The Middle Stone Age of Nigeria in its West African Context

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Cover illustration: Umaru Gol, on the road to Zenabi, 10 April 1978

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For my companions of those years
Radovan and Emilia
Subhash and Vibha
George and Marjorie

There is no aim, there is no existence of aim
There is the road, the road, the road
Ghalib (1797-1869)

And through the wide world I went,
wonders to hear
William Langland (1332-1400)
Piers Plowman

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Preface

This book has been a long time in the making. Its origins go back to the author's fieldwork in Northern Nigeria, conducted for the most part in the 1970's, when he was a staff member of the University of Ibadan. The work was supported logistically and financially by the University and also by the Nigerian Federal Department of Antiquities (now the National Commission for Museums and Monuments). Thanks go to all those involved in the fieldwork, particularly to our regular driver Bernard Njoku and to Umaru Gol, my indispensable right hand man. In the field he knew exactly what was required, he could always be relied upon, and his occasional pithy remarks on life in general always stuck in the mind. The Bisichi Jantar Mining Company, on whose leases we worked, provided help in many ways, including the provision of accommodation in their rural rest houses at Lerebi and Kalatu. Thanks go to the General Manager Mr Thomson, and to his local managers in the field, Messrs Coker and Busari. My subsequent visits to the other countries of West Africa were financed by myself, apart from three (much appreciated) small grants from the Boise Fund, the British Prehistoric Society and the Cambridge Philosophical Society, to assist me respectively in Senegal and Sierra Leone. I have always taken the view, going back to my Ph.D. days, that there is no substitute for a personal acquaintance with the countries and with the material which are the object of your study. In carrying out these visits, I had help from many colleagues and institutions. In Cameroun, I thank especially Alain Marliac, without whose friendly cooperation I could have done nothing, and also Mohammadou Eldridge, then at the museum in Garoua. Professor John Sutton kindly facilitated my visit to Ghana, and thanks go to those who helped me locate the material I needed in the Department of Archaeology storeroom, Messrs Agyei-Henaku, Adjedu, and Murey. In the Ivory Coast, I had a great deal of help from François Guédé Yodé, and I thank Professor J.P. Tastet and Robert Chenorkian for accompanying me to Anyama. I later had the opportunity to discuss the Sangoan industry from this site with Professor V.P. Liubin, a man whose devotion to the study of prehistory was unparalleled. My visit to the diamond mines of Sierra Leone would have been impossible but for the assistance of all the staff of the NDMC, particularly Professor Victor Strasser-King, Messrs Koroma and Mantell, and the local staff who showed me round the mining areas. I am grateful to Mrs Dorothy Cummings, then Director of the Cotton Tree Museum in Freetown, for allowing me access to the collections there. In Senegal, I was fortunate to benefit from the great kindness and hospitality of Abdoulaye Camara and his family, and our visits to some of the sites in the vicinity of Dakar were greatly facilitated by M. L. Hébrard. In Mali in 2001, I was able to join a small group led by Professor Rudolph Kuper on a visit to Ounjougou and other sites, after the PAC meeting in Bamako, when we were shown great hospitality by Eric Huysecom and his team. I subsequently was able to discuss the sequence at Ounjougou with Sylvain Soriano on the occasion of his visit to Sheffield in 2009. For many details in all these countries I am of course dependent on published literature, and also on a number of unpublished materials which I have been able to consult. Most of the photographs in this work are my own, as are the drawings, unless otherwise indicated. My drawings no doubt are far from perfect, but in executing them I have endeavoured to follow the example of the (far superior) Pierre Laurent, who was kind enough to spend some time with me in Les Eyzies, a long time ago, showing me how he did it.

The purpose of this work is fairly self-evident. It is to make known the Palaeolithic sequence in West Africa, insofar as it concerns the Middle Stone Age, in which is included the Sangoan, in the form of a monograph. The sequence in West Africa is not widely known to scholars working in other parts of the continent, so much so that it is sometimes assumed that there is no such sequence. There are many reasons for this neglect, partly because there is a scarcity of spectacular finds such as have been made elsewhere, but not least because of inadequate (or no) publication of such finds as have been made. The author is not altogether free of blame in this regard. A number of his reports concerning particular aspects have been published, relating both to Nigeria and to other countries, but some of these are in relatively inaccessible journals, and this is the first general account of the subject which he has been able to produce. Life itself got in the way, so I regret the delay, but I hope that this book will nonetheless serve its intended purpose.

Chapter 1

The Middle Stone Age in West Africa: Introduction

In order to comprehend fully the archaeology of Nigeria in particular and West Africa in general, it is necessary to have a broad understanding of the region's geography and environment, including its environmental history so far as that is possible. In addition, something should be said about the institutional framework within which archaeology has been conducted in the region, and some definitions of archaeological terminology are required. This introduction is intended to provide the necessary background on these topics, before proceeding to a detailed discussion of the archaeological evidence, in a country-by-country fashion.

Geography

Politically speaking, West Africa is generally taken to correspond to the 15 countries now grouped together as ECOWAS (Economic Community of West African States). This comprises the former British colonies of Gambia, Ghana, Sierra Leone, and Nigeria, the former states of French West Africa (except for Mauritania), Liberia, Cape Verde, and Guinea-Bissau (Rochebrune and Sablayrolles, 2000). For the purposes of this work, Cameroun and Chad (formerly part of French Equatorial Africa) are also included, since so far as prehistory is concerned, they have close links to the countries to their west. The current boundaries of all these countries are shown in the map at Figure 1.

The map at Figure 2 shows the physical geography of the region. Here as in the other maps the northern boundary is taken to be the Tropic of Cancer (23.5° N). For the most part, as remarked by Harrison Church (1963), the land lies between 600 and 1600 feet (or about 200-500 metres) and constitutes a 'worn monotonous and fairly level surface'. Notable areas of higher relief include the Fouta Djalon and Guinea Highlands, the Jos Plateau, the Adamawa, Bamenda, and Cameroun Highlands, and, in the north, the high massifs of the Aïr Mountains and the Adrar des Iforas. A number of important rivers flow through the region, most notable the river Niger, which is some 2600 miles (or about 4000 km) long. The Upper Niger was not originally connected with the Lower Niger, but joined it in the Quaternary thanks to a considerable flow of water down the course of the Tilemsi and the partial silting up of the Araouane Lake. The Inland Delta on the Upper Niger is still a reminder of this former lake. Other important water courses include the Senegal, Volta, and Benue rivers, as well as the Chari which drains into Lake Chad. Nonetheless, as Harrison Church (1963) puts it, neither the areas of higher land nor the rivers 'do much to upset the [north-south] zonal arrangement of climatic and vegetational belts' which are such a characteristic and dominant feature of the West African landscape.

Geology and Geomorphology

The present physical geography of the region evidently reflects its underlying geology to a considerable extent. The geological map at Figure 3 is based upon the 'esquisse structurale' produced by Furon and his colleagues in 1958, as well as the book by Furon himself (Furon *et al.*, 1958; Furon, 1963).

Some of the details may well have been subject to revision in the meantime (Schlüter, 2006) but in its general lines this map is perfectly adequate for our purposes. Attention may be drawn to some outstanding features of the map, as follows. In the first place, it is obvious that Pre-Cambrian rocks are widespread, occupying about one third of the whole area. They are folded in places, often in a north-east to south-west direction, as in the case of the Atacora anticline. Palaeozoic deposits are also widely present, notably in Ghana (where the Voltaian Supergroup is alternatively regarded as Proterozoic), in southern Mali and in Guinea, as well as further north where they form part of the Taoudéni syncline (one of the largest such features in the world). The Benue Trough contains marine Cretaceous sediments, which also occur west of the Adrar des Iforas, both witnessing an extensive marine transgression which

