INTRODUCTION

G. N. BAILEY AND P. CALLOW

The central problem addressed by the case studies in this volume is the nature of the classifications applied to the most visible material expressions of prehistoric activities – primarily stone artefacts – in terms of types and groups and subdivisions of various sorts, and the relationship of these categories and the boundaries they imply to the behaviour patterns and thought processes of prehistoric people.

For good or ill, artefacts have dominated archaeological thought, whether explicitly as the main subject matter of analysis or implicitly as the means of subdividing periods into named sub-stages which form the basic framework for discussion of more wide-ranging themes in behavioural and cultural evolution. In Stone Age archaeology the prevalence of stone artefacts in the preserved record of material culture carries both disadvantages and advantages in artefact-dominated studies. The physical constraints on the working of the primary material limit its responsiveness to the human imposition of form and restrict its sensitivity to variations in human behaviour. This same characteristic, however, also sharpens the challenge to methodological procedures and interpretive theories, and stimulates careful thought about such issues as the identification of artefact function, the meaning of stylistic attributes or the effect of discard behaviour.

Within the past two decades the drawbacks of concentrating on analyses of stone artefacts have been accentuated by four principal developments.

(1) The spread of radiometric dating methods, which has undermined if not totally eliminated the need to rely on artefact analysis as a guide to chronological correlation.

(2) Dissatisfaction with the conventional 'culture = people' hypothesis as the standard basis for interpreting variations in artefacts and assemblages, in which similarities are equated with cultural idiosyncrasies imposed by a distinct ethnic tradition, and temporal change is explained in terms of population migrations and invasions.

(3) A growing realisation that variation in stone artefact morphology and assemblage composition cannot be referred simply to cultural variation, but represents the combined output of a whole range of potential variables, including stylistic idiosyncrasies, technological constraints, availability of raw materials, functional factors, patterns of discard, post-depositional loss and sampling bias, many of which are difficult to isolate in a prehistoric context.

(4) A growing interest in social, ecological, behavioural and economic issues, and the development of new techniques for analysing subsistence data, site locations, settlement patterns, human skeletal remains and palaeoenvironments, all of which seem to bear on these issues more directly, and with less ambiguity than stone tools.

If these factors have sometimes led to a sense of disillusion about the value of stone artefact analysis, there are equally powerful arguments for reasserting its central role, not the least being the unassailable fact that stone artefacts remain the most abundant – frequently the only – source of human activity preserved in the prehistoric record.

First, ethnographic and experimental work under controlled conditions has greatly improved our understanding of such relationships as those between raw materials and artefact form, between reduction sequences and assemblage composition, and between edge-damage and artefact function, and has thus improved the prospect of isolating and controlling for the various components of artefact variation.

Secondly, as methods of analysing and interpreting other sources of data such as remains of animal bones, site distributions or palaeoenvironmental indicators have been developed, it has become apparent that these are no less ambiguous than artefacts and are equally difficult to interpret.

Finally, it has become clear that classificatory procedures applied to stone tools have a fundamental effect at all levels of analysis and interpretation of past behaviour,

often subtly imposing preconceptions about the interpretation of the past which are all the more powerful for being removed from the forefront of analysis. Even studies which are not primarily or explicitly concerned with stone tools, such as those concerned with past environments, economies or other aspects of culture and social organisation, depend to some extent on various levels of stone-tool classification. For example the subdivision of the Stone Age into conventional sub-units – Lower/Middle/Upper Palaeolithic, Mesolithic, Neolithic – based ultimately on notions about developments in stone-tool technology. Yet the boundaries created by such subdivisions easily acquire the status of established facts which are then assumed without question to indicate significant transformations in a step-wise pattern of cultural development affecting all aspects of human behaviour, while the periods between the boundaries are assumed to represent plateaux of stability or continuity. Clearly the basis for identifying such boundaries in the first place needs to be critically re-examined before any attempt is made to explain the 'changes' implied by these boundaries in behavioural and cultural terms. Thus taxonomic frameworks may impose an entirely false set of expectations about patterns of variability and long-term change or continuity, by imposing arbitrary boundaries at certain points in a morphological or temporal continuum which then become the focus of attention at the expense of others. Classificatory labels, then, are intimately bound up with concepts about past behaviour, and it is the nature of this relationship and the problems it poses, especially the problem of circumventing the subjective element derived from our own experience and imposed on the past, with which the chapters in this volume are primarily concerned.

