

## AN ARCHAEOLOGICAL SURVEY NEAR BIR SAFAF, EASTERN SAHARA

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Although, climatologically, the southern part of the Eastern Sahara is now best known for its extreme aridity, geomorphological and archaeological evidence indicates that this has not always been so. The area is dotted with traces of playa lakes, of spring vents, of small, essentially permanent lakes and with thousands of scattered archaeological sites which bear witness to the ubiquity of more ephemeral sources of water and vegetation (WENDORF and SCHILD, 1980; WENDORF *et al.*, 1984). Although such traces indicate an environment wetter than that of today, still the southern Eastern Sahara seems to have been more arid during the Quaternary than areas to the North, West or South (WILLIAMS and FAURE, 1980; VAN ZINDEREN BAKKER and COETZEE, 1980; PETIT-MAIRE, 1983), where large and permanent lakes and major integrated drainage-systems are known to have existed. Even a few hundred kilometres to the South in northern Sudan, there were permanent lakes and a much higher Holocene rainfall than in southern Egypt (HAYNES, 1982).

This view of the southern Eastern Sahara as long having been a particularly arid section of a very dry area began to be revised in 1981, when the space shuttle, Columbia, carried the shuttle imaging radar experiment in a southwest-northeast sweep across part of northern Sudan and southern Egypt (McCAULEY *et al.*, 1982). The radar revealed numbers of buried and hitherto unknown features, which appear to be valleys (some almost as large as the Nile Valley) and stream-channels which are integrated from major drainage-systems. One of the areas covered is to the southwest of Bir Safsaf where the radar revealed a pattern which strongly resembles a series of braided stream-channels. The age of these stream-channels, and, indeed, of the entire drainage-systems, is not firmly established but they are certainly not younger than Pleistocene and, therefore, already existed during at least some of the Pleistocene and Holocene wet periods, when the southern Eastern Sahara was occupied by people.

It was hypothesised that the existence of these drainage-systems as subterranean anomalies would have influenced the distribution of ground-water during wet periods: being more permeable than the surrounding and relatively undisturbed deposits, they would most probably tend to collect water. This greater concentration of ground-water would have been reflected on the surface by the occurrence of vegetation, principally *Tamarix* and *Acacia* trees whose roots may go down as far as 10 m (*Tamarix*) or even 20 m (*Acacia*) in search of moisture (L. BOULOS, *pers. comm.*). The presence of these trees would indicate to human groups in the area the occurrence of significant amount of sub-surface water, which, combined with the greater local concentrations of plant and animal resources, would encourage them to settle in the vicinity. The area of the old braided stream-channels might therefore be marked by corresponding patterns in the distribution of later Pleistocene and Holocene human settlements.

To test this hypothesis, an archaeological survey was carried out in the area of the braided channels in January of 1984.

The northernmost corner of the survey-grid established over the channel-area was 15 km to the W of Bir Safsaf; the base-line extended southwestwards from this point.

Altogether, 13 passes were made across the survey-area in parallel northwest-southeast tracks, giving a total area covered of 6 × 15 km and a total linear distance of 195 km. Over 200 archaeological sites were located, all of them small and almost all of them Middle or Late Neolithic (*ca.* 7,500-5,000 B.P.), but with a few Lower Palaeolithic (0.2 mya) and one Early Neolithic (8,500-8,200 B.P.) occurrence.

### TERRAIN AND SITE DISTRIBUTION

Most of the survey-area is flat sand-sheet but there is some variation. The northwestern 4-5 km are

undulating, because of a series of long sand-ridges, running approximately northeast-southwest. These are thus very similar in direction to the underlying braided channels, but neither the ridges nor the depressions between them are unbroken. If the channels played any role in the formation of the ridges and depressions, the precise nature of that role remains, for the moment, elusive. Between the ridges are elongated (northeast-southwest) depressions, often flooded by a calcium carbonate crust. A brief excursion some 3 km northwest to the base-line showed that more ridges and depressions occurred in that direction.

To the southeast of the ridges, the survey-area is an absolutely flat and featureless (save for rare tamarisk mounds) sand-sheet for 5-6 km. In the southeastern 4-5 km of the area, however, the sand-sheet begins to be interrupted by outcrops of Nubian sandstone. These are small and low and tend to occur in broken northeast-southwest alignments. More such outcrops were visible beyond the survey-area but were not visited.

The archaeological sites tend to be concentrated in two bands across the area, at the northwestern end and at the southeastern end. Sites of two periods are associated with the ridges and depressions at the northwestern end: Lower Palaeolithic and Neolithic. Lower Palaeolithic artefacts (Acheulean handaxes and flakes) occur on top of the carbonate crust in the bottoms of most of the depressions. They are all extremely aeolised, some are hardly recognisable and others undoubtedly were not recognisable, indicating a very long period of exposure on the surface, and all have dropped onto the carbonate crust. The crust is therefore earlier than the end of the Acheulean.