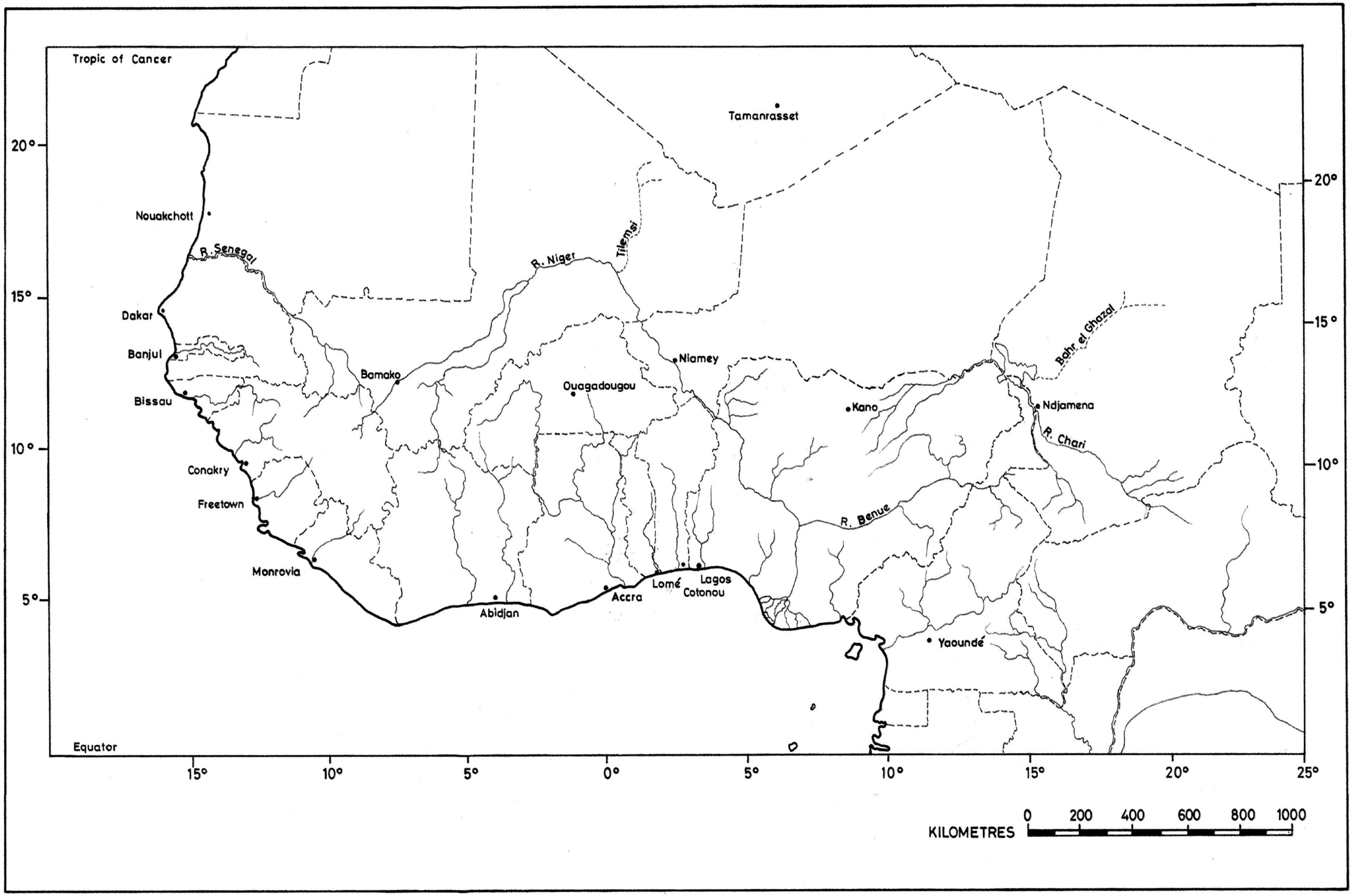

Figure 1. West Africa: Political boundaries.

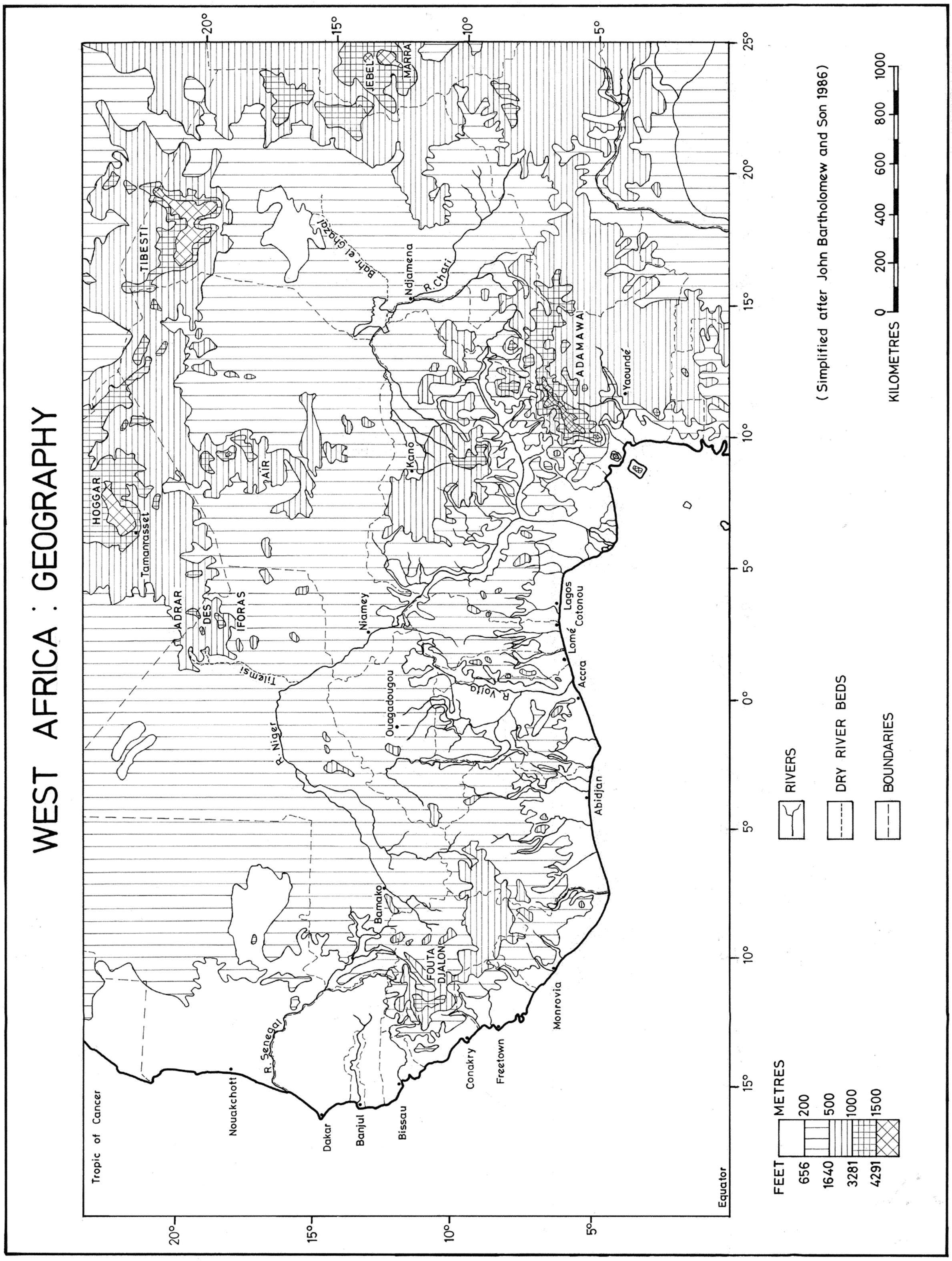

Figure 2. West Africa: Geographical features.

