RE-INVESTIGATION OF THE MATJES RIVER ROCK SHELTER

BY

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Frontispiece: Excavation and conservation at Matjes River rock shelter

Declaration

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature:

Date:

ABSTRACT

The rehabilitation of the Matjes River rock shelter on the eastern side of Plettenberg Bay, South Africa, provided an opportunity to obtain new information on the deposits. A metre wide column was excavated through six metres of shell-rich deposits at the junction of two cuttings made in the 1920s and 1950s and known as the "Apex". A small section was cut into the upper layers in the entrance area. A suite of radiocarbon dates shows the deposits to be between 6300 and 10 600 years old with a possible hiatus in deposition between 9000 and 8000 years ago. The hiatus is marked by a disconformity that separates an upper loose shelly deposit from a series of finely bedded loams. The sequence includes artefacts of the Wilton and Albany industries and the transition between these industries is dated to 7400 BP. In the relative frequencies of *Donax serra* and *Perna perna,* the shellfish remains show there was a change from a sandy to a rocky shore environment that can be accounted for by the rise of sea level in the Holocene. There is no evidence that shellfish were intensely exploited and farmed down. As observed at Nelson Bay Cave, *Choromytilus meridionalis* is more common in deposits 9000 years and older. This suggests that the low sea surface temperatures of the Late Pleistocene persisted in the beginning of the Holocene. Information obtained on the deposits is being presented in educational displays for visitors to the site.

OPSOMMING

Die rehabilitasie van die Matjesrivier rotsskuiling, geleë aan die oostelike kant van Plettenbergbaai, Suid-Afrika, het 'n goeie geleentheid verskaf om nuwe informasie te bekom oor die opeenvolging. 'n Meter wye kolom is uitgegrawe deur 6 meter van skulpryke depositos by die kruispunt van die twee uitgrawings wat gedoen is gedurende die 1920s en 1950s en wat bekendstaan as die "Apex". 'n Klein seksie is uitgegrawe in die boonste lae van die ingangsarea. 'n Reeks van radiokoolstofdaterings toon aan dat die afsetting dateer tussen 6300 en 10 600 jaar gelede met 'n moontlike breek in deposisie tussen 9000 en 8000 jaar. Hierdie breek word gemerk deur 'n onreëlmatigheid wat die boonste los skulp afsettings van 'n reeks leeme skei. Die opeenvolging sluit artefakte van die Wilton en Albany industrieë in en die oorgang tussen hiedie industrieë is gedateer tot 7400 BP. In die relatiewe frekwensies van *D. serra* en *P. perna* toon die skulpvis oorblyfsels aan dat daar 'n oorgang vanaf 'n sanderige tot rotsagtige omgewing plaasgevind het wat deur die styging van die seevlakke in die Holoseen verklaar word. Daar is geen bewyse dat skulpvis intensief geekspliofeer was nie. Soos by Nelsonbaai grot is *C. meriidionalis* meer algemeen in die depositos wat 9000 jaar en ouer is. Dit suggereer dat die laer see temperature van die Laat Pleistoseen tot aan die begin van die Holoseen geduur het. Informasie wat deur die uitgrawing bekom is word gebruik vir opvoedkundige uitstallings vir besoekers aan die vindplaas.

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CONVENTIONS

In line with other in-house research at Matjes River rock shelter the following conventions are adopted:

- Matjes River rock shelter is not abbreviated to MR.
- Middle and Later Stone Age are not abbreviated to MSA and LSA.
- Top shell midden is abbreviated to TSM.
- Lower shelly loam is abbreviated to LSL.
- Industry is written with a small i.
- Scientific names are given in full at the beginning of each chapter and are abbreviated thereafter.
- Zone as in Balanoid zone written with a small z.
- The name *Nassa* in this thesis refers to *Nassarius kraussianus*. This estuarine shellfish was use for making beads and there are references to *Nassa* beads in the archaeological literature. *Nassa* is derived from *Nassa kraussiana*, a scientific name that has been superceded.

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CHAPTER 1

INTRODUCTION

The Matjes River rock shelter, the subject of this thesis, is an east facing high overhang in a cliff overlooking the silted-up mouth of the Matjes River. This is a minor river draining the outer margin of the coastal platform and entering the sea on the eastern side of Plettenberg Bay, on the southern Cape coast. The town of Plettenberg Bay, on the opposite side of the bay, is 10 km distant and the block of private land on which the shelter is situated borders the small resort of Keurboomstrand. The National Parks Board currently manages this land and the 5 km strip of private coastal land to the east, as an extension of the Tsitsikamma National Park.