Middle or Late Neolithic sites occur along the northern (north-facing) slopes of the sand-ridges (which are also the southern slopes of the depressions). Neolithic artefacts also occur in the bottoms of the depressions in relatively fresh condition, although those on the actual carbonate crusts tend to be more weathered. The single Early Neolithic sites (8,500-8,200 B.P.) also was found on the northern slope of a sandridge. This distribution of *in situ* or only recently exposed Neolithic sites suggests that the modern topography of discontinuous elongated ridges and depressions has changed little since the Early Holocene.

Sites on the flat sand-sheet are very rare and very small and all are Middle or Late Neolithic.

The second concentration of Neolithic sites is at the southeastern end of the survey-area, associated with the Nubia sandstone outcrops. Here are relatively large numbers and clusters of hearths and artefact-scatters, almost always along the southeastern edge of the northeast-southwest alignments of outcrops, or along the southwestern edge where

the alignments are broken. There is occasionally a general and very thin scatter of artefacts among the outcrops themselves, but recognisable « sites » tend to be outside the immediate sandstone area.

#### TYPES OF ARCHAEOLOGICAL SITES

The Lower Palaeolithic is represented only by isolated and extremely aeolised artefacts. The local surface morphology has been radically altered since the Middle Pleistocene and any essentially *in situ* Lower Palaeolithic sites are now buried and remain undetected.

The Neolithic occurrences are almost all rather small and poor in artefacts, but there is considerable variation among them. The two basic varieties are hearths and artefact-scatters.

#### CONCLUSIONS

The range of artefacts and, specially, of types of retouched tools from almost all sites is so limited as to appear rather undiagnostic. We believe, however, that almost all of the sites can be assigned to the Middle or Late Neolithic for the following reasons. The recognisably Lower Palaeolithic finds are all very aeolised. In general, the flake-assemblages differ in technology from Middle Palaeolithic (there is no use of the Levallois technique and no platform-faceting) and no assemblage has any specifically Middle Palaeolithic characteristics. The overall rarity of bladelets (and total lack, except for one site, of tools on bladelets) argues against Early Neolithic. Indeed, the discovery of one indisputable Early Neolithic site, with a full range of bladelet-tools and even microburins, suggests that their absence elsewhere cannot be totally ascribed to deflation and differential destruction, especially since numbers of the sites from the plateau above the Kiseiba Scarp have yielded radiocarbon dates in the Middle-to-Late Neolithic range, as well as occasional diagnostic artefact-types (CONNOR, 1983). We are unable, however, to distinguish between Middle and Late Neolithic, except for the half-dozen occurrences where we observed invasive, bifacial flaking, which is characteristic of the Late Neolithic.

All of the sites represent short-term camps, most of them by very small groups. We suspect, but cannot document, that at least most of them were overnight (possibly longer) stops by small groups of pastoralists accompanying herds of cattle or sheep/goat. In this context, the virtual absence of Early Neolithic sites may be significant. Cattle were the only domestic animals known in the Early Neolithic; sheep or goats were known in the Late Neolithic and may have been introduced during the Middle

Neolithic (GAUTIER, 1980). Cattle are rather thirsty animals, requiring relatively succulent vegetation and water at least every other day (STENNING, 1959). Sheep and goat, on the other hand, can tolerate much drier conditions. The presence of only one identifiable Early Neolithic site in the survey-area indicates that cattle were not herded there during that period; we know that early Neolithic cattle-herders ranged far afield in their search for pasturage (WENDORF *et al.*, 1984), so the area southwest of Bir Safsaf was presumably too dry. Since the climate was drier during the Middle and Late Neolithic than it had been during the Early Neolithic, the area would have remained too dry for cattle during the later periods and the herd-animals were almost certainly sheep or goats. Unfortunately, faunal remains were very rare except for fragment of ostrich eggshell (presumably broken water-bottles) and one almost complete mandible of *Gazella dorcas* (A. GAUTIER, *pers. comm.*). The gazelle was hunted but this does not contradict the « pasto-

ralist » hypothesis, since herding does not preclude hunting, while hunting as the sole activity represented is precluded by the sheer density of sites in the area.

The elongated depressions in the northwestern area may have concentrated water (and vegetation) during and after the rainy season, hence their attraction to human-settlement. The attractions of the area of Nubia sandstone outcrops seem to be that it provided sandstone with which hearths could be built (they are far more common than elsewhere), and, secondarily, some shelter from the wind; hence the location of sites on the southern edges of the outcrops. Water (and, again, vegetation) may also have tended to concentrate in the areas between the outcrops.

While the braided channels may have had some effect on settlement-patterns during the earlier periods (the aeolised, Lower Palaeolithic artefacts seem to be strongly associated with the channel-area), the effect had apparently ceased to obtain by the onset of the Holocene.

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