The thirteen case studies range widely in time period and geographical focus. In terms of the conventional subdivisions, five deal with the Lower Palaeolithic, three with the Middle Palaeolithic or Middle Stone Age, six with the final stages of the Palaeolithic (Upper Palaeolithic, Mesolithic or Late Stone Age according to context), and two with ethnographic data. In terms of geographical coverage six papers deal with African topics (one North, one West and four sub-Saharan), four with Europe and three with Australia/New Guinea. Notwithstanding this variety we have resisted the temptation to group the chapters according to the conventional chronological or geographical boundaries. Apart from creating inevitable imbalances between different areas and periods, such an arrangement would have vitiated much of the overall aim of the collection to bring to light underlying issues which are common to different areas and/or time periods. A more serious objection to such an arrangement is that it would have reaffirmed existing preconceptions about the relative importance or 'progressiveness' of different areas and time periods, and thus obscured the very question of why the boundaries are drawn where they are in the first place. Instead the papers have been organised around a series of four themes which address the central problem of identifying and explaining artefact variability at successively larger scales of analysis. They begin with investigation of the fine detail of artefact variation and the problem of identifying artefact types, proceed through geographical approaches focused on some of the ecological and social correlates of artefact variation, to analyses of assemblage variation at the regional scale, and end with a discussion of the very large-scale problems raised by 'Early Man' studies and the biological, behavioural and cultural issues raised at this level of investigation.

The first theme (Part 1) concentrates on individual classes of artefacts (including prehistoric rock paintings and drawings). All the authors in this section are concerned with the problem of disentangling the various components that contribute to artefact variation at this level, and with the problem of identifying the behavioural and mental processes that lie behind the creation of archaeologically identifiable types. The chapters dealing with stone artefacts are based on modern tool-making experience, respectively experimental and ethnographic. The use of such information by archaeologists has a long history but until recently has been extremely subjective, whereas these two studies are examples of the application of more rigorous research design. This increased explicitness in framing questions about enduring problems has been one of the characteristic features of artefact studies (and indeed archaeology in general) since the 1960s, and has had as great an effect on recent thinking as entirely new methods such as use-wear analysis. A subsidiary issue brought out in all the papers is the contribution of the individual artisan to the overall pattern of variation.

Comparison of an archaeological assemblage with experimentally produced material is employed by Bradley and Sampson to isolate the effect of raw materials, knapping skill and technique. In principle, replication of reduction sequences is applicable to a wide range of archaeological situations. Yet relatively few such studies have been performed, presumably because of the difficulties involved in acquiring the necessary knapping skills. The analysis presented by Bradley and Sampson still remains one of a very few such studies in spite of the fact that the work was completed in 1976.

White and Dibble use an explicit framework to analyse ethnographic observations as an aid to generating hypotheses about archaeological data. In addition to the factors of material, skill and technology considered by Bradley and Sampson, they include as relevant variables the intended

function of artefacts and the mental templates employed by their producers. By studying the production of a single recognised category of artefact in a modern context where all these variables can in principle be controlled, they demonstrate differences in shape and size which they attribute to the operation of micro-traditions.

Clegg uses a similar analytical framework in a discussion of prehistoric art. By focusing on art he brings out an important distinction, which is equally relevant to other classes of artefacts: the distinction that should be made between 'naming', a term used by him to denote the application of a descriptor by the archaeologist to a prehistoric drawing, and 'labelling', which he uses to denote the meaning of the drawing to the artist. Thus, in analysing the drawing of, say, a kangaroo, to borrow Clegg's system of notation, one should distinguish between '!kangaroo' (name) and 'kangaroo' (label). In Clegg's view it is impossible to recover 'labelling' information, a point that he supports with ethnographic data (thereby illustrating one use of ethnographic control, as a guide to what cannot be done with archaeological data in a prehistoric context). Once this is recognised it is possible to concentrate interpretation on problems of discrimination between variations due to style, tradition, functional factors or other constraints on art production. As Clegg points out, this distinction between naming and labelling is equally relevant to other classes of artefact. A '!scraper', as recognised by the modern lithic typologist, cannot be accepted as a 'scraper' unless it can be shown that such a tool represented a formal category in its maker's conceptual framework – and it is worth noting that use-wear traces cannot of themselves establish identity as opposed to function. However, this does not prevent systematic analysis of '!scrapers' to provide information about prehistoric behavioural and mental processes. Art is amenable to analysis in the same way as other artefacts. Failure to observe the distinction between naming and labelling has resulted in art being treated in a different category from stone artefacts, and therefore being ignored as a potentially abundant source of information about prehistoric activities.