Thomas Frederick Dreyer (1888-1954), an entomologist by training held the Chair of Zoology and Geology at Grey University College (now the University of the Free State) from 1912 until his retirement in 1949 (Hoffman 1957). In 1928 he began what is referred to as a pilot excavation in the rock shelter. The shelter, 45 m above sea level, is 55 m long and not particularly wide. The drip line is only some three metres from the back wall. It is not a rock shelter in the conventional sense because the roof is the overhang of the high cliff. The cliff made the site a sheltered place, protected from the westerly storm tracks that move along the coast. This may explain why the deposits proved to be surprisingly deep - almost 10 metres.

The pilot excavation of 1928 was continued the following year and a large quantity of the deposit along the back wall of the shelter was excavated in a short period. The literature is vague about the number of months Dreyer spent in the field but what is usually referred to as Dreyer's cutting may have been largely excavated in those first two years. The site was perceived as being very rich in cultural material and in burials. Perhaps this is not surprising in view of the volumes of deposit involved. This was a dig-along-the-back-wall-to-find-burials-type of excavation that was a feature of the early years in much of the archaeological exploration in South Africa.

Dreyer's excavation established Matjes River rock shelter as an important archaeological site. The assessment of importance had much to do with the finds of skeletal material, seen to be significant in understanding the races that had inhabited the region. Affirmation of significance came from the comments of the most distinguished authority of the time, Sir Arthur Keith. Dreyer was not an archaeologist and the assessment of significance was not made on archaeological grounds. Others at the time, notably A. J. H. Goodwin who introduced professional archaeological standards to South Africa and who gets frequent mention in the following pages, were aware of the need for more controlled excavations. Although speculative, the researches of Dreyer may have been the motivation for the programme of excavations Goodwin launched in the 1930s at nearby sites. Goodwin's research at Oakhurst is discussed in Chapter 3. Possibly his was an attempt to put the record straight. From his call (Goodwin 1935b) for a moratorium on the excavation of sites on the southern Cape coast he was clearly concerned about standards of excavation. It did not matter that sites like Matjes River rock shelter were "*rich*" - they had to be properly excavated to yield significant information.

The reason for another excavation project being launched at Matjes River rock shelter in 1952 is difficult to understand. It may have been that Dreyer's mantle had fallen on the next generation. On his retirement Dreyer had been appointed Honorary Curator of Archaeology and Anthropology at the National Museum in Bloemfontein. He may have encouraged the director of the museum, Abraham Carl Hoffman, a palaeontologist with similar interests, and a staff member and later Professor of Anthropology at the University of Fort Hare, Albert Johann Dirk Meiring, to undertake a new Matjes River project. The renewed interest in Matjes River may also have been linked to aspirations for the National Museum to be national in its research and its displays.

In 1952, under this institutional umbrella, Hoffman and Meiring began extensive excavations at the rock shelter. In the course of five expeditions, approximately 2000 tons of earth were excavated. An "*unprecedented*" number of stone artefacts and bone tools were recovered and a tally of 30 000 objects is mentioned by J. T. Louw (1960), a museum officer given the task of studying the collections. Hoffman was a long serving member of the Historical Monuments Commission, later the National Monuments Council, and in 1953, through his influence, Matjes River rock shelter was declared a National Monument. It is one of the relatively few precolonial monuments that have been formally proclaimed something that may change when the new proposed heritage legislation is enacted. It was one of less than a half a dozen archaeological sites to be declared and this seemed to underscore the importance of the site. It is one of the largest shell midden deposits in a rock shelter anywhere in the world and deserving of proclamation but at the time other equally significant archaeological sites were not given that protection status.

The archaeological and physical anthropological importance of the site had not been argued in the literature. It was left to Louw, working under the direction of Hoffman, to assemble the artefacts and human remains from the excavations and to make sense of the findings. Louw (1960) published his doctoral thesis on the Matjes River rock shelter as a monograph in the memoirs of the museum. This was the first opportunity for external assessment of the significance of the research at the site. No assessment is neutral but that published in 1961 in the South African Archaeological Bulletin by the physical anthropologist, Ronald Singer, and the archaeologist, R. R. Inskeep, was not only severe but also devastating. As discussed in Chapter 3., these reviews of the monograph exploded the myth of Matjes River rock shelter as a "*rich site*" of inherent significance. Others with access to the National Museum collections have concurred with this assessment (Sampson

1972, 1974). The only conclusion to draw is that although the site is significant, the research done there has not been distinguished and the results have been poorly published.