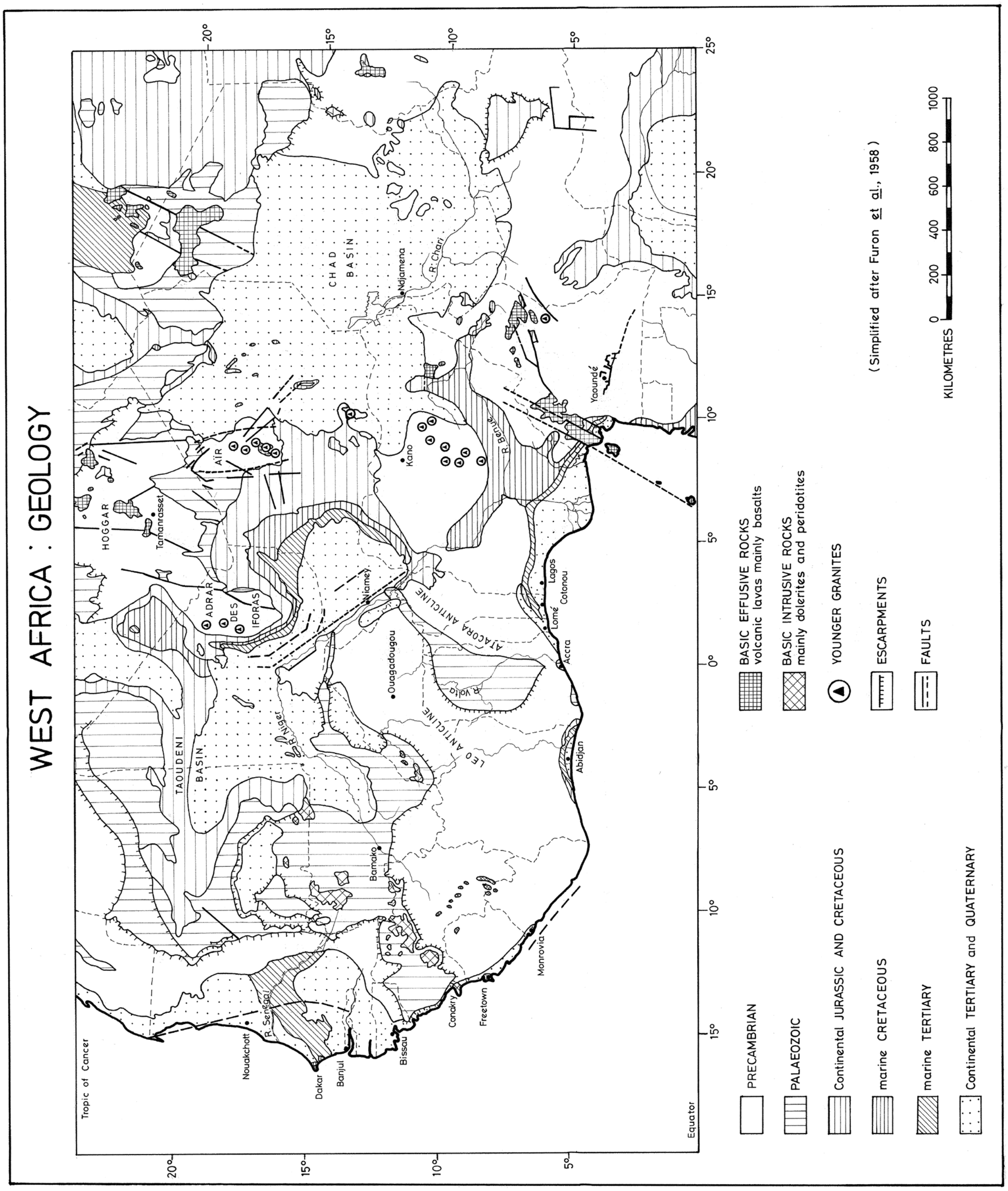

Figure 3. West Africa: Geology.

once formed a ‘Saharan sea’ (Furon, 1963, Fig. 1) connected with the Tethys ocean in the area of what is now the Mediterranean. About 1000 km long, the Trough also forms part of a broader Central African Rift system. The Tertiary and Quaternary sediments are of more direct concern to us. In general (apart from an important occurrence around Thiès in Senegal) they are of Continental origin. In addition to significant coastal presence (notably in Senegal, the Ivory Coast, and the Niger delta), the large areas of such deposits in the once vast Chad basin, and to a lesser extent along the upper Niger, are of obvious importance. Igneous rocks (both extrusive and intrusive) are also of major importance, particularly in the area of the Cameroun Highlands, where there is an impressive system of faults (Furon, 1963, Fig. 21). The system extends out to sea, as far as São Tomé and Príncipe. Finally, clearly marked on the map, are the Younger Granite volcanic occurrences in the area around the Jos Plateau, in the Aïr, and the Adrar des Iforas. They are of particular significance in relation to the Nigerian MSA, and they will be referred to in detail later. Indispensable works of reference for interpreting the landforms which developed in this environment are provided by Thomas (1974) and Tricart (1972), including the sometimes tricky question of the equivalence (or non-equivalence) of the respective terms in English and French.

Vegetation and Climate

A classic account of the vegetation of Nigeria was written by R.W.J. Keay (1965, 3rd edition) and in this case it may provide a suitable starting point for a consideration of the vegetation of West Africa as a whole. A simplified version of Keay’s map is at Figure 4, and a map of the entire region is at Figure 5, the latter based upon the work of Aubréville *et al.* (1958).

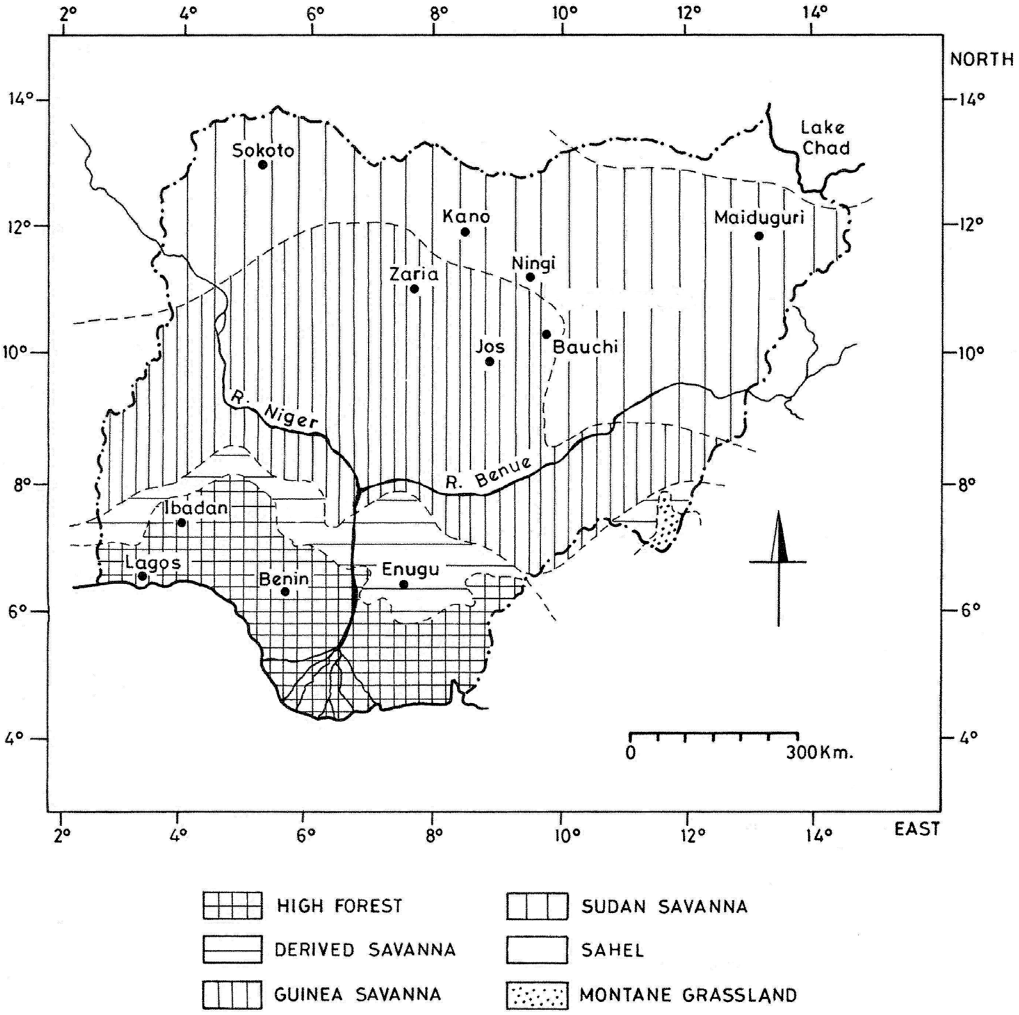

Figure 4. Vegetation zones of Nigeria (after Keay, 1965).

