pieces and a very few sickle blades. Special finds included fragments of worked basalt and limestone, some bone and stone beads and a piece of chert with an incised pattern on the cortex.

No botanical data were obtained, but faunal analyses showed (Garrard 1985) that gazelle featured strongly in the economy of the inhabitants, and other animals, notably sheep/goat and hare were also exploited. Although no C14 dates could be obtained, typological comparisons suggest that Ibn el-Ghazzi dates from much the same time as the site of Dhuweila.

Dhuweila is a small hunting camp on a low basalt ridge immediately to the east of Qa'a Dhuweila, a large mudflat in the southwestern sector of the survey area (Betts 1985, 1986, in preparation). There have been two periods of occupation at the site. The lowest levels relate to a late stage of the PPNB. A C14 date of 8190 \pm 60 bp (BM-2349) was obtained from a hearth just above bedrock. In the Late Neolithic period the site was reoccupied, with the new inhabitants in some cases making use of existing walls in the reconstruction of buildings. No C14 dates are yet available for this later reoccu-



pation but preliminary analysis of the chipped stone assemblage seems to suggest that it probably took place in the late 6th to early 5th millennium BC.

The flint assemblage from the earliest levels at Dhuweila was again typical of PPNB tool kits in the survey area, with bipolar blade cores, often heavily reduced, high proportions of arrowheads and burins, some bifacial pieces, borers and a very few sickle blades. Arrowheads were mostly of Byblos and Beidha type. The Late Neolithic flint assemblage was also dominated by arrowheads. There were a number of types, almost all of them small bifacially pressure-flaked points and transverse arrowheads. There is some evidence for the special selection of fine-grained exotic stone, particularly for the transverse arrowheads. Other components of the Late Neolithic assemblage included tabular scrapers and fine pressure-flaked bifacial knives.

Apart from the large amounts of bone and chipped stone, the site was not rich. Other artefacts produced by the excavations comprised some basalt grinding implements, shell, stone and bone beads, one limestone animal figurine, some pieces

of chert with incised lines on the cortex, and in the Late Neolithic levels a few reddish coarse-ware sherds and one dark burnished body sherd. Perhaps the most interesting aspect was the discovery of a number of engraved stones found *in situ* in the PPNB levels. Most of these were finely scratched representations of horned animals, possibly gazelle, but one had a series of human figures, suggesting some details of ornamentation. Other stylistically similar carvings were found on the surface of the site and nearby.

Preliminary identification of some of the faunal remains (Garrard, pers. comm.) shows that in the PPNB the economy of the inhabitants of Dhuweila was based on exploitation of gazelle and occasionally wild ass, hare and other small game. In the Late Neolithic, gazelle still predominate strongly in the faunal assemblage but there is also some evidence for domestic sheep/goat. Imported objects at the site included a few marine shells, some fragments of Dhubba marble, and limestone used for a crude stone vessel and an animal figurine.

Area survey in the immediate vicinity of the site identified at least four other similar sites, all with rock art of identical

style, all with associated scatters of PPNB flint, and three of them with structures incorporated into 'kite' walls. 'Kites', stone-built animal traps, are very common in the lava region. They consist generally of several long guiding walls leading up over a low rise to a trap or stone enclosure, often surrounded by a series of small stone 'hides'. Similar traps were in use in the area at least up until the 19th century and the earliest forms could possibly go back well into the early 7th millennium BC. The uppermost Late Neolithic level at Dhuweila includes an enclosure wall which swings around the south-eastern end of the site to link with a 'kite' wall running up from the mudflat at the bottom of the hill, showing therefore that some walls were in existence in the Late Neolithic period. The coincidence of so many PPNB sites lying on or against 'kite' walls also strongly suggest that the 'kites' were in use during the later 7th millennium in the area. The Dhuweila 'kites' form part of larger systems which in turn suggests that a considerable number of them may have been in use during the later aceramic Neolithic periods in the basalt region and that the tradition may have developed at a still earlier date.