As a national monument the Matjes River rock shelter has been something of an embarrassment. The concern has been the conservation status of the site. The 1950s excavation of a cross-cutting from the back wall though the deposits to the talus slope beyond the drip line, destabilised the standing sections. Apparently made for no better reason than to improve the ventilation (Louw 1960:16) and to make it possible to walk through the site, this excavation was ill advised. It set in train a series of collapses of *in situ* deposits.

At the time of the proclamation, the conservation measures taken by the Historical Monuments Commission were to fence off the area and to erect a notice board. Later, when collapse of standing sections destroyed the fence, a new corrosion resistant fence was erected by a contractor and paid for by the National Monuments Council. Progressive erosion of the deposits has meant that this new fence has fallen down over part of its length. Fencing was an inadequate conservation measure. It did not exclude visitors and only served to confine them to the most sensitive area where most damage could be done. Replacing the old fence by the new one simply increased the area of visitor impact.

For a number of years the Historical Monuments Commission employed a labourer, who had assisted in the excavations of the 1950s, as a guard in the summer season when most visitors were received. This measure, at best an attempt at passive conservation because the guard was not trained as a guide, was discontinued after his death. The notice board, a large metal sheet, was hanging by a single bolt when this investigation started. Painted black and scratched with graffiti, it states in white lettering that the Matjes River rock shelter is protected as a national monument, that it was excavated by Professor Dreyer and that the finds are on display in the National Museum in Bloemfontein. It carries no information to alert the visitor to the archaeological importance and the sensitivity of the site. The notice board has been taken down and is stored at the back of the shelter.

In 1993 the current programme of work at Matjes River rock shelter was begun. It has two objectives, firstly, to rehabilitate the site and secondly, to obtain information on the stratigraphy, dating and contents of the deposits through research. These are not separate tasks. The rehabilitation has depended on research to establish the priorities for conservation and to provide information for displays. The initial phase of work was the clearing of the site to determine what materials were in situ and what were slumped. Slump material was used to fill plastic bags and the shoring up of some sections was begun. In 1994, having gained an understanding of the nature of the deposits in the initial phase, a decision was made to excavate a profile through the deepest part of the site, the "Apex". The Apex is the junction between Dreyer's cutting and the Hoffman-Meiring cross-cutting. It is the results of the Apex excavation that make up the main part of this thesis. Exploration of the site was continued by excavating at the slump material along the back wall to establish and map profiles along the length of Dreyer's cutting, south of the cross-cutting. This exploration had to be completed before the erection of a boardwalk to control visitors access. The National Monuments Council (Deacon & Brett 1993) has the primary responsibility for the work of rehabilitation. Data reported in this thesis will be used in explanation boards and fibreglass resin impregnated peels taken from the excavated section are being mounted as exhibits. Research and conservation have been closely linked in this project.

In the interests of conservation, the scale of the 1994 excavation was limited to the Apex section and a small cutting near the entrance. The fieldwork entailed sampling the strata in a continuous column through the full sequence. The published papers, including Louw's (1960) monograph, do not provide the details that make it possible to relate what can be seen in the field to the reported findings. As discussed in Chapter 3, the sections published by Louw (see Figure 7), for example, were sketched impressions of how the major culture-stratigraphic divisions may have appeared. In fairness to Louw, he was not responsible for recording the stratigraphy. The sections to which his drawings may relate are no longer standing and the drawings do not reflect any of the stratigraphic complexities of the sediment accumulation. The new fieldwork complements earlier research by providing such detail but it does not add greatly to the finds from the site. The logical extension of the research presented in this thesis would be the analysis of the old collections in the National Museum in Bloemfontein, something beyond the scope of this phase of the project.

It took four and a half months to excavate the column, less than a square metre in area, through 6 m of deposit. The deposits, in the Apex section, are gently dipping, multiple fine bands and lenses of occupation loams and shell. The stratigraphy is not as complex as that visible in the re-exposed sections of Dreyer's excavation along the back wall of the shelter. The cut-and-fill features associated with sleeping hollows at the back of the shelter would have been a more exacting and time-consuming task to excavate even in a small area. Although details were not resolved in the earlier excavations, the gross culture-stratigraphic units recognised had some stratigraphic validity giving the old collections value.

