elephant, rhinoceros, an equine (*Equus mauritanicus*), aurochs, gnu, *Bubalis*, gazelle and barbary sheep. The site is generally considered to be of early Upper Pleistocene age, but there is no precise dating evidence.

At the southern fringes of the area, comprehensive systematic collections of Acheulian material have recently been made at *Adrar Bous* in Niger, and are in course of analysis by J. D. Clark and co-workers. Other major sites have been located by Biberson all along the foot of the *Mauritanian Adrar*. Further east are other famous sites, such as those of the *Fezzan* (Libya) and of *Tihodaine* (Algeria), but as yet researches have largely been of a reconnaissance nature.

THE NILE VALLEY AND ADJOINING DESERT OASES

The Nile Valley forms a corridor of lush vegetation and water resources that cuts across the eastern end of the Saharan arid zone. On either side lies desert country, but to the east of the river valley there is a series of vast topographic hollows that dip down below the regional watertable thereby establishing oases. The most famous of these are the Fayoum, Kharga, Dakhla and Bir Sahara. Both the Nile and the oases have yielded evidence of early Stone Age occupation.

The Nile Valley, like most other major river valleys, contains a series of fluviatile deposits at elevations above the reach of the modern river and pioneer studies such as those of Sandford and Arkell concentrated on these. In Middle and Lower Egypt 'terraces' were recognized at altitudes of 90 m, 65 m, 48 m, 30 m, 15 m and 3 m above the modern floodplain. The three highest terraces appeared devoid of all traces of stone tools, while the next three were reported to contain several evolving stages of hand-axe industry. The lowest terrace was reported to contain only 'Levalloisian' and 'Mousterian' artifacts. Studies of the heights and the gradients of the terraces led earlier workers to attempt elaborate interpretations of relations to changing climate and fluctuating sea level. However, as in the case of many other river-terrace systems, it is now recognized that the known geological and archaeological records are very fragmentary relative to the length and complexity of the Pleistocene, so that many of the earlier interpretations must be put aside pending studies involving modern methods and a fresh approach; the earlier work has been well summarized by Alimen and by McBurney (see bibliographical essay, p. 947).

The only excavated earlier Stone Age sites yet reported from the Nile

Valley are those in the Arkin area of Nubia which were investigated by Chmielewski. At *Arkin 8*, concentrated patches of discarded artifacts were found in a thin lens of residual fluvial or colluvial deposits that lie within the shallow bed of a wadi tributary of the Nile. It has been suggested that each concentration represents a camping place, and that some of these show arrangements of stones that may have been the footings of wind-breaks. In one case a hollow is reported as a possible example of a scooped-out hut floor. Cairn-like heaps of material are also mentioned. All these suggestions of possible structures are important in view of the rarity of such traces from the earlier Stone Age; however, until more details are available the published reports of them are difficult to evaluate. The shallow depth of the deposits encasing the occurrences makes the recognition of structures a particularly difficult matter.

Some 2500 artifacts were recovered from the Arkin 8 site. These are partly made on medium-sized quartz cobbles and pebbles from gravel deposits in the area and partly on slabs of ferruginized sandstone. Smallish hand-axes of varied form are fairly numerous. There is a distinctive series of bifacial ovates – which appear to be simply oval cobbles which have been sharpened all round by the removal of flakes from both faces. There are neat polyhedral and discoid cores plus numerous flakes. The Levallois technique (see p. 239) is scarcely in evidence and flake scrapers, while present, are uncommon.

At the site of Arkin 5 other assemblages were recovered by a combination of excavation and surface collection. It is suggested that this was a quarry site and that certain hollows in the surface of the Nubian sandstone were quarry pits, later used as stone-working places. Again, the shallow depth of the deposits that mantle the occurrences is an obstacle to secure, detailed interpretation. The Arkin 5 assemblage is notable for its strong Levallois component and for a number of bifacial foliate forms that resemble 'Lupemban lances' (see chapter 4).

Although it was not recovered by excavation, mention must be made of a very large collection of a hand-axe-dominated series of stone tools from further south, namely at *Khor Abu Anga*, near Omdurman. A small wadi or gully has cut deeply into fluvial deposits. As erosion and small-scale quarrying proceeded during several years prior to 1949, Arkell collected more than a thousand artifacts most of which come from gravel layers exposed near the base of the section. Of these, 185 items were definitely *in situ*. Neatly made almond-shaped, pointed and heart-shaped forms predominate, but as at Arkin 5 there are thin foliate, 'Lupemban'-like pieces.