Aceramic Neolithic sites in the basalt region seem to belong predominantly to the Mid-to-Late phases of this period, a phenomenon echoed elsewhere in the semiarid steppic zones, for example in the Negev and Sinai (Bar Yosef 1981). These step-pic groups followed a lifestyle which was in marked contrast to that of contemporary village settlements in the fertile areas. They had an economy based to a very great extent on hunting, combined in some cases with a little agriculture (Garrard *et al.* 1986) and perhaps—although the evidence is still very fragile—herding of domesticated animals (Garrard *et al.* in press). Survey data on earlier sites in the basalt region have shown that the area seems rarely, if ever, to have been entirely unoccupied, even if visited only seasonally, and so it seems likely that these steppic groups could well represent an indigenous development adapted specifically to the conditions pertaining and the resources available in the more marginal areas. The nature of the remains discovered so far suggests that these inhabitants of the marginal zones were quite mobile, with resource procurement strategies oriented strongly towards very localised conditions. Common traits in material culture, particularly the chipped stone industry, indicate connections between mobile bands and settled villagers, but how far they interacted is difficult to deduce at present.

Apart from the upper levels of Dhuweila, there are also a large number of other sites dating to the later Neolithic. These sites have become known as 'burin sites' because of the high proportions of concave truncation burins characteristic of their flint assemblages. 82 'burin sites' or scatters were located during the course of the survey. Of these, one, Jebel Naja, site 2321, was excavated.

Jebel Naja (Betts 1985, 1986) lies on a steep east-facing slope in the southern part of the survey area, sheltered from the prevailing wind by the rim of the basalt plateau and overlooking the alluvial fan of Wadi Qattafi where it debouches out of the lava country onto the open gravel plains. The site

consists of a dense scatter of flints in and around a cluster of corrals and cleared terraces. These structures almost certainly vary greatly in date. Some may relate to the Neolithic occupation of the hillside but the soundings failed to prove this conclusively. A C14 date of 7340 \pm 100 bp (Ox A 375) was obtained from charcoal fragments found in a hearth in one of the soundings.

The flint industry was flake-based. Cores were irregular, usually with little or no preparation, and cortical surfaces were often used as striking platforms. Among the retouched pieces, burins, especially those on truncations, overwhelmingly predominate, accounting for 81 per cent of all excavated tools. Other tools included crude flake scrapers, bifacial knives, borers and drill bits on burin spalls. Two small bifacially worked points and one transverse arrowhead were also found.

Apart from chipped stone, the only other artefacts to be recovered were beads. These were made mostly of a soft friable pinkish stone. A few were on chips of Dhubba marble. The virtual absence of charcoal precluded botanical analysis. Faunal remains (Garrard 1985) included sheep/goat, hare and gazelle. The condition of the specimens rendered it impossible to determine whether or not the *Ovis/Capra* pieces were from domesticated animals.

All of the 'burin sites' and scatters located on the survey conform quite closely to the excavated assemblage from Jebel Naja. Survey work in the basalt region has produced the largest sample of these sites ever to be studied as a single corpus, and it is through analysis of these that the rather fragile dating evidence from Jebel Naja can be reinforced by typological data.

The first 'burin site' to be reported was Wadi Dhobai B (Waechter and Seton Williams 1938), a site in what is now more properly referred to as Wadi Jilat (Garrard *et al.* 1985). There were remains of a circular limestone structure and an industry containing a mixture of PPNB elements such as bipolar cores and tanged arrowheads of Byblos type, together with an extremely high proportion of burins on concave truncations. Because of the PPNB element, the industry became known as the Dhobaian, a desert variant of the early Neolithic.

Field in his surveys recorded a number of sites with very high proportions of concave truncation burins, especially in the vicinity of Jebel Umm Wual in northern Saudi Arabia. Garrod in her discussion of the flint collections (Garrod, in Field 1960) pointed out the similarities between these sites and the Dhobaian industry, the main difference being the lack of arrowheads in the Umm Wual collections. With reservations as to the precise connection between the two industries, she referred to Field's collections as Wualian.

Since then survey reports have noted these sites in profusion all over the Syro/Arabian desert. They have been recorded from Rutbah in Iraq (Field 1960) up to the very rim of the Jordan Rift Valley (Rollefson *et al.* 1982; Macdonald *et al.* 1982, 1983) and from Palmyra (Akazawa, in Hanihara and Akazawa, eds. 1979) down to Jauf and Sakaka south of the basalt in Saudi Arabia (Adams *et al.* 1977; Parr *et al.* 1978;

Ingraham *et al.* 1981). To date, only a few detailed reports of specific assemblages are available (Akazawa, in Hanihara and Akazawa, eds. 1979; Rollefson and Fröhlich 1982; Rollefson *et al.* 1982; Garrard *et al.* 1985, 1986, in press), but even these illustrate the uniformity of the industry over large areas.