Part 2 focuses specifically on the geographical dimension in artefact variation and the ways in which this can be mapped on to spatial variation in other classes of data as an independent check on the groupings and behavioural processes suggested by the artefacts themselves. Geographical studies simply represent a dimension within which one might examine a considerable range of specific issues – taxonomic, cultural, social, ecological. The chapters in this section express something of that diversity by using studies of geographical distributions for very different purposes. Mellars and Haynes, and McBryde adopt a similar approach to the extent that they deal with the *distribution* of individual artefact types rather than with the artefacts *per se*. Mellars and Haynes map the distribution of Mesolithic flint microliths and axes against geological formations in an investigation of the influence of ecological factors on site locations and subsistence strategies. McBryde uses the distribution of ground stone axes in relation to source quarries, and ethnographic data on language distributions to analyse some of the social factors influencing the organisation of exchange networks. Davidson's chapter is concerned more with artefact assemblages and the meaning of variation between them. He examines regional distributions of Middle Palaeolithic and Upper Palaeolithic industries in Spain, in relation to palaeoenvironment and subsistence, to clarify the nature and validity of these larger taxonomic groupings. Although predominantly geographical in focus, his chapter approaches the problem of interpreting regional variations in artefact assemblages, and thus provides an introduction to issues which are taken up and expanded in the following section.

Part 3 combines a number of the techniques and approaches, analysed separately in the preceding section, and focuses on large-scale variation between artefact assemblages in a regional or continental perspective. Here the emphasis is on the ways in which *a priori* naming of entities within a cultural paradigm has influenced and even obscured behavioural processes and sources of variation stemming from, for example, raw material differences and subsistence. The chapters in this section include a strong historical element, since one of the basic issues at this level of analysis is the relationship between our current concepts and approaches and those we have inherited from our archaeological predecessors. The influence of past work is examined for each of the areas covered by the chapters and a reassessment is carried out on the basis of new data and/or theoretical developments. This section gains additional coherence from the fact that three of the contributions relate directly to Africa (Allsworth-Jones, Close and Parkington), while the fourth (by Rolland) introduces the question of African antecedents for the technology in question. Rolland and Allsworth-Jones are both concerned with variation at the 'techno-complex' level. They critically examine, respectively, the temporal boundary created by the terminological division into Lower Palaeolithic and Middle Palaeolithic, and the geographical boundary between Europe and Africa created by the division into Middle Palaeolithic and Middle Stone Age. Close and Parkington deal with the Late Stone Age in north and sub-Saharan Africa, and focus on variation at a regional scale within broadly defined techno-complex units. Among other issues considered are

the identification of variation and the impact of raw material availability and subsistence strategies on the industrial record. Developing awareness of these and similar factors has significantly altered our ideas on 'cultures' and their recognition by the prehistorian.

Part 4 deals with very large-scale and hence, necessarily, long-term patterns, and is focused on the 'Early Man' record of sub-Saharan Africa between *c.* 2 mya and 0.1 mya. Whether the apparently slow rate of change in material culture, and the evidence of biological change as a factor in developments during this early period, is a function of the relatively undeveloped state of human conceptual and cultural abilities, or whether it is simply a function of looking at behaviour over very long time-spans, consideration of the palaeontological evidence, and the implications of biological change for the course of human development, are a major issue at this scale. Accordingly, this section begins with a detailed discussion by Bilsborough of the fossil record. His review of the major theoretical issues confronting physical anthropologists, when taken in conjunction with the two succeeding chapters, demonstrates the extent to which biological and cultural studies have converged in recent years. Archaeologists and physical anthropologists alike have increasingly recognised the powerful role of semantics in constraining as well as stimulating scientific advance, and the scope for differences of interpretation engendered by sparse and/or equivocal data – though entrenched positions have been abandoned only slowly and as yet incompletely. Both fields of study have drawn on models recently developed by evolutionary biologists (and more explicitly defined than previous ones), thereby creating new opportunities for polarisation of views.

The chapters by Isaac and Gowlett are both concerned with the problem of extracting useful behavioural information from simple stone artefacts; of how to define and interpret large-scale assemblage variation such as that implied by the division into Oldowan and Acheulian categories; and of where, in a temporal continuum, one should draw the line between distinctively 'human' as opposed to 'non-human' behaviour. Although they overlap considerably in their subject matter, they represent very different approaches. Isaac addresses the development of stone tools in terms of their adaptive significance. Primate and other studies as well as experimental work are used in an investigation of the opportunities offered to hominids by behavioural innovation. Isaac's position is thus one which works forwards in time, beginning with indisputably non-human creatures and attempting to assess the extent to which a more human mentality may be inferred with the passage of time. Gowlett's approach is the reverse of this, in that he extends backwards in time the search for conceptual information carried by stone tools, as evidence of the human intelligence of their makers. He concludes that not all of the principles embodied in later industries are identifiable before 1.5 mya, but that 'there is . . . a good case for saying that we are seeing idealised morphological forms imposed on stone, even if only for practical convenience'. Yet Isaac's view is that 'the early assemblages do not involve distinct, arbitrary imposed design'. This divergence is the result of contrasting views about the significance of relatively well-defined and repeated artefact forms, and poses the question of how far the imposed form discernible in the Oldowan implies some sort of geometrical design concept, as opposed to being merely the end-product of a series of technological steps of proven adaptive benefit.