Wendorf (1968) grouped the Arkin occurrences, Arkell's material and various surface finds as the 'Acheulian of Khor Abu Anga type'. Apart from strong indications that the material is appreciably older than the late Pleistocene industries of Nubia, there are no data to indicate the age-span of these occurrences.

Earlier Stone Age material has been found in and around the various oasis depressions to the east of the Nile. Much of this has been recovered as surface collections and is of uncertain value for modern archaeology, but there have also been a number of important excavations.

The classic study was that carried out at Kharga Oasis by Caton-Thompson and Gardner in the years 1930–2. They recovered late Acheulian artifacts from a mound that represented the deposits of an ancient spring and from sheets of gravels interstratified with limestone tufas found along the scarps surrounding the oasis depression. The older assemblage from the spring mound contains a varied series of 370 well-made hand-axes. Cleavers were present but very rare. Other elements include a few cores and choppers and very rare flake tools. Only half as many flakes as hand-axes were found, implying either that the large tools were made elsewhere or that the water currents from the spring have swept most of the flakes away. Levallois elements are present but very rare.

The material from the gravels of the Refuf pass appears to document an Acheulian industry broadly comparable to that of the spring mound, overlain by a later industry of which the Levallois technique was a conspicuous part. Subsequent Pleistocene industries in the area were classified in the monograph as Levalloisian, Khargan, and Aterian (see chapter 4).

In recent years an international research group that includes Wendorf, Said and Schild has continued the exploration of oases and has located and excavated important additional 'late Acheulian' sites in spring mounds at Dakhla Oasis which is reported to have yielded hand-axe-dominated assemblages that are comparable to that of the Kharga springs. A 'final Acheulian' assemblage has also been excavated from a fossil spring at the edge of the Bir Sahara depression.

None of the oasis sites can be dated with any precision. They can be shown to be older than Aterian, Mousterian and so-called Levallois occurrences, the earlier stages of which can be shown to have been well beyond the range of the ^{14}C technique (i.e. > 50 000 years BP). Most workers suspect that these sites are of late Middle or early Upper Pleistocene age (i.e. 200 000–100 000 years BP), but even this is uncertain.

They clearly document at least the periodic existence of times when desert conditions were much less extreme than now, but correlation with particular palaeoclimatic episodes would be purely conjectural. It is not even known whether they correspond consistently to glacial or to interglacial times.

In prehistoric times, the Nile Valley constituted a strip of typically African plant and animal communities which reached northwards into the Mediterranean basin. It may well be that the valley was an important link in the web of Middle Pleistocene cultural interconnections; however at present the number of well-documented, well-dated archaeological assemblages is too small for one to make any direct assessment of cultural continuities. The presence in the Sudan of forms reminiscent of the Lupemban industries of equatorial Africa is a possible indicator of interconnection.

SOME GENERALIZATIONS AND INTERPRETATIONS

Site characteristics and site location

We may hope to learn something about land use and camping habits from comparative study of the settings in which sites occur. Table 3.10 provides lists of selected important African Early Stone Age sites classified according to their topographic contexts. The categories are only rather vaguely defined and, since some sites could be classified into more than one division, this has been indicated.

The predominance of sites associated with lake basins and with river-valley sedimentation is presumably largely a consequence of the fact that these topographic situations provide optimum conditions for the preservation of very ancient material. However, research has shown that even within a lake basin, the early archaeological sites often tend to be associated with stream courses. It seems very likely that there were often various advantages that encouraged early social groups to camp in the bed of a seasonal stream or on its banks: for instance, water courses are often tree-lined and provide better than usual shade as well as a range of fruiting trees; then, too, the sandy substratum of a stream bed is more comfortable for sitting and resting than most other parts of the terrain. Finally, for early humans, proximity to pools of water or to places where water-holes could be dug may well have been an important attraction. Acheulian materials also accumulated in quantity around springs such as Ternifine, Kharga Oasis, Sidi Zin and Amanzi.