Matjes River rock shelter, like other coastal sites, is not rich in artefacts, contra the assertions of earlier researchers. However, comparisons can be made with other important sites in the Plettenberg-Keurbooms region, namely, Nelson Bay Cave and Oakhurst. These sites have equivalent Holocene deposits and artefact industries. Together with Matjes River rock shelter, they form part of the understanding of the local prehistory. Lacking has been the complementary study of local open site middens, which are being destroyed at an alarming rate by development.

In Chapter 2 a historical perspective of coastal shell midden studies is presented. Shell middens rival rock art as the first archaeological traces of precolonial peoples to be recognised. However, understanding of their significance was hard won - indeed is still being won. Through the research of Dreyer and Goodwin the southern Cape with its regional focus on Plettenberg Bay and surrounds became a centre for coastal midden studies. Chapter 3 discusses this regional setting and its sites, one of which is Matjes River.

This thesis is a record of what was observed in the course of peeling away the layers that had formed in one of the largest shell heaps known. Even though it is suspected that metres of deposit have been lost from the Apex section through erosion, the deposits are still impressively deep. When the results of radiocarbon assays became available one of the surprises was how rapidly the deposits had accumulated. The dating, excavation procedures and stratigraphy are discussed in Chapter 4. The main contribution of this thesis is summarised in the simple form of a section drawing in that chapter.

The laboratory analysis that followed on the fieldwork has focussed on the analysis of the artefact finds and the shellfish remains. At coastal sites in general, and in early Holocene layers in particular, the lithic materials are undistinguished. At Matjes River rock shelter, not only are formally shaped stone tools few but even irregular flakes are frequently "*overhit*", broken down the length because the blow initiating the release of the flake was misdirected. It may be significant that the lithic technology is so rudimentary. It is as if the artefact makers had little interest in or knowledge of the principles of percussion flaking. For the archaeologist with the task of analysing the typology of the artefacts it is disconcerting to have to deal with "*amateur*" artificers. The lithic analysis is reported in Chapter 5.

Collecting shellfish leaves a strong archaeological signal because the shells, the inedible residues, are bulky. Matjes River rock shelter is an archaeological site because it is a sheltered location on what has been a productive section of coast for gathering shellfish. The setting, a half-moon or half-heart bay, a major estuary disgorging nutrients into the bay and long shore drift and counter currents cycling the nutrients, is a probable explanation for the abundant shellfish finds. A sheltered place close to a collecting ground would be an apt description. There are still impressive beds of the brown mussel on the rocks east of the shelter. The analysis of the shellfish remains sampled in the excavation is reported in Chapter 6.

No archaeological site holds all the answers to what people were doing in any area at any time. Yet each research observation is a piece of the jigsaw puzzle that archaeologists attempt to assemble. The Matjes River rock shelter can be seen in this light. In the obituary that Hoffman wrote after Dreyer's death, he described Matjes River rock shelter as noteworthy for the mass of burials. Perceptively, Inskeep (1961), in his review of the Louw monograph, described the rock shelter as a cemetery site. There must be some explanation why this and other shelters, particularly in the southern Cape, are "*rich*" in burials. This in turn must be telling us something about people, territories and human settlement in the southern Cape in the Holocene. In Chapter 7, how observations at the Matjes River rock shelter contribute to the wider understanding of the precolonial history of the southern Cape are discussed.

CHAPTER 2

HISTORICAL OVERVIEW OF COASTAL MIDDEN STUDIES

2.1. INTRODUCTION

The purpose of this chapter is to review what has been written about coastal midden deposits in South Africa. Visible as heaps of shell, coastal middens were among the first archaeological occurrences to be recognised. Their significance was not appreciated until the latter half of the last century because they were trivialised as the trash heaps of lowly "*Strandlopers*". Full appreciation of midden occurrences as a major class of archaeological sites came about as recently as the 1930s when systematic investigations began. Those investigations were on a scale reflecting the very small base of archaeological science at the time and the scale was too limited to more than encourage token efforts at conservation.

The radiocarbon revolution (Taylor 1996) that began in the 1950s brought the realisation that coastal midden deposits were much older than had been anticipated. Coastal middens were not simply the leavings of Van Riebeeck's Strandlopers. This did not save the countless deposits that were built over in the development of coastal resorts begun in the 1960s, a development that continues today. Once there were many coastal midden deposits along the South African coast, but now they are fewer. As this chapter shows, our understanding of this kind of archaeological resource has grown but we still have much to learn.