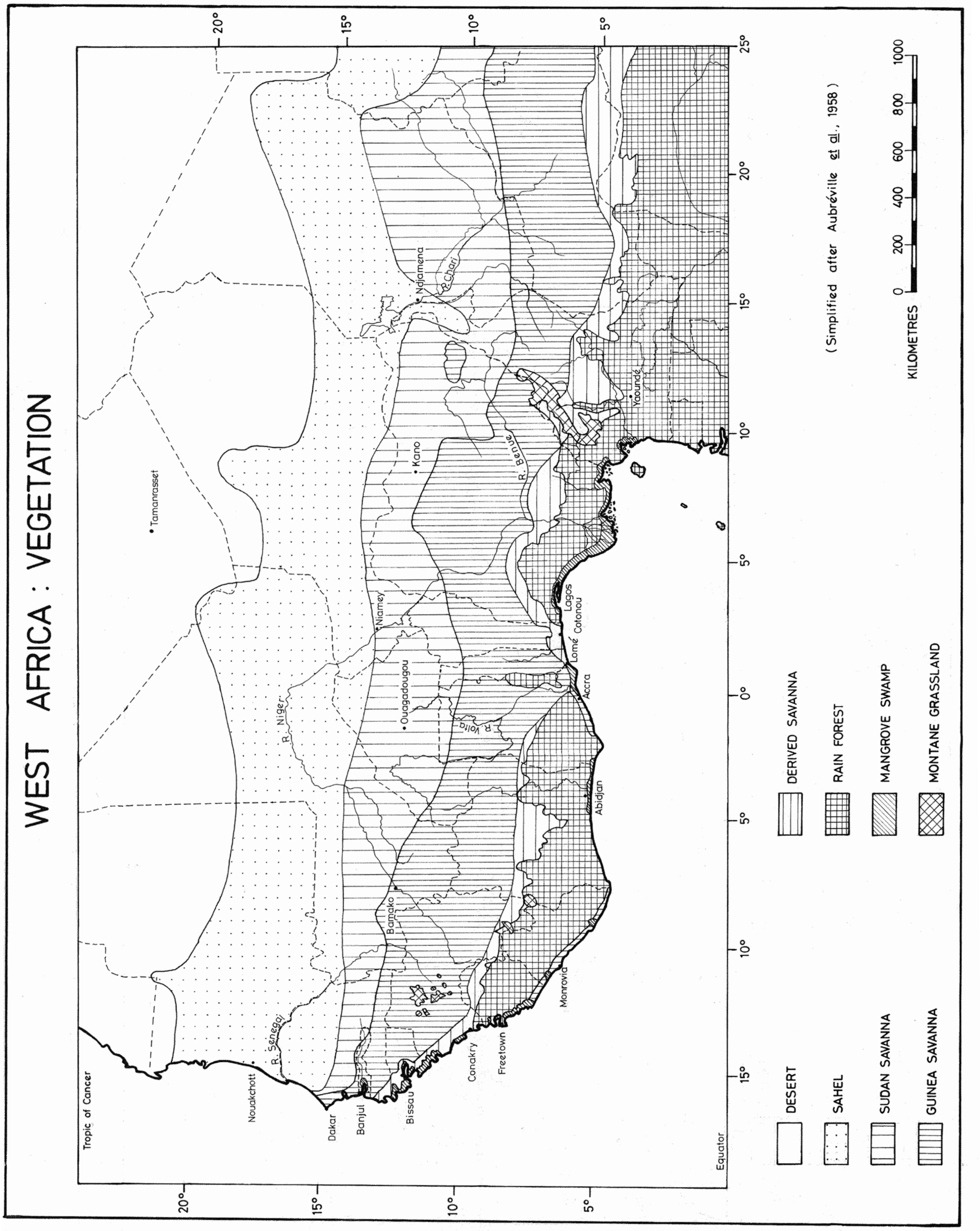

Figure 5. Vegetation zones of West Africa.

It can be seen that the broad lines of Keay's system do continue throughout the region, not surprising, since the principle of division into Sahel, Sudan and Guinea Savanna zones was already proposed by the French botanist Auguste Chevalier in 1900, and it has proved reliable. As Keay points out, the vegetation of Nigeria (and West Africa as a whole) is determined by climate, in particular by the mean annual rainfall and the severity of the dry season. Forest (High Forest or Rain Forest) is defined as vegetation dominated by woody species in open or closed canopy, from which grasses are virtually absent. Most of the trees are not fire-tolerant. Savanna has grass dominant in the field layer, but also has woody species with some degree of fire-tolerance. Derived savanna, shown as a separate zone on both maps, indicates a belt of country where, as Keay put it, 'the combined effects of native agriculture and grass fires can bring about, and indeed undoubtedly have brought about, the degradation of forest to a savanna type'. The purely climatic limit of continuous forest (ignoring the effects of degradation) is determined by two factors, a mean annual rainfall of at least 48 inches (1219 mm), and a lowest mean monthly relative humidity of not less than 70%. Mangrove (*Rhizophora*) and fresh water swamp are not indicated separately on the map of Nigeria, but they are on the map of West Africa. Keay, unlike Chevalier and other authors, divided the Guinea Savanna into a southern and a northern zone, although they have here been amalgamated into one. Clearly the northern zone is drier than the southern, and is characterised by such trees as *Isoberlinia doka*, *Isoberlinia dalzielii*, *Monotes kerstingii*, and *Uapaca togoensis*. The Sudan zone is drier still, with much of the soil being loose and sandy, and there are far more thorny plants than before, most of them species of *Acacia*. The 20 inches (508 mm) isohyet more or less marks the boundary between the Sudan and Sahel zones, with various types of *Acacia* again abundant in the Sahel. So far as Nigeria is concerned, montane vegetation is confined to a small area on the boundary with Cameroun (as well as in Cameroun itself), although as shown on the map of the entire region, it does also exist in patches in the Fouta Djalon and Guinea Highlands. The lower slopes of the mountains, up to about 6000 feet (1830 metres), are forested but thereafter the forest gives way to grassland, which is of steppe rather than savanna type. Keay is at pains to emphasise that the 'ideal' vegetation pattern has been considerably modified by human action everywhere (not only in the derived savanna) but this no doubt concerns at most the last few thousand years. Further information to supplement the above is given by Dalziel (1937), Keay *at al.* (1964), Lawson (1966), and Hopkins (1974). The broader African picture is described in detail by White (1986), which has the advantage of providing French equivalents for the relevant English terminology.

The close connection between vegetation and climate is clear from the foregoing account, but as anyone who has lived in West Africa will testify, the climatic conditions through the year (as reflected in the vegetation) are anything but static. The seasonal contrasts, in terms of average monthly rainfall, are strong (Thompson, 1975, Fig. 2). Two opposing air masses confront each other throughout the year, equatorial maritime from the south-west giving a maximum rainy season in August, and tropical continental from the north-east (the harmattan) producing a dry season which is at its strongest in January. The moving frontier between the two is the Inter-Tropical Convergence Zone. In January the position of this front is at about 5-7° N and in August it is at about 17-21° N. The rain accompanying the movement of the front is usually associated with line squalls, normally arriving from the east (Hopkins, 1974). Apart from the mean annual rainfall, its seasonal distribution is equally important. Harrison Church (1963) remarks that 4 inches (102 mm) monthly rainfall is sufficient for most plant growth. His Fig. 19 ('Number of months with at least 4 inches of rain') presents a map showing how many months in the year fulfil this requirement in the region as a whole, based on readings from 44 weather stations. The resulting measurements reveal four east-west trending bands, with respective totals of 1-3, 3-5, 5-7, and >7 months. Not surprisingly, these bands bear a close resemblance to the vegetation zones just discussed: Sahel, Sudan Savanna, Guinea Savanna, and Rain Forest respectively. These contemporary clues to the inter-connection between vegetation and climate are surely also of relevance when considering past environmental conditions.

Climatic and Environmental History

Those investigating the history and archaeology of West Africa have never doubted that its climate varied over time, but the models used or assumed to explain it have themselves been subject to drastic

Table 1. The pluvial and inter-pluvial system as assumed to exist in Africa (after Clark, 1959, Table 2).

Geological stage	Climate	Climatic stage
Recent	Present Climate 2nd Post-Pluvial Wet Phase	Present Nakuran
Epi-Pleistocene	Dry 1st Post-Pluvial Wet Phase	Makalian
Upper Pleistocene	Dry Fourth Pluvial	Gamblian
Middle Pleistocene	Very Dry Third Pluvial	Kanjeran
	Dry Second Pluvial	Kamasian
Lower Pleistocene	Very Dry First Pluvial	Kageran

change. What has been written, in particular by scholars of an earlier generation, cannot be understood (or reappraised) if these assumptions are not clearly understood. This question was addressed in a recent paper (Allsworth-Jones, 2016), so the main points only will here be summarised.

In the decades up to and after the second world war, there was a widespread assumption that, broadly speaking, pluvial (or rainy) periods in Sub-Saharan Africa corresponded to glacial episodes in the temperate northern hemisphere (Oakley, 1964: 85; Clark, 1959: 33-35, Table 2). Clark's diagram, reproduced here as Table 1, provides a handy summary.

It can be seen that the pluvial periods were divided from each other by dry or very dry phases. The names of the pluvials, as well as inter-pluvials and post-pluvials, were taken from localities in East Africa (Bishop, 1967). Thus the Gamblian or fourth pluvial corresponded to the last glacial period. It was preceded by the third inter-pluvial, or very dry period, corresponding to the last interglacial. Two wet phases of lesser intensity referred to as the first and second post-pluvials (or Makalian and Nakuran) came after the Gamblian, and were separated from it and from each other by two arid episodes. The Makalian was regarded as Epi-Pleistocene, but the Nakuran was Holocene. So far as the archaeological record is concerned, it was assumed that the Middle Stone Age in Sub-Saharan Africa corresponded chronologically to the Upper Palaeolithic in North Africa and Europe (Clark, 1970, Figure 1, Chronological table of African prehistory). Hence it was a 'laggard' and not a 'leader' (Clark, 1975). This scheme was assumed to hold good for West Africa, and it is reflected in the writings of Oliver Davies, who was concerned above all with Ghana, and in the report by Geoffrey Bond (1956), who was invited by Bernard Fagg to examine the sequences which he had identified at Zenabi and Nok in northern Nigeria. On the basis of radiocarbon dates obtained at these sites, it was suggested that 'the Middle Stone Age may have survived into the Makalian interval in this part of Africa' (Barendsen *et al*. 1957), and this was not regarded as anything unusual. The circumstances at these sites are considered in more detail below.