The difficulty of assessing the validity of extrapolation based on models derived from animal behaviour studies, experimentation, more recent prehistory and ethnography is perhaps at its most evident in studies of very early behaviour. All the same it is a recurring theme throughout this volume and an awareness of its importance is arguably one of the most notable developments over the past two decades.

Despite the thematic organisation of this volume, there is some tendency for successive themes to be represented by chapters dealing with periods of increasing antiquity. This ordering is largely consequent upon the resolution of detail, which is often possible in later prehistory and which permits discussion of issues whose scale is familiar to us from our own experience. Students of the more remote past, on the other hand, usually adopt a broader perspective because of the relative sparseness of sites, the vicissitudes of preservation and reduced precision in dating. However, the loss of detail is compensated by the opportunity to investigate larger-scale phenomena. While this contrast is not inconsistent, as it happens, with increase through time in technological complexity and population density, it should not be seen as lending support to a widespread and deep-lying assumption that as one moves further back in time, so human behaviour becomes more simple, more 'primitive', perhaps less important as a clue to human self-awareness; conversely, as one moves forwards in time to the modern era, so behaviour becomes more complex, more developed, more 'advanced', more relevant to modern concerns. Gowlett's plea that considerations of conceptual ability and culture should be restored to the interpretation of the earliest behaviour patterns, and that these are not simply a matter of biological or functional demands, highlights the contrast in perspectives that can come from a consideration of the long Palaeolithic record. Re-examination of the chronological and geographical frameworks within which past behaviour is

analysed should, at the very least, aid in restoring and maintaining some balance as between the study of earlier and later periods, and renew the challenge to examine critically the notion of progressive advancement with time as the dominant if implicit philosophy in studies of the human past.

1

CHARLES BRIAN MONTAGU McBURNEY (1914–1979): AN APPRECIATION

J. DESMOND CLARK AND L. PATRICK WILKINSON

With the death on 14 December 1979 of Charles McBurney, Professor of Quaternary Prehistory, British archaeology lost its foremost prehistorian of the Palaeolithic, and the Department of Archaeology at Cambridge one of its most successful and dedicated teachers. Charles will be remembered with respect and affection by the many colleagues and former students with whom he associated and whom he taught in the course of more than forty years devoted to finding out more about the biological and cultural evolution of early man. The impressive breadth and depth of his learning aided by his facility with foreign languages and his ability to impart information in an atmosphere of humour, friendliness and informality, provided a rare opportunity and introduction for those aspiring to a professional career in archaeology. In fact, the great success of the Cambridge School in training and research in the years following the Second World War was to no small degree due to the inspiration and grounding given by Charles McBurney. He was both a product of and a major contributor to the expanding horizons in Palaeolithic studies and to developing the excellence that we have come to associate with prehistoric studies at Cambridge. He was, first and foremost, a field archaeologist and his often rigorous campaigns in north Africa, Iran and western Europe were the training grounds for not a few who are leaders in the field today. The cultural sequence that he uncovered in the Haua Fteah Cave in Cyrenaica, dug between 1951 and 1955, is still the most complete and significant in the whole of North Africa, while the excavations that he directed for several seasons at La Cotte de Saint-Brelade in Jersey are providing equally significant, indeed exciting, new knowledge of early middle Palaeolithic behaviour close to the European continental ice sheet. These are but two of the highlights of an impressive publication record based on a rigid discipline of digging, recording, analysis and inspired interpretation.

Charles Brian Montagu McBurney was born on 18 June 1914, on the family farm at Stockbridge, Massachusetts. He was the son of Henry McBurney, an American engineer with a British wife, and grandson of a famous surgeon who gave his name to 'McBurney's Point', relative to the human appendix. His upbringing was peculiar: he suffered from colitis so, when he was eleven years old, his parents took him and his sister to Europe, where they divided their time between Bailey's Hotel in London, 'The Bear' at Gründelwald and the 'Trois Couronnes' at Vevey. He was educated by a series of young tutors. He was keen to meet any challenge of learning and his mother's tastes created a cultural atmosphere in which he developed a love of literature and music. Then came the financial crash of 1930. The Stockbridge home had to be sold, to Charles's great distress: he had lost his roots; but it was not until 1950 that he became a British citizen.

Fortunately, one of Charles's tutors was George Gilling-Lax, who had won a scholarship to King's College, Cambridge in 1928, and it was on his recommendation that Charles went to that college in 1933. Examination competition was less severe in those days and the College Tutor was able to back his fancy. It is doubtful whether there had been any real reason why Charles should not have gone to school, other than the protective instincts of his mother. Certainly, coming to King's was a tremendous liberation for him. Yet, for one who had never been able to have the company of his peers, it was a strain to settle down even in so easy-going a society. However, his boyish charm, his sensitivity, his puckish sense of humour, his independence of mind, his instinctive good taste, his love of music and literature, his keen intelligence and his eagerness to learn about all sorts of things combined to smooth his path. He soon made friends, while the value he set on

The personal part of this chapter is taken, by kind permission of the Council, from the Obituary by one of us (LPW) in the privately circulated Annual Report for 1980 of the Council of King's College, Cambridge. We also acknowledge information kindly provided by R. R. Inskeep, G. Ll. Isaac and D. A. Roe.

religion and, again, his love of music, made the Chapel a lasting source of inspiration to him.