2.2. EARLY OBSERVATIONS

In his 1487 voyage pioneering the seaway around the southern tip of Africa, Diaz sailed not to the end of the earth, but to a part remote from the circum-Mediterranean civilisations of the Old World. He found the land inhabited; as did those who followed the route he charted. The inhabitants were Khoekhoe, people with cattle and sheep. Commander Diaz had a fleeting and far from amicable encounter with the people (Axelson 1987) but later mariners stayed to trade cattle and sheep and they give us the first written observations of shellfish gathering. Among them was Mandelslo (Raven-Hart 1967:150), who visited the Cape in 1639. He described two groups, the Strandlopers who relied on shellfish and fish when their herds had been depleted and the "*Watermans*" who possessed no stock but moved seasonally to the coast. In 1620, Augustin de Beaulieu (Raven-Hart 1967:100) described the people as "*savages*", living on the edge of starvation and subsisting on shellfish and decaying meat. The reference to decaying meat may refer to eating the washed-up carcasses of whales and other marine mammals. The 1636 visitor, Artus Gijsels (Raven-Hart 1967:146) met people, presumed to be Khoekhoe, without cattle and living on the coast. They were reported to have subsisted on fish, shellfish and anything else the sea offered.

Van Riebeeck's journal (Goodwin 1952a:8; Thom 1952, 1954) is a good record of people living on marine resources. A diligent observer, with an eye for trade, he recorded the numbers of cattle and sheep possessed by the Khoekhoe. He added a third grouping, the "*Vismans*", who subsisted by fishing, owned cattle and were continuously at war with the Strandlopers. The Vismans were never seen at Table Bay and they were last mentioned in 1660 (Moodie 1960:217). The implication was that two or three economically and questionably ethnically separate groups with overlapping territories were living seasonally in the coastal zone. If the Strandlopers were impoverished Khoekhoe, then the Watermans, without stock, were axiomatically San

(Bushmen). The identity of the Vismans is less clear but Goodwin (1952b) mentioned that perhaps as cattle owners they too were Khoekhoe.

The validity of ethnic distinctions between Khoekhoe and San has long been debated in the literature. Recent claims that there are archaeological signatures for discrete groups of herders and hunter-gatherers persisting into historic times in the same area of the western Cape (Smith *et al.* 1991; Yates & Smith 1993) has been labelled as perpetuating the apartheid mindset (Schrire 1992). The Strandloper/Waterman and Khoekhoe/San dichotomies are constructs that have confused rather than clarified thinking about interactions between individuals and communities at the time of European contact. The debate on historical ethnic divisions still has to run its course.

Van Riebeeck's journal (Thom 1952, 1954) showed that in 1652 coastal midden deposits were still being formed. The collapse of the political power of the Khoesan in the western Cape followed soon after (Elphick 1985:214). This was because of inter-group warfare among the Khoesan, the intrusion into their territories by VOC officials, freeburgers and semi-nomadic cattlemen (trekboere). Conflict with and enslavement by the colonial powers spelt the end of traditional Khoesan lifeways. As the liberal historian De Kiewiet (1950:20) elegantly put it, "*bartering for cattle introduced the Hottentots to the white man's tobacco and firewater and diseases*" and smallpox epidemics in particular contributed to the collapse of their social structure. Disruption extended to those groups using coastal food sources. As the agricultural frontier moved beyond the immediate confines of Cape Town and the Boland this impact was extended. There is a reference to Strandlopers on the Namaqualand coast as late as 1872 (Martin 1872) but by the middle of the last century middens had virtually ceased to be formed anywhere along the western Cape coast.

Late eighteenth and early nineteenth century travellers left written accounts of contact with coastal dwellers. The soldier and explorer, Gordon (Raper & Boucher 1988:256), was probably the first traveller to appreciate that the coastal shell deposits were of human rather than of natural origin. In

August 1779, in the hills near the mouth of the Buffels River in northern Namaqualand he found marine shells which "*seemed to have been brought here by people or baboons*". Gordon (Raper & Boucher 1988:274) encountered a group of foragers on the Orange River who waded over the river to collect shellfish. Paterson (1790:109), Gordon's travelling companion on the same journey, described an abandoned coastal encampment near the mouth of the Orange River. The matjies-style huts, typical of the Nama Khoekhoe, were still standing and the camp may have been in use although he was unable to interview the occupants. This appears to have been a coastal midden site in formation because of the associated shellfish remains. Given the flimsy nature of matjies huts it is probable that the occupants fled on seeing the uninvited visitors (see also Wilson 1990).