The idea that pluvials could provide a continent-wide standard of comparison and that they could be equated with glaciations in the northern hemisphere did not, however, survive further investigation. Karl Butzer, after a careful examination of the available evidence, came to the unequivocal conclusion that 'the African pluvial record is far too complex to serve as a basis for stratigraphic correlation' (Butzer 1971: 350-351). The classical East African pluvial chronology, and terminology, was 'based on false premises and incorrect deductions; it should therefore be abandoned entirely'. This did not mean that there were no drier and wetter phases which could be discerned in the various African regions through time, nor that correlation on geological grounds was inadmissible as such. In particular, he agreed there was good evidence for a prolonged and widespread dry episode corresponding to the last glacial period in many parts of the continent (cf. Butzer 1978: 208), and two wetter phases in the earlier part of the Holocene could be clearly discerned in the Sahara. In fact, many of the phenomena once classified as Gamblian (including the type site) could be regarded as part of this post-Pleistocene sequence of events. The idea of a 'dry phase south of the Sahara 20,000 years ago' was also championed by Burke and his colleagues (Burke *et al*. 1971, 1972). As they said, this scenario is the opposite of what was previously accepted, and it is of particular relevance in West Africa, where for example there is clear evidence that the lower valley of the Senegal river was blocked by great dunes during a time period referred to by Francophone authors as the Ogolian.

The loss of pluvials as a means of continent-wide correlation has been more than compensated for by the application of palaeomagnetism and oxygen isotope analysis that together have produced a chronostratigraphy which in principle has world-wide validity (Imbrie, 1979; Smart and Frances, 1991; Lowe and Walker, 1997). Palaeomagnetic stratigraphy involves the measurement of the natural remanent magnetism of sediments or rocks. Bernhard Brunhes in 1906 and Motonori Matuyama in 1929 observed that cooling lava flows acquired a direction of magnetization parallel to the earth's magnetic field. To their surprise, the direction of some ancient lava flows showed not 'normal' but 'reversed' polarity, in other words there must have been a dramatic switch when (as it were) north became south and south became north. Subsequent work by many others showed that over the past two million years there have been at least four episodes of reversed polarity separated by periods of normality. We can reliably estimate the times of transition thanks to potassium-argon (K-Ar) and argon-argon (Ar-Ar) dating of several of the key locations. One important reversal took place about 735,000 years ago, and in honour of the first researchers this has been named the Brunhes-Matuyama boundary. Several archaeological sites in East Africa, where volcanic eruptions were frequent, have been dated in this way. Signs of polarity may also be detected in the sediments of marine cores, and in this way it acts as a vital adjunct to oxygen isotope analysis.

There are two main isotopes of oxygen, ^{18}O and ^{16}O, the former being heavier (as well as less abundant) than the latter. Both occur in marine cores, in differing frequencies, since they were incorporated into the shells of foraminifera, and these in turn reflected the ratios of the two isotopes which were prevalent in the sea water at the time. Nicholas Shackleton and his colleagues (following on earlier work by Emiliani) showed why the variations occurred and what they meant in terms of Pleistocene geochronology. They showed that a mechanism was at work which reflected the alternation of glacial and interglacial events. The lighter isotope ^{16}O is more easily picked up by evaporation, and during colder periods it tended to be precipitated and then trapped in the extended glaciers. During warmer periods when the ice sheets melted the ^{16}O would be returned to the oceans. Thus, during the cold periods the oceans were isotopically 'heavier' and in the warm periods they were isotopically 'lighter'. This was demonstrated by Shackleton and Opdyke (1973) on the basis of Pacific core V28-238, which also had palaeomagnetic evidence showing the Brunhes-Matuyama boundary. The ratios of the two isotopes are measured not in absolute terms but as relative deviations ($\delta^{18}O$ per mil) from a laboratory standard value. A succession of peaks and troughs were detected, and these were labelled Oxygen Isotope Stages

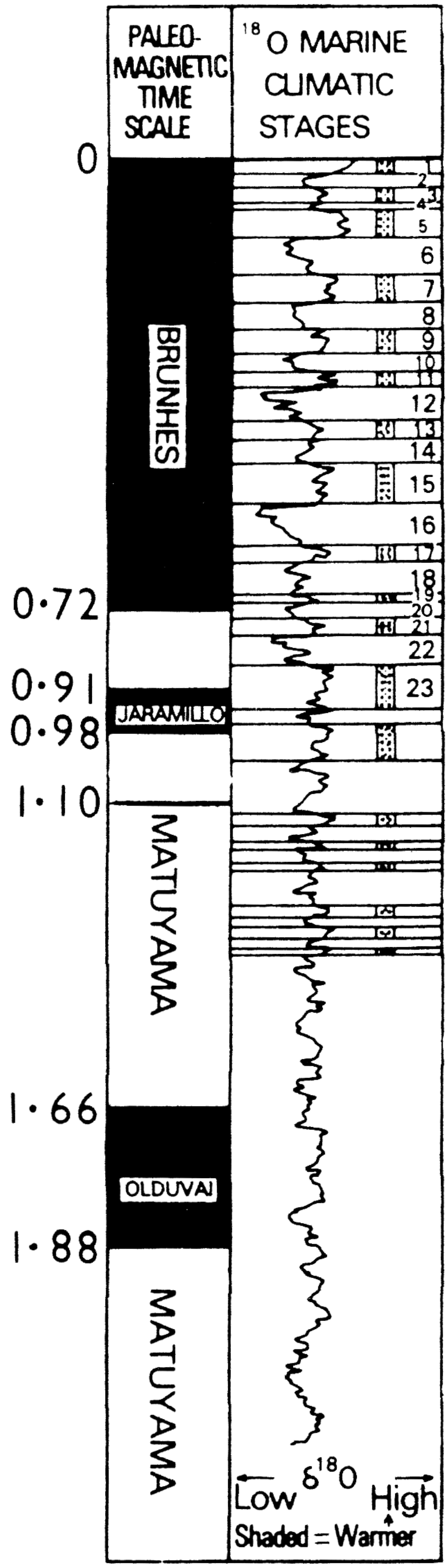

Figure 6. Oxygen isotope stages and the palaeomagnetic time scale (after Smart and Frances, 1991, Fig. 9.1).

1-22, up to and beyond the Brunhes-Matuyama boundary, where the odd numbers correspond to warmer periods and the even numbers to colder ones. The authors concluded (Shackleton and Opdyke, 1973: 48) that their scheme was sound, inasmuch as it depended on ‘a phenomenon, isotopic change in the oceans, that must occur essentially synchronously’. ‘It is highly unlikely that any superior stratigraphic subdivision of the Pleistocene will ever emerge. We propose that the stages set up in this core be adopted as standard for the latter half of the Pleistocene’. This is how it has turned out to be. The oxygen isotope curve was later extended further back into the Pleistocene, and this, together with a comparison to the palaeomagnetic time scale, is shown in Figure 6 (Smart and Frances, 1991, Fig. 9.1). It has also been demonstrated that the regularities observed in such diagrams can be correlated with long-term changes in the earth’s axis and its orbit around the sun, thus vindicating the general theory advanced in the early years of the 20th century by Milutin Milankovitch (Imbrie, 1979).