Lack of systematic schooling also made it hard for him to adapt to conventional, examination-orientated studies. In French, which, of course, he spoke fluently, he got a Second and this was followed in his second year by a Third in German. Wisely, he then diverted to archaeology and anthropology, an uncle having undertaken to pay for him to have a fourth year. That year we were only some six to eight reading archaeology, but we received an unforgettable introduction to what prehistory is all about. This was the time of the new work on the Mesolithic and Neolithic in southern England and of the new discipline that Mortimer Wheeler was instilling into excavation methods and recording. We learned the difference between data and hypotheses and how to use – and, hopefully, not to misuse – both in prehistory. What is more, we were introduced to artefacts and the many ramifications behind those we were looking at as they lay on the table in Miles Burkitt's study. As one (JDC) who shared supervisions with Charles in those relatively untroubled but exciting times between the wars, it is certain that we both benefited immeasurably from the grounding we received at that time. Learning was exciting when a supervision on the Lower or Upper Palaeolithic of western Europe, on the sequence in southern Africa, on Louis Leakey's discoveries in the Kenya Highlands or at Olduvai Gorge was embellished with some of the artefacts and with personal anecdotes about the discoveries and the excavators, made all the more impressive by occasional visits from some of these pioneers in anthropology and prehistory who are now part of the history of the discipline. Among the social anthropologists, for example, were Haddon, the leader of the first ethnographic expedition to the Torres Straits; Hutton, who told us of the Naga head-hunters he had at one time administered; or Driberg, who had experienced, if not actually encouraged, a war among restless tribesmen on the upper banks of the Nile. We were privileged also to meet for the first time some of the leading archaeologists of the day – probably none quite as awe-inspiring to a young student as the Abbé Breuil – and we learned from the spring term 'outings' to gravel pits in East Anglia, or to the coast at Clacton and Walton to appreciate that artefacts without context have no place in prehistoric studies. The inspiration and discipline we absorbed from our teachers lasted a lifetime.

Charles did not get a First in the Tripos but he did well enough for the College to back its fancy and award him the Parker of Waddington Studentship for the year 1937 and the next, and he was able to enjoy, to his great profit, a year in Paris. His subject of research was ambitious: to investigate whether the earliest remains of *Homo sapiens* in western Europe evolved from those associated with Neanderthal Man. The outbreak of war disturbed everything but, yet again, the College decided that he was a good bet and he was elected to a Fellowship in 1940. In 1941 he joined the RAFVR (USA) to be trained at Medmenham, along with other prehistorians such as Grahame Clark and Glyn Daniel, in the interpretation of aerial photographs. Sent out (to his mother's alarm) to the Middle East, he thrived there both in health and in mind, and it was while serving with the RAF in the Western desert in 1942–3 that Charles first became interested in African prehistory.

Wartime service took him along the Libyan littoral over some 1,200 miles of coast from Alexandria to Tripoli. From the mostly surface finds recovered, following usually brief though sometimes more extended investigation of sites, he realised that there existed here a long and important Palaeolithic sequence which might be tied into a palaeoenvironmental context and which formed in Cyrenaica a link between the valley of the Nile and the Atlas Mountains. Some thirty sites were discovered in the course of this preliminary investigation, mostly in Cyrenaica and the Sirtican desert and they were later described in 'The Stone Age of the Libyan littoral: the results of a war-time reconnaissance' (McBurney 1947). Finds included Acheulian bifaces from both Tripolitania and Cyrenaica, followed in both regions first by a Middle Palaeolithic of Levallois-Mousterian form and later by assemblages based on the use of blades; local regional variants and more than one stage appeared to be present. Neolithic artefacts were also found and Charles resolved to return after the war to undertake a more extensive investigation.

In 1948 he received his doctorate from Cambridge on *The Prelude to the Upper Palaeolithic in Western Europe: A Comparative Study of the Earlier Industries from Cave Deposits*. His examiners were Dorothy Garrod, Gordon Childe and Alfred Barnes. Their reports on the dissertation saw promise and originality amid faults and immaturities and he was awarded the degree. The work is a critical study of the extent to which the Upper Palaeolithic blade technique might have been derived from the Middle Palaeolithic and of the origins of Modern Man relative to the neanderthalers. This problem is still very much with us and it is one that continually concerned Charles, as his subsequent publications show. He was appointed to a University Lectureship in 1952 at a time when he was actively engaged in further excavations in Libya.