On site 79 at Palmyra (Akazawa, in Hanihara and Akazawa, eds. 1979), out of a total of 281 pieces collected, 63 were burins and 5 were modified flakes. The rest of the collection was made up of cores, blanks and waste. The concave truncation burin was predominant among the burin types. All of the cores were unprepared except for the production of the striking platform which was plain and flat, produced by a single blow without secondary facetting. The 'burin site' at Jebel Unweinid reported by Rollefson and Fröhlich (1982) had a blade-based industry, with blanks struck from tabular cores. Of 121 tools from Jebel Uweinid (Sqs 1–5) 113 were burins, and of these 99 were on concave truncations. The only other tools were one atypical grattoir, a tile knife and five truncated pieces. Rollefson also reported on a smaller collection obtained from rescue work in Amman (Rollefson *et al.* 1982). Seven out of the eleven burins in the Umm Utheina collection were on concave truncations. Out of 23 tools in the collection, 11 were burins, together with borers, a scraper, and some miscellaneous retouched pieces.

Garrard has located several 'burin sites' in Wadi Jilat and around Azraq (Garrard and Stanley Price 1977; Garrard *et al.* 1985, 1986, in press). The sites for which data is available all show the same pattern of high incidences of burins, especially concave truncation types, together with a few scrapers, borers and bifaces. Production of flakes and blades varies, with neither class dominating strongly.

With the large amount of data now available, it has become possible to define the industry of the 'burin sites' quite closely and it becomes apparent that the evidence from Wadi Dhobai B on which the tentative dating for the industry is based must be considered anomalous. The relationship between arrowheads of Byblos point type and elements characteristic of the 'burin site' industry on which this dating rests is only to be found at Wadi Dhobai B, and, to a certain extent on sites in the el-Kowm area—Qdeir 1, Nadaouiyeh 3, Umm el-Tlel 2 and basal el-Kowm 1 (J. Cauvin 1981). No other sites, out of nearly 100 analysed examples and the numerous others described in general reports, appear to echo this feature. Recent study of other Neolithic sites in Wadi Jilat (Garrard *et al.* 1986, in press) now suggests that the site of Wadi Dhobai B probably dates primarily to the PPNB and may have a deflated level in topsoil relating to a later stage of occupation contemporary with the other 'burin sites' nearby.

The question of the date of these sites has always been subject to discussion and uncertainty as the extraordinary nature of the assemblages renders it difficult to relate them to the familiar Syro/Palestinian chronology. One major stumbling block has been the extremely low proportion of tools other than burins, tools which might, in acceptable quantities, provide closer parallels with known industries, and it is only now

with the large sample of collections obtained from recent surveys that a consistent pattern of small numbers of other tools can be seen to occur on all of the larger sites. These include rather crude flake scrapers, bifacial pieces—both leaf-shaped and sub-rectangular ('tile-knives'), borers, drill bits on burin spalls and very occasionally small bifacially worked points and transverse arrowheads.

Of these tools, the scrapers and borers cannot be considered very diagnostic. They are often crudely made on irregular chunks and cannot be closely paralleled to specific types elsewhere. The drill bits on spalls are unique in the Levant. The only other known occurrence of this tool type is in the Saharan Neolithic (Gausson and Gausson 1965; Close 1984). However the bifacial pieces and the very rare arrowheads can afford some clues. Tile knives and foliate bifaces are generally associated in Palestine with Pottery Neolithic assemblages (see for example Crowfoot Payne 1983: 710; Stekelis 1950: 6; Anati 1963: Pl. XI, 1–3; Olami *et al.* 1977: 45, FIG. 14, 3–4). The small bifacial points and transverse arrowheads are also late types and attest to the essentially post-PPNB character of the 'burin site' industry. The single C14 date of 7430 ± 100 bp (Ox A 375) obtained from the hearth in 2321 should, as an isolated date, be treated with a certain degree of caution, but it does not clash with the mid-sixth to -fifth millennium date suggested by the more diagnostic tools.