In the following account, the evidence currently available for dating the MSA and Sangoan sites in West Africa will be summarised and assessed, but for the moment we are concerned only with the climatic and environmental aspect. The impact made by the study of marine cores, and the importance of movement in the Inter-Tropical Convergence Zone, may be illustrated by reference to the sequence of events now established for the end of the Pleistocene and the beginning of the Holocene in the region. Thurstan Shaw, in his study of the LSA at Iwo Eleru in the south of Nigeria (7° 26’ N 5° 7’ E) had proposed that its occupation began in savanna conditions and persisted in a forested environment (Shaw and Daniels, 1984; Allsworth-Jones *et al*., 2010). The uncalibrated radiocarbon dates for the occupation of the cave range from 11,200±200 to 3465±65 BP, marking a change from an aceramic to a ceramic way of life. The results of the marine core studies and the climatic reconstructions based upon them bear out the accuracy of his hypothesis. Thus, deMenocal and his colleagues have established a framework for the nature and longevity of what they term the African Humid Period, which followed the end of the Pleistocene, on the basis of the marine core at ODP site 658C off Cap Blanc, Mauritania (deMenocal *et al*., 2000). Humid conditions initially commenced about 14,800 years ago, with the main episode of the AHP occurring between about 9,000 and 5,500 years ago. It is likely that during the preceding Late Glacial Maximum (equivalent as we have seen to the Ogolian) the southern boundary of the Sahara may have been situated at about 14°N, whereas in the early Holocene the northern boundary of the forest may have reached as far as 10-12°N (Dupont *et al*., 2000). Lézine and Cazet (2005, Fig. 5) have proposed a step-wise model for the northward expansion of the forest in West Africa during the AHP, extending from about 11,600 to 9,300 years ago. There was a similarly uneven retreat at the end of the period. There is some disagreement about the extent to which the forest was reduced to fragments along the coast during the LGM, but the principle of its expansion is not in doubt. The advance of the forest in the AHP was mirrored by a rise in lake levels, including Lake Chad (Leblanc *et al*., 2006). The lake may have begun to fill as far back as 10,160±160 BP and may not finally have begun to retreat until 3,000±110 BP. It is estimated that it will have been at its maximum extent between about 7,700 and 5,500 BP, i.e., about 8,500 to 6,300 years ago, when calibrated. Lake Mega Chad therefore constitutes one of the most convincing cases demonstrating an early Holocene climatic optimum, and an eventual decline to conditions more resembling those of the present.

This story is however now dwarfed by dramatic new evidence from Lake Bosumtwi in Southern Ghana (6° 30’ N 1° 25’ W) (Miller, 2013; Miller and Gosling, 2014). This lake occupies a 1.08±0.04 million year old meteorite impact crater 11 km in diameter. The lake itself at present is 8.5 km wide and 76 metres deep. Since the time of impact, 294 metres of sediment have accumulated in the centre of the basin. It was first investigated by Mike Talbot and his colleagues, who obtained radiocarbon dates on exposed lacustrine deposits on the shores of the lake and also on material from three cores which were put down in 1976 (Talbot, 1983; Talbot and Delibrias, 1980; Talbot *et al*., 1984). The longest of these cores was 17 metres, and a succession of lake level and vegetational changes was plotted, going back for 27,500 years (Talbot, 1983, Fig. 1). Two marked Holocene regressions were observed, but the main regression occurred prior to 12,500 BP, during which time the vegetation in the area of the lake was characterised as wooded grassland of montane character. In 2004, further cores were put down as part of an International Continental Drilling Program, this time extending to the full depth of the deposits, and a much longer record of

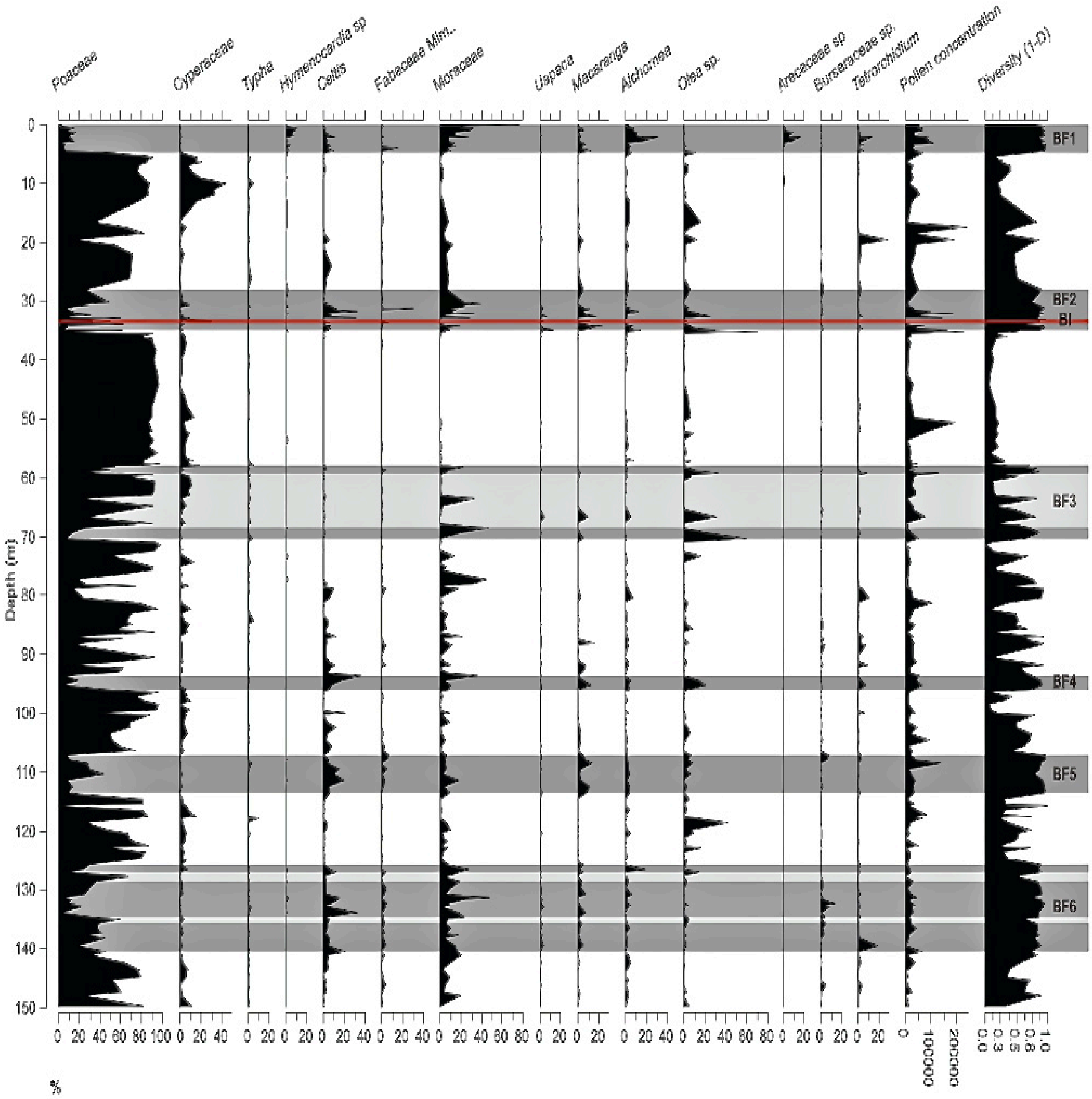

Figure 7. Palynological and stratigraphic record at lake Bosumtwi (after Miller and Gosling, 2014, Fig. 2).

climatic change has been obtained, particularly on the basis of core BOS04-5B. The results so far have been summarised in Charlotte Miller's thesis, where particular attention is paid to the fossil pollen record (Miller, 2013). 135 new dates (most of them radiocarbon) were obtained for this core, and a chronology for the last 520,000 years has been estimated based on a linear interpolation between the radiocarbon dates and an Ar-Ar date on impact glass at the base. The sequence thus established extends through 150 metres of sediment (Miller and Gosling, 2014, Fig. 2) (shown here as Figure 7).

With 216 pollen taxa identified to at least the family level, this is said to be the 'longest terrestrial pollen record' so far obtained in Africa. According to Miller, grass pollen was the dominant component throughout, but there were six prolonged periods of forest expansion, which on the basis of comparison to marine cores are equated with interglacial episodes. In the diagram, the Bosumtwi forest zones (BF) are shown as dark and pale grey horizontal bars. Bosumtwi forest zone 1 (BF1) is equated with the Holocene and BF2 (at a depth of 35.85 to 28 metres) with the last interglacial period (oxygen isotope stage 5e). There are two optically stimulated luminescence (OSL) dates from core 5B for this episode of

112,415±8010 and 78,620±5590 BP. Not that everything is completely straightforward. During this episode, as expected in terms of the model, grass pollen drops from 61 to 5.6% and there is a corresponding rise in woodland taxa. Nonetheless, there are also indications that this long wet period was interrupted by a 'megadrought' when the lake was completely dry, as indicated by the red bar showing a barren interval (BI) at the appropriate point in the diagram. What is clear in general is that we now have a reliable standard of comparison covering much of the Quaternary in West Africa, which is as good as any elsewhere on the continent. What is still missing is a direct link between this sequence and the archaeological record.