North Africa and the Mediterranean

After returning to Cambridge in 1946, Charles mounted an expedition under the auspices of the Department of Archaeology and Anthropology in the summers of 1947

and 1948. The object was to investigate with Richard W. Hey, a Cambridge geologist, the region of the Gebel Akhdar and the north Cyrenaican coast and to provide a palaeoclimatic framework for relative dating of the assemblages and correlation with the succession in other parts of the Mediterranean basin. Most of the coastline between Benghazi and Derna was examined in detail and evidence from Tripolitania and Siwa Oasis (Neolithic) was also studied. The outcome was the jointly authored volume *Prehistory and Pleistocene Geology in Cyrenaican Libya* (McBurney and Hey 1955). The study showed that in prehistoric times, as it is today, the Gebel Akhdar was an isolated but relatively fertile region of Mediterranean vegetation surrounded by desert steppe, the population of which looked rather to the east – to Egypt and the Nile valley – than to the Maghreb and the west, largely no doubt because of the problems of overland movement across the Sirtican desert.

This study identified six former high sea levels and a period of lowered sea level, subsequent to the last raised marine beach, when dunes (now fossil) were accumulated at the time of the maximum of the Last Glaciation. The Middle Palaeolithic occupation of the coastal plain and the mouths of the wadis was seen to belong to the time of the last high level and the Upper Palaeolithic to the subsequent regression (McBurney *et al.* 1948). The study thus produced the first evidence from Libya for Quaternary marine fluctuations and temperature changes into which the archaeological evidence could be fitted and with which that of Europe and the Near East could be correlated.

One of the most intriguing of the sites discovered and excavated during this expedition is that of Sidi el Hajj Creiem, a primary context hunting camp/butchery site by the side of a narrow pool of water within a rocky ravine. The concentration of flint artefacts and broken bones had accumulated, it was thought, during a relatively brief period of several days only. In this short time, however, the Middle Palaeolithic hunters had been successful in butchering some five to ten Barbary Sheep, three to four zebra, two to three giant buffalo and a gazelle, not to mention a number of tortoises. Charles concluded that this group also made use of the shoreline some 6.5 km to the north, since some of the flint they used for making artefacts showed the limey tubules left by marine worms still adhering to the cortex of the stone. A conjoining study of the artefact and bone debris, if the assemblage is still available, might provide yet more information about this group of Levallois-Mousterian hunters. The Libyan volume is also noteworthy because it contains the first accounts of two succeeding Upper Palaeolithic industries that show the special nature of the Cyrenaican assemblage as compared to those from Egypt or the Maghreb. Charles's excavation at Hagfet ed Dabba (McBurney 1950a) in the Gebel Akhdar gave us our first knowledge of what he later called the Dabban but the excavations provided no indication of its age nor, for that matter, did his sounding and study of Petrocci's earlier collections from Hagfet et Tera, containing what later came to be known as the Eastern Oranian.

Charles's excavations and analyses showed both the potential of the Libyan sites for obtaining faunal evidence – the Dabban peoples, for example, concentrated on hunting the Barbary Sheep – and the need to find a site with a long, stratified and datable sequence to show the relationships of these various industrial assemblages. Besides the collections from his own excavations, Charles studied all those available from Tripolitania, which showed that a rather different cultural sequence was present there than in Cyrenaica – one that had affinities with the Aterian and the Iberomaurusian of the Maghreb. Charles's study of the sites he had found in 1942–3 in the Sirtican desert provides almost the only knowledge we have of the prehistoric assemblages there and of the specialised pre-neolithic industry with small, round-based points that call to mind (though they are not the same as) the Epipalaeolithic Bou Sāada points from the Maghreb. One of his special concerns at this time was to investigate the spread of Neolithic economy, which he believed came from Egypt to Cyrenaica and the desert oases to the south. His descriptions of finds from Siwa are the first detailed accounts of stone artefacts from the northern oases and the similarity of certain forms there to those from Egypt was noted. The volume also sets the stage for the kind of systematic studies to be undertaken later: quantitative data on assemblages are given, and much information about the economic base is provided by the analyses of plant and animal remains by Dorothea Bate and other specialists. It shows well the emphasis Charles always gave to taxonomy and well-defined classification, to looking for evidence that would show the nature of the habitat and the economic base as well as to the need for a sound relative and absolute framework for palaeoclimatic and cultural sequences.