Little is known so far about the economy of these sites. Nothing is known about plant remains as the samples from Jebel Naja only yielded a few tiny fragments of unidentifiable charcoal (S. Colledge, pers. comm.). Faunal remains from Jebel Naja are also very scanty. Garrard (1985) reports 4 bone fragments of sheep/goat, 2 of hare and 3 of gazelle. Garrard was unable to determine whether the Ovis/Capra specimens were from domestic animals or not. From Wadi Dhobai B, Bate (1938) reports fox, badger, hare, gazelle, rock partridge and tortoise, but these findings probably relate to mixed PPNB/late Neolithic contexts. Tortoise seems to have been common on most Wadi Jilat sites including the pre-Neolithic ones (Garrard, pers. comm.).

The very low incidence of sickle blades might suggest that exploitation of cereals was not a dominant aspect of the economy of these groups. Likewise the low number of arrowheads, especially in comparison with the PPNB, might suggest that hunting was not a high priority in their subsistence pattern. One interesting point to note is that there is a marked change of site location between the PPNB sites and the 'burin sites'. PPNB sites, and also Epipaleolithic sites, are normally located on high points—on summits overlooking wadis or on small hillocks in the basalt hammada. By contrast, the 'burin sites' are almost all on basalt/wadi margins, lying on the lower slopes of east-facing hills, protected from the prevailing wind and overlooking mudflats or major wadis. This pattern is so marked that many of the 'burin sites' have been consistently reused by nomad groups up to the present day when they are still favoured as camps by the modern beduin. However, whether this choice of location reflects the adoption of a pas-

toral economy is still open to speculation until adequate faunal data become available.

Very recent work in the Azraq Basin has provided a little more evidence to support the possibility that sheep/goat pastoralism was being adopted by desert peoples towards the end of the 7th millennium. Excavations at Azraq 31, a mid-to late 7th millennium site right on the edge of the modern lake, produced evidence (Garrard *et al.* in press) showing that sheep/goat bones were present in significant numbers in an environment where they would be unlikely to exist in the wild.

Another interesting aspect of these sites has also emerged only very recently. Excavation of early Neolithic desert sites dating to the PPNB period normally reveals a fairly substantial depth of occupation deposits, including ash, charcoal and bone as well as chipped stone. Sites such as Dhuweila and Ibn el-Ghazzi in the basalt region, and Jilat 7 (Garrard *et al.* 1986) and Wadi Dhobai B (Waechter and Seton Williams 1938) in the flint steppe all have at least 50 cm of ashy soil and mixed cultural debris. This seems to be in marked contrast to the 'burin sites' where the depth of occupation is very shallow with almost no ash, charcoal or bone. Two 'burin sites', Jilat 23 and Jilat 24, have been sounded recently (Garrard *et al.* in press). The flint scatter is related in each case to roughly circular low-walled structures built of upright limestone slabs, yet careful sampling failed to reveal any trace of ashy levels either inside or outside the walls. This seems to agree with the findings at Jebel Naja, where quite extensive clearance located only one or two small hearths, despite a prolific scatter of chipped stone.

It seems possible therefore that the pattern of subsistence changed fairly substantially between the mid-7th millennium and the beginning of the 6th millennium. Sites began to be used either for shorter periods of time, or were visited less often, or the economy of the people changed in such a way that the nature of their occupation was radically altered. The virtual absence of ash seems to imply a more intermittent pattern of occupation, but the absence of bone might also imply a dependence on live animals rather than on meat. However this change was not total, as the upper levels at Dhuweila testify. Such a hunting camp, on an exposed site, with ashy occupation deposits and evidence for plant processing and the herding of domestic animals is quite different from typical 'burin sites'. As far as dating evidence goes, it seems reasonable to suppose that the upper levels at Dhuweila might have been roughly contemporary with some of the 'burin sites'. This means either that groups following separate subsistence strategies co-existed within the steppic zone, or that each site type represents a different part of the annual cycle or the overall exploitation strategy of one general group.

As further information continues to appear on Neolithic steppic adaptations, the outline presented here will be both reinforced and modified. Evidence is still thin in a number of key areas, particularly those concerned with agricultural and herding practices, but it is clear that the pattern of adaptive strategies in the steppic areas during the Neolithic periods is

complex, differs most markedly from that in the more fertile areas, and requires further investigation.

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