The first British occupation of the Cape in 1796 encouraged a new wave of exploration. Barrow (1801:67) was one of several who ventured an opinion on the shellfish accumulation in the Cape St. Blaize Cave at Mossel Bay. He thought the piles of shellfish were the result of seabirds bringing the shellfish into the cave as food while using the cave for shelter and nesting there in their thousands. Lichtenstein (1810:219) also visited this cave and accepted the local lore that Khoekhoe living on shellfish had occupied the cave. It must have been occupied in the recent past for folk memories to persist. In spite of the refutation of Barrow's explanation doubts that coastal middens were cultural and not natural persisted.

The midden controversy, as it was labelled by Goodwin (1935b), was not resolved until some 50 years later. In 1858 Gregory (1858:62), in reply to a query by Martin (1858), was able to give a reasoned argument why coastal middens were not natural phenomena. He pointed out that it was historically known that the Khoekhoe had inhabited the Cape Peninsula before colonisation and that groups still living along the Namaqualand coast practised shellfish gathering. He commented that the shells from the gathered shellfish were thrown away "*without the least concern for the place*" but it was this act that created the coastal middens.

A statement published about this time by Boucher (1872) referred to shell mounds in the Eastern Province and showed a general acceptance of coastal middens as artefacts. His reference to shellfish collecting by "*coastal tribes at the present day*" is relevant because in the Eastern Province this tradition continues into the present (Bigalke 1973; Lasiak 1992).

> *"...shell mounds are to be found at many spots on the coast; particularly at a rocky point near a fresh-water fountain, about midway between the Kleinemond and Fish Rivers, and thence right along to the Bashee. The mounds are from one to, say ten feet high, and composed entirely of the broken remains of edible shellfish, bones of animals and also broken remains of the stones used in breaking up the shells, while the flat summit of the hills is often covered with the stones used for the same purpose. This mound was made by people residing some distance inland, which is explained by the fact that for three to four miles inland from the beach large quantities of edible shellfish remains are found, and in all or most cases mixed up with broken clay pots and charcoal. Beyond this the shell deposit ceases, from which it may be taken for granted that the shells collected by those living at a distance were broken up and the flesh extracted for the purpose of lightening the load. There can be no doubt of this as the same thing is done by the coastal tribes at the present day."*
>
> Boucher (1872:56)

The midden controversy appeared to have been resolved but as recently as the 1950s, Gatehouse (1953:3) questioned whether all shell scatters at Cape Hangklip were indeed middens and not normal beach deposits. He did not accept the presence of burnt bone and artefacts as sufficient evidence of human agency. Although this cautionary note that shell beds formed by marine action may mimic coastal middens, normally coastal middens lie well above the tidal range and the human agency is beyond dispute.