In 1948 Charles had discovered a huge cave – the Haua Fteah – on the north side of the Gebel Akhdar and he undertook its excavation in three field seasons in 1951, 1952 and 1955, the last being a major expedition of twenty Europeans and fifteen Cyrenaicans. In Haua Fteah Charles had 'hit the jackpot' for he found there a stratified sequence of cultural horizons extending back into the time of the Last Interglacial more than 100,000 years ago and unequalled at any other site in the whole of northern Africa. With the cultural remains were recovered well-preserved faunal assemblages together with fragmentary hominid fossils and palaeotemperature and environmental evidence that provided the basis for correlation of this long and complete sequence with the climatic changes of the

later Pleistocene. By this time also the radiocarbon method of dating had been developed by Willard Libby and Charles was one of the first to make good use of it to the extent that the Haua Fteah is still the best dated continuous sequence from the northern part of the African continent.

The volume *The Haua Fteah (Cyrenaica) and the Stone Age of the South-east Mediterranean* (McBurney 1967b) is a monumental compilation and Charles's best-known and most important work. He dedicated it to Dorothy Garrod, to whom he owed a great deal in his apprentice years, describing it – too modestly – as 'an inadequate tribute' to her 'great contributions to prehistory and to many years of friendship'. For those of us who work in Africa this book is an example of thoroughness in analysis, interpretation and reporting that has rarely, if ever, been equalled. The 14 m or so of horizontally stratified deposit are not only the key to Libyan prehistory but their intermediate geographical position makes them invaluable for the aid they provide in correlating the sequences in the Maghreb with those in the Levant – two of the best explored regions of the Mediterranean basin outside western Europe. The deep (12.50 m) unsupported excavation was an achievement in itself, in that it was prevented from collapse only by divine providence, though this came close to being overstrained on the occasion when someone dropped a bucket the whole of the way from the top to the bottom of the 2 m^2 deep sounding without hitting the man working in it. While the speed with which he climbed out of the excavation is legendary, what he said to the offender is mercifully not recorded. These field seasons also showed Charles's resourcefulness in that, with limited funds and insufficient containers for the excavated finds, he used for this purpose the discarded tins from the garbage dumps left over from the war. He had an indomitable spirit also and, although he suffered severely from back trouble at Haua Fteah, he never complained. Ray Inskeep relates how, when trouble with the local headman over labour problems might have led to an ugly confrontation and some of the excavation party became decidedly nervous, Charles's response was, 'if they attack in the night, beat 'em off with pick-helves'.

The excavation produced over 500,000 artefacts of which 50,000 were retouched tools, all from sixty stratigraphic levels. The magnitude of the task of analysing all this material might well have daunted many less determined investigators. However, Charles and his students completed the task of studying the whole collection – not merely a sample from each level – and presented the results in a series of quantitative graphs and tables showing the precise nature of each assemblage and how these changed through time, throughout the accumulated sedimentary deposits. The Haua Fteah sequence was all the more important because of the chronology that Charles was able to establish by combining the evidence from several different sources. Among his collaborators he was fortunate in having Eric Higgs, Garth Sampson and C. Emiliani. Eric Higgs's faunal analysis was also important for the light it threw on the animal communities, food preferences, hunting ability and butchery practices, besides confirming the herding of sheep/goats by the Neolithic population *c.* 5000 b.c.

The Haua Fteah monograph is of unparallelled importance for African prehistorians for many reasons: it throws entirely new light on such matters as the relationship of neanderthal physical stock with the Levallois-Mousterian, on the common affinities of the Cyrenaican sequence with that from the Levant, and on the earliest date yet recorded from anywhere – as early as the Last Interglacial – at which sea foods were used, a 'first' shared with sites on the south coast of South Africa. Although new problems were also created by the study, Professor Grahame Clark in his foreword to the volume has expressed the true value of the work when he says, 'to many of the younger prehistorians working in universities and other institutions in different parts of Africa, Australia and North America, as well as nearer home, *Haua Fteah* provided an introduction to disciplined research which they will not easily forget. Of the many contributions to prehistory made by the Department of Archaeology and Anthropology at Cambridge during the past twenty years, this must surely rank as among the most valuable. I would like to recommend this book both as a massive source of entirely new information and as a most important essay in methodology reflecting credit on all concerned in its production.'

The Haua Fteah volume leaves no doubt that, at this time, Charles saw the disappearance of the 'neanderthaloid' populations and the Mousterian industries of western Europe and North Africa as being due to their abrupt replacement by Modern Man with a strikingly different material culture. Like Louis Leakey before him in the Munro Lectures at Edinburgh (Leakey 1936), Charles stresses the essential importance of the regional stratigraphic and faunal sequence and a well-established chronology as the only sure foundations for understanding the technological and behavioural changes manifest in the prehistoric record.