Archaeological perspectives

This work concerns both the Middle Stone Age (MSA) and the Sangoan, the latter because so far as West Africa is concerned, its occurrences, when stratigraphically verified, bear a close relationship to the MSA, and in one way or another it has long been assumed (rightly or wrongly) that it was somehow intermediate between the Acheulean and the Middle Stone Age. Both expressions require definition. The term MSA was originally proposed by Goodwin on the basis of the archaeological materials then known in South Africa (Goodwin, 1928). Typologically, it was said to be characterised by scrapers and points, but the two essential elements in Goodwin's definition were technological: the frequent presence of flakes with facetted butts, and 'a tendency to convergent rather than parallel flaking' on the dorsal surface of the flakes. From the first, there were elements of comparison between the MSA and the Middle Palaeolithic of Europe, the Near East, and North Africa, since, following Burkitt's suggestion, Goodwin accepted that it showed 'strong Mousterian influence'. As mentioned already, it was once assumed that the MSA was contemporary with the Upper Palaeolithic in Europe, but, irrespective of that, I long ago came to the conclusion – on the basis of the material from Nigeria and Cameroun – that 'at a techno-complex level, making allowance for lesser taxonomic differences, Middle Palaeolithic and MSA are really identical' (Allsworth-Jones, 1986: 166). That is not to say that the MSA is an undifferentiated whole. In relation to East Africa, J.D. Clark pointed out some time ago (1988) that the 'beginnings of regional identity' could be discerned at this time. He referred to 'a number of spatially adapted variants or facies' which in his view were closely related to different environments and habitats, as well as to such factors as raw material and available resources. It is likely that the same was true in West Africa.

The methodology here adopted for the study of these industries is based essentially on the work of François Bordes (1961, 1972: 48-54, 152-157). He prepared a list of 63 types, of which the first three were unretouched Levallois flakes and points. Generally similar but shorter lists are given here for the various sites studied. They are not exactly uniform, because they depend in some cases on material inventoried by others, and there are a number of idiosyncrasies which need to be taken into account. One particularity is the appearance of artefacts which I have referred to as *limaces*, which are especially characteristic of Zenabi, Tibchi, and Yelwa, in northern Nigeria. By *limace* (literally 'slug') is meant an 'ellipsoidal unifacial tool' (Bordes, 1972), objects described in more detail as '*racloirs convergents doubles*' typically '*épaisses et symétriques, parfois trapues et larges*' (Bordes, 1961: 23). As emphasized in the account of the Nigerian sites, the artefacts given this name are on the boundary between cores and steeply retouched tools, and probably they extend the meaning of the term beyond what was intended by Bordes, but they are unquestionably distinctive and deserve a separate appellation of some kind. To express the percentage contribution of unretouched Levallois flakes and points to any particular assemblage, Bordes suggested the use of a Levallois typological index (ILty), as distinct from a Levallois technological index (IL) which includes all Levallois blanks, whether retouched or not. Other indices can be calculated, such as (technically) the percentage contribution of facetted and dihedral platforms to the totality of all blank platforms (IFl) or (typologically) the percentage of sidescrapers (IR) in any given assemblage. These indices have been used on occasion in this work, and they can be useful in distinguishing one kind of industry from another. Bordes also suggested a number of categories of cores, among them Levallois, disc, and prismatic. The Levallois cores were actually divided into three types: flake, blade, and point (Bordes, 1961: 71-72). A Levallois flake was defined in a simple and sweeping fashion, as follows (Bordes, 1961: 14): '*éclat à forme prédéterminée par une préparation spéciale* *du nucléus avant enlèvement de cet éclat*'. For Levallois points and blades, Bordes maintained that the same principle applied, but he admitted that the preparation of the core was somewhat distinct. In the first case, its preparation permitted the production of '*un éclat triangulaire, obtenu d'un seul coup, sans retouches*'. In the second case, a series of '*longs éclats étroits*' were obtained, '*parallèles au lieu d'être centripètes*'. These definitions and distinctions have also been observed in this work.

Since Bordes's time, the Levallois concept has been further refined, notably by Eric Boëda (1990, 1994). He has emphasized the variability inherent in the concept, and in particular he has distinguished two main types, which he has termed preferential and recurrent (*récurrent*: '*série, dont chaque terme est une fonction des termes immédiatement précédents*'). The two types, as defined by Boëda, are illustrated at Figure 8.

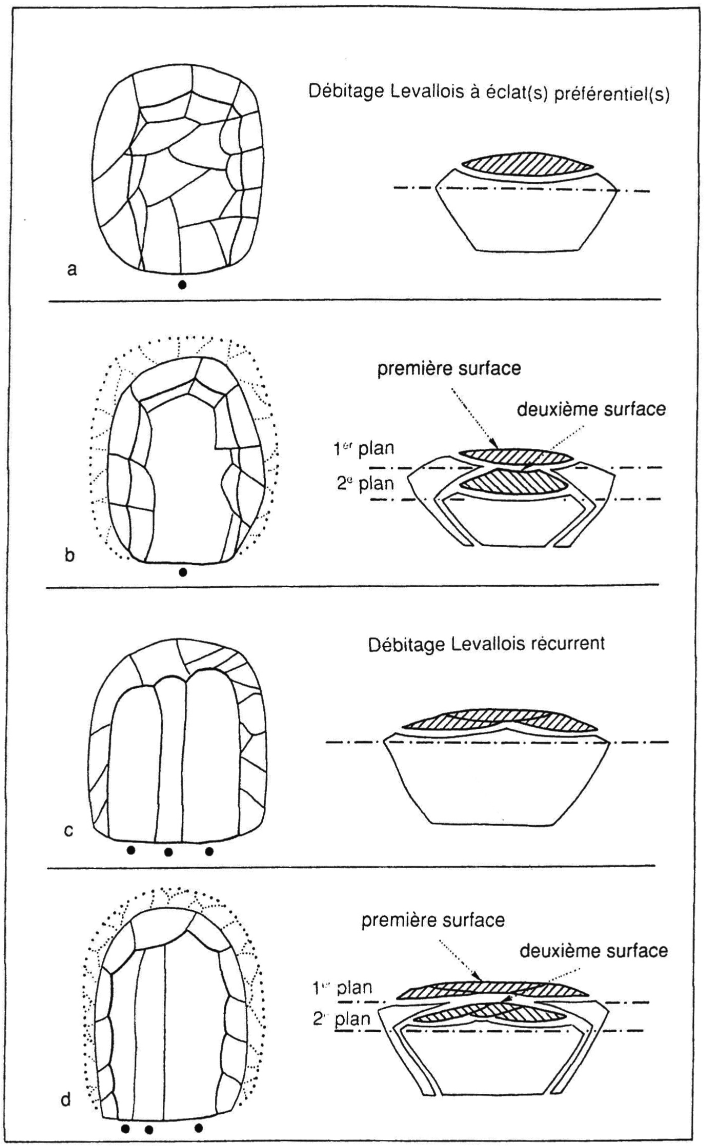

Figure 8. Preferential and recurrent Levallois techniques (after Boëda, 1994, Fig. 176).

a and b show the preferential process, a being the first removal, b the second. As Boëda points out, the second removal cannot take place without a reworking of the removal surface. c and d show the recurrent procedure, where the core is struck from one platform. Again there are two stages, the second of which requires reworking as before, but at each stage several Levallois blanks can be produced. In both cases, it is the surface which is exploited, hence the procedure is different from that characteristic of the Upper Palaeolithic - which Boëda terms volumetric - where the creation of a crested guide flake (*lame à crête*) is the starting point of the process (Boëda, 1990, Fig. 4). Specifically in the African context, further varieties of the Levallois technique have been suggested, in particular (following a proposal originally put forward by J. and G. Guichard) concerning so-called Nubian cores (Vermeersch and Van Peer, 1988; Van Peer, 1991).

These cores are illustrated at Figure 9, 1 and 2. The Nubian I method [shown at 2] enables the production of points or pointed flakes by creating a distal ridge, from a platform at the opposite end to the one which is intended for the removal of the Levallois blank. The Nubian II method [shown at 1] also achieves a central ridge, in this case by means of a series of transversal scars. In both cases the cores are approximately triangular. Figure 9, 3 and 4, shows (by contrast) a 'classic' Levallois core, and a so-called Halfan core. As originally defined by A.E. Marks, this type of core was seen as a means for the production of secondary Levallois flakes, i.e., flakes exhibiting a large negative of the first Levallois removal on their dorsal surface, although in Van Peers' view it is no more than a variant of the 'classic' method. While as the name implies, these methods are important in North-east Africa, they were so far as I am aware not employed in West Africa.