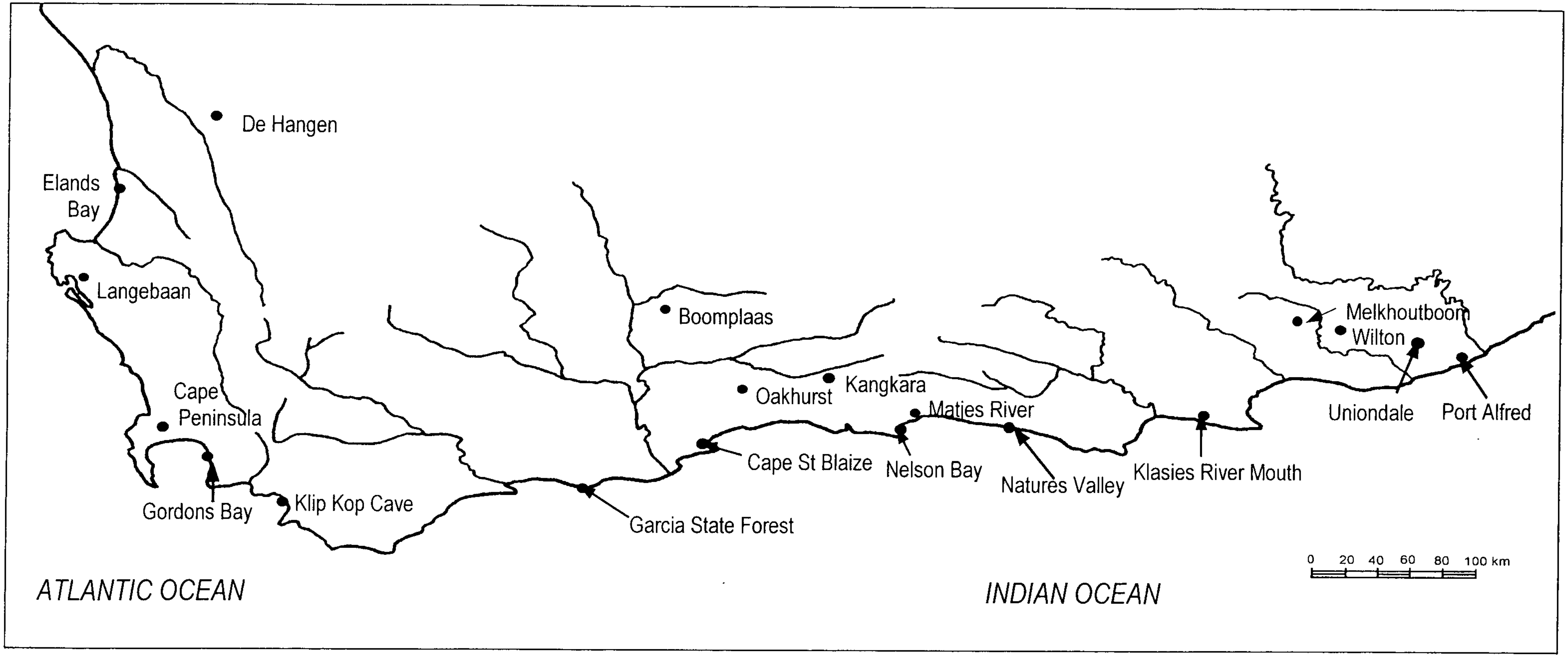

Figure 1: Location of archaeological sites along the southern coast of South Africa

2.3 PIONEER STUDIES

The first researchers to take a serious interest in archaeology were engineers, botanists and geologists. They were keen observers and while their comments may seem superficial, it was a stage of learning about coastal middens, and their contribution was significant. The geologist, Gooch (1881:154), had a good perception of time and he appreciated that time was involved in the formation of such deposits. He was a regionalist expecting archaeological materials to pattern according to different regional environments and a form of environmental determinism underlay his thinking. Accordingly, Gooch was impressed that along the western Cape coast, middens were dominated by perlemoen shells and mussels whereas in Natal small rock oysters and mussels were abundant. His conclusion was that regional differences, meaning tribal differences, extended to shellfish gathering. Colson (1905:166-168), like Gooch (1881), recorded regional differences in shellfish collecting. The coastal middens near Port Nolloth contained more limpets than on the sandy Cape Flats coast. This established that different ecological settings offered different shellfish resources.

Schonland (1896:120, 1903:25), a well-known botanist, reported on the material found in a coastal midden south of the mouth of the Swartkops River and provided the first detailed report on the shellfish species represented in a midden deposit from Port Alfred. Also noteworthy was the identification of a skeleton from the first excavation as a Strandloper by his colleague Leslie. Schonland was less prepared to be dogmatic about the race of the individual and considered the skull belonged to a race forming a side-branch of the Khoekhoe. He seems to have been conversant with a theory attributed to Theal that the San, as well as impoverished Khoekhoe, were responsible for coastal middens. Perceptively he concluded that a clear definition of the term, Strandloper, was not possible although it usually implied "*Primitive Hottentots*".

A contemporary of Schonland, Kingston (1900:48) excavated the caves at Nature's Valley that produced further burials. He too described the burials as belonging to a primitive group of people identified as Hottentots but did not show Schonland's awareness of the problem of ethnicity. His excavation method rather than his classification of the skeletal material were later criticised by Goodwin (1935b: 301) as lacking in scientific restraint. At the turn of the century a problem uppermost in the minds of these pioneer researchers was the racial affinities of the people who accumulated the coastal middens.