Charles McBurney's interest in north Africa and his knowledge of French rendered him probably the best-read English-speaking prehistorian on the subject of the French discoveries and publications on the Maghreb and the west and central Sahara. His volume *The Stone Age of Northern Africa* (McBurney 1960), the third of the Pelican overviews of the prehistory of the African continent, was therefore important for the general insight it gave into the prehistory of this vast region and how it could be corre-

lated with the record in Libya and the north-eastern parts – Egypt and the Sudan. This excellent synthesis still remains the only general introduction in the English language and is a thorough review of the evidence available at the time it was written. It also contains perceptive summaries of the changing pattern of European, Near Eastern and sub-Saharan prehistory during the Palaeolithic which serve as a backdrop, as it were, to the study of the less well known successions from northern Africa where, as he says, 'the accidents of initial discovery continue to exert an appreciable influence on the subject [prehistory] throughout the early phases of its development'. The book certainly had an effect on the course of subsequent investigations in the northern parts of the continent.

Charles McBurney did not return to Libya after the 1955 season but he maintained an active interest and continued to publish on North African prehistory and its significance within the Mediterranean world. In particular he was concerned with the origins of the Upper Palaeolithic there and of its antecedents as these relate to the North African neanderthal populations. His contribution to the *Neanderthal Centenary Volume* (McBurney 1958) demonstrates the anatomical and cultural relationships between the populations of Cyrenaica and Palestine. 'In a word, everything points to a close community between the human populations of the Gebel Akhdar and western Asia at this time.' But he goes on to suggest, because of the isolated and specialised nature of the older *Atlanthropus* stock from the Maghreb; because of the relative suddenness with which the Levallois-Mousterian appears in North Africa and the Levant; and because of the occurrence in tropical Africa of believed 'transitional' assemblages of handaxes and tools made on specialised flakes, that 'the new mutations leading to an advanced neanderthaloid type (and perhaps ultimately to *Homo sapiens*) were spreading in the tropical zone'. In view of this early prediction it would have been interesting to know what he thought about the subsequent finds of Modern Man with a 'Middle Stone Age' industry at Border Cave in Natal dating, it is thought, to between 80,000 and 90,000 years b.p. (Beaumont *et al.* 1978). So far as the replacement of the neanderthaloids by Modern Man is concerned, he saw this as the result of immigration from western Asia, an earlier migration colonizing Cyrenaica and a later one replacing the *Atlanthropus* stock in the Maghreb. Prehistorians today are less inclined to associate technological change with population changes since it can be demonstrated all too clearly that the former is possible without the latter. But, so far as Cyrenaica is concerned, Charles's contention has much to commend it.

He published five or six other papers relating to Libyan prehistory that appeared in various edited volumes. A conference at Benghazi in 1967 resulted in an excellent synthesis on the 'Libyan role in prehistory'. Another paper appeared in 1968 in *Geology and Archaeology of Northern Cyrenaica, Libya* (McBurney 1968). At the end of 1973 Charles attended a conference on 'Problems in Prehistory: North Africa and the Levant' at Southern Methodist University, Dallas. This was organised and the subsequent publication edited by Fred Wendorf and Anthony Marks. Charles's contribution was on the 'Current status of the Lower and Middle Palaeolithic of the entire region from the Levant through North Africa' – a formidable title – and task – which he tackled with his customary thoroughness and enthusiasm (McBurney 1975a). Using the important coastal succession from the Atlantic coast of Morocco as a yardstick he suggested correlations with Europe and the Near East, concluding that the Moroccan sequence was sufficiently comparable to that from certain European localities, both in chronology and technology, that there is likely to have been little or no time difference between the appearance of the 'handaxe tradition' throughout the Mediterranean basin and North Africa following the initial expansion from tropical Africa. He discusses the influence of raw material on the Lower and Middle Palaeolithic populations of tool-makers and the development of the prepared core techniques in relation to special needs, not the least of which was the need to conserve good material that was not available in the immediate vicinity of the occupation site.

Charles also took this opportunity to show how new evidence indicated that the Middle Palaeolithic (Levallois-Mousterian) had been replaced by the earliest Upper Palaeolithic blade industry (Dabban) in North Africa during the Denekamp Interstadial between 32,000 and 42,000 b.c., confirmation for the beginning of the Dabban's coming from the type-site itself. A similar time for this replacement can also be seen in the Middle East. Using palaeotemperature evidence he showed that the Levallois-Mousterian made its first appearance sometime earlier than 60,000 years ago at the end of a long period of temperate climate. Re-emphasising the 'striking analogy with the Levallois-Mousterian of Palestine', he now considered that there were 'grounds for classyfying the Palestinian and Libyan finds within a single specific taxon' with the only aberrant element being 'fairly evident traces of the Aterian' at the Haua Fteah and two other Cyrenaican sites. Because of the sparseness of the evidence he said little about the preceding 'Pre-Aurignacian' except to point to its Middle Eastern and Cyrenaican connections and to say that it now appeared that 'it can hardly be later than the Last Interglacial'. He was able to show the correlation between the 6–8 m beaches in Cyrenaica and the Levant and the Ouljian of Atlantic Morocco, dating to 80,000 years b.p. or, more probably, to *c.* 100,000 years b.p. at