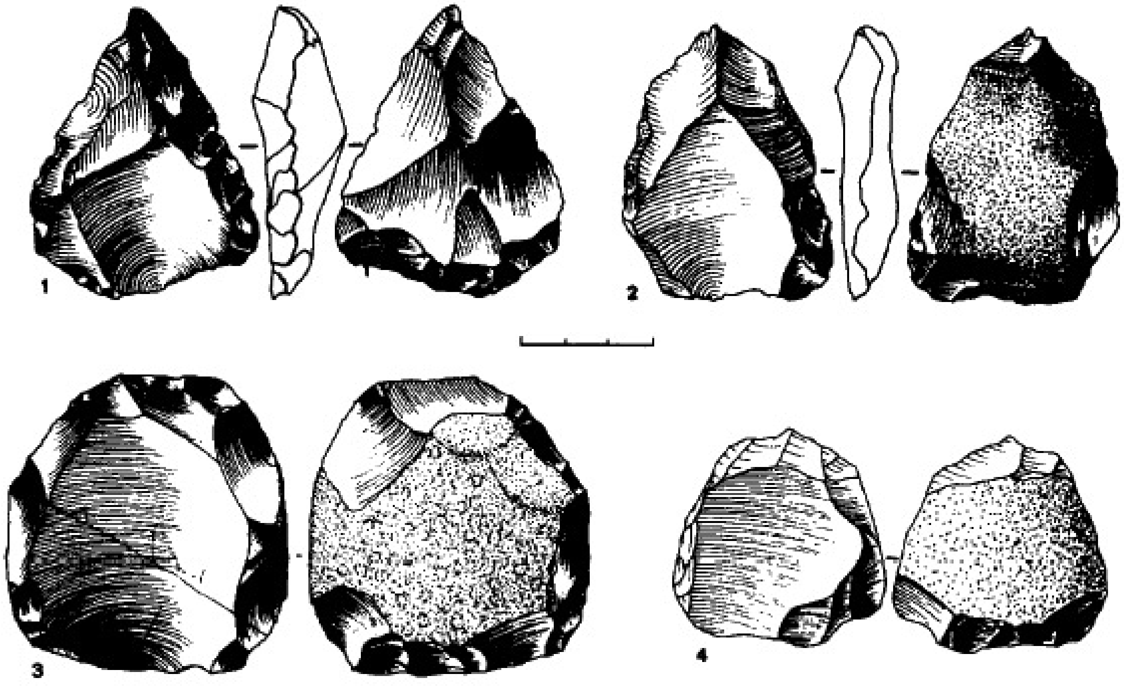

Figure 9. Nubian cores (1 and 2), 'classic' and Halfan cores (3 and 4) (after Van Peer, 1991, Fig. 3).

While the definition of the MSA might be relatively straightforward, that of the Sangoan is not. Some of the relevant points were considered before (Allsworth-Jones, 1987), so they will here be summarized as succinctly as possible. The name Sangoan comes from Sango Bay, on the west side of Lake Victoria in East Africa, where significant collections were first made on the hills above the Bay by E.J. Wayland in 1920 (Cole, 1967). Subsequently the term has been much more widely used, and it is fair to say that it has become a 'very loosely defined entity' (McBrearty, 1987). At least in the period when the fieldwork described in this volume was carried out, by this author and others, the main standards of reference were supplied by the work done by J.D. Clark in north-eastern Angola and at Kalambo Falls (Clark 1963, 1964, 1969, 1974). All the finds and sections in Angola were located as a result of diamond mining operations carried out along the river valleys of Lunda province, in various horizons of what were referred to as Kalahari Redistributed Sands. The successive archaeological entities recognized were labeled Sangoan/Lower Lupemban, Upper Lupemban, Lupembo-Tshitolian, and Tshitolian, all of which names recur in West African writings on the subject, particularly those of Oliver Davies. There were few individual collections of any size, those from Musolexi, Camafufo, and Catongula being particularly important. Two radiocarbon dates for the Sangoan/Lower Lupemban from Mufo were published, respectively 38,000±2500 BP (UCLA-168) and >34,000 BP (UCLA-169), and one for the Upper Lupemban of 14,503±560 BP (C-581) from the same locality. Clark summed up the post-Acheulean cultural development that took place in north-eastern Angola as showing 'continuing and general similarity of form which indicates that it represents a gradual autochthonous evolution' with a number of common factors binding all these cultures together (Clark 1963: 184). At Kalambo Falls the situation was better in that one had a single site and a clear stratigraphy (Clark, 1969). A number of radiocarbon dates were obtained, in the range from 46,100±3500 BP for the Sangoan Industrial Complex to 27,500±2300 BP for the Lupemban Industrial Complex (Clark, 1974, Table 10).

The methodology adopted for the study of the artefacts attributed to the Sangoan was quite different to that employed for the MSA. The broad classes were as defined by M.R. Kleindienst (1962), namely, large cutting tools (LCT), heavy duty tools (HD), and light duty tools (LD), and most of the individual artefact classes were also as defined by her, apart from those specific to the Sangoan (Clark and Kleindienst, 1974). Thus, Kleindienst (1962) originally defined picks in a rather general way as 'sturdy tools with a minimum of overall trimming, but with emphasis upon a point as such', but this definition was later made more restrictive. Clark made a clear distinction between handaxes, picks, and core-scrapers, although he admitted that in the past it had proved very difficult to describe core-scrapers adequately (Clark, 1963: 50). They were described by Kleindienst (1962) as 'high-backed tools characterized by steep trimming from a flat surface along some segment of the circumference'. Core-axes also posed a problem. According to Clark, the Sangoan core-axe was 'usually carefully worked, either bifacially or unifacially, only at one end', but 'the most evolved forms are elongated with roughly parallel sides and sometimes may have both ends retouched' (Clark, 1964: 317, plate 11). Lanceolates and other pointed forms, which 'always show a thin section and careful secondary retouch over one or both faces' (Clark, 1963: 51), were generally included among the light duty tools, although this was not invariably the case. The ambiguities and implied very broad range of material which could be included in some of these artefact classes have given rise to endless difficulties for the archaeologists working on materials which they have classified as Sangoan in West Africa. This particularly applies to Asokrochona in Ghana and to Anyama in the Ivory Coast, as discussed later in this work, but also to the less well known occurrences in Nigeria and Cameroun. The difficulties also reflect a tendency earlier remarked upon by Clark (1963: 190) 'for some prehistorians to describe any crude post-Acheulean industry of early Later Pleistocene times as Sangoan on the basis that it contains only crude and heavy elements ... ignoring the fact that the assemblage is often very incomplete'.

Institutional Framework

West Africa, so far as official languages go, was and is divided into Francophone and Anglophone countries, reflecting their colonial histories, and this division affects the way archaeology was and is conducted as well, not least in respect of the terminology employed (de Barros, 1990; Kense, 1990). French West Africa was quite centralized, and much of the research work carried out, before and after independence, was based upon the Institut Fondamental d'Afrique Noire (IFAN) in Dakar, originally founded in 1938. There were branches in other West African cities, and later universities were also created, in Dakar in 1957 and in Abidjan in 1964, but IFAN has retained a pre-eminent position. Much research work has also been carried out, in various disciplines including archaeology, thanks to French metropolitan institutions, notably the Office de la Recherche Scientifique et Technique Outre-mer (ORSTOM) created in 1943 (and now renamed the Institut de Recherche pour le Développement, or IRD). Both IFAN and ORSTOM sponsored a wide range of publications, as well as specialists in the field, such as Alain Marliac, who worked in Cameroun for many years, exclusively for ORSTOM. There was no parallel to this centralized system, or to research sponsored from the metropolis, in Anglophone West Africa, particularly Ghana and Nigeria. In both countries, independently, museums and government archaeological services were founded, but much depended on the initiative of colonial officers who persuaded their superiors of the merits of what they advocated. The University College of the Gold Coast (now the University of Ghana) in Legon was founded in 1948, and the National Museum of Ghana in 1957, at the time of independence. Thurstan Shaw actually worked, and conducted excavations, in Ghana prior to that, while based at the Achimota College. The Nigerian Antiquities Service was created in 1943, and the Jos Museum was opened in 1952 (Shaw, 1969; Njoku, 1978). Bernard Fagg, who investigated Nok and Zenabi among other sites, served as Director of Antiquities from 1957 to 1966. The University of Ibadan was founded (like Legon) in 1948, but the Archaeology Department did not come into existence until 1970, with Thurstan Shaw as its Head. The author's own fieldwork was for the most part conducted while he was a member of staff of the University of Ibadan, with financial and logistical assistance from the Department, as well as from the Federal Department of Antiquities (now the National Commission for Museums and Monuments). It could not have been done otherwise. In describing and analyzing the MSA in Nigeria and the other countries of West Africa, for the purposes of this volume, it was decided that, after an examination of the material from Nigeria itself, the other relevant sites should be examined country by country. This is not a division which has much to do with prehistory, but it has a lot to do with present day reality, including the Francophone-Anglophone division referred to above, and the way in which archaeology is conducted in those countries. A general summary will then highlight the overall picture emerging, including some recent developments which have modified quite considerably the pattern previously thought to exist.

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