FitzSimons was Director of the Port Elizabeth Museum from 1906 to 1936 and was a zoologist by training (Schauder 1963:52). He excavated a number of rock shelters along the Tsitsikamma coast apparently with the primary purpose of recovering skeletal remains. Among these sites was Whitcher's Cave (FitzSimons 1923:544) which produced twenty or more burials. Unfortunately his work was never adequately published and most of his personal notes appear to be untraceable (Schauder 1963:59). His novel idea (FitzSimons 1926:816) was that the skeletons from the older levels were of a massive-boned race, akin to Boskop, and that coastal Bushmen replaced this race. It is understandable that FitzSimons would see affinities between the cave skeletons and the famous Boskop calvarium from the Northern Province he had collected for his museum (Coon 1963:641). The concept of a *"Boskop race*" became entrenched in the literature but was exploded as a myth in a critical review by Singer (1958:177). He stated that it is "*now obvious that what was justifiable speculation (because of the paucity of the data) in 1923 and was apparent as speculation in 1947, in inexcusable to maintain in 1958"*. Most of the physical types introduced in the pioneer stage of physical anthropological studies do not stand up to a critical evaluation and types like Boskop have been shown to fall within the normal morphological variability of the Khoesan and Negroid (Bräuer & Rösing 1989:61). There still may be validity in the FitzSimons observation that the older remains show more robust morphology. The sample of end-Pleistocene human remains is inadequate for comparison with those from the Holocene.

Confusion over who made the shell middens continued after FitzSimons completed his excavations. In the climate of the time it was assumed that racial types formed discrete entities with distinguishing cultures. The question was whether the Strandlopers represented a distinct race. Goodwin and Van Riet Lowe (1929:148,157) answered this by pointing out that the terms Strandloper (Wilson 1990) and Bushman had little meaning and they referred to all Later Stone Age people as San. This is still the practice. The term Strandloper ceased to have any biological or cultural relevance but its usage has continued as part of South African English.

A contemporary of FitzSimons and fellow museum director was Hewitt. He has been appointed to the Albany Museum in 1910 and served the museum until 1950 (Leslie-Brooker 1987). Like FitzSimons, Hewitt (1920) was a zoologist, researching lower vertebrates. Through an association with Stapleton (1919) and other Jesuit priests at St Aidans College in Grahamstown he developed a keen interest in archaeology. This led to the investigation of a number of coastal and inland archaeological sites, some of which, like Howiesons Poort and Wilton are well known names in the literature on South African archaeology. Early collaborative efforts (Hewitt 1920:305) led to the description of finds of Strandloper pottery associated with fresh water mussel shell, *Unio caffer*, along the Sundays River approximately 36 km inland from Algoa Bay. Hewitt recorded this pottery in his excavations at rock shelters like Uniondale near Grahamstown and at the Wilton rock shelter near Alicedale. What was called Strandloper pottery is the typical Cape coastal ware; bag-shaped pots with narrow necks, simple decoration, lugs for suspension and occasional spouts (Rudner 1968). This pottery made well into historic times can be associated with Khoekhoe herders. In archaeological contexts the finds date to within the last 2000 years and they are associated with the remains of domestic animals. That the pottery was found not only on the coast but also some distance inland suggested to Hewitt (1920) and later to Laidler (1935) that the pottery-makers practised some form of seasonal transhumance.

In this pioneer stage the dating of coastal sites was a problem. Sites which would have included deep well-stratified deposits and which could have provided a cultural stratigraphy had been excavated. Cape St. Blaize

Cave (Leith 1898), the caves at Natures Valley (Kingston 1900) and Whitcher's Cave and other FitzSimons (1923, 1926) sites are examples. All probably preserved long Holocene records and Cape St Blaze included a Middle Stone Age occupation (Goodwin 1935a). Shellfish-rich deposits of all ages are very similar wherever they occur and changes in time may not have been anticipated. However, observations were accumulating that pottery occurred only in the top layers of midden deposits. In the Eastern Province, where there had been early Iron Age or pre-colonial farmer occupation, "Bantu" pottery occurred in layers overlying "*Hottentot*" pottery (Shapiro 1934; Laidler 1935:560). This was a start to constructing a culture-stratigraphy of coastal midden deposits.

2.4. CONTROLLED EXCAVATIONS

The researches of Dreyer and Goodwin ushered in a new era of studies of coastal deposits. Goodwin (1935b) summing up the situation made the following suggestions and identified some of the problems that he considered important.

> *"While we already know that the midden sites which surround our southern coast are in part ascribable to peoples using either Wilton or Smithfield cultures, there still remain a large number of middens and midden deposits which contain no conventional stone implements whatever ... Our middens still need to be carefully surveyed in general and particular. Strict attention must be paid to relative age and to stratification within each deposit, and the series related to others about our coast ... we should be able to relate certain of our deposits with the changing sea fauna. No less important is the relating of these deposits with changes in culture, the appearance of pottery, the change from Smithfield to Wilton elements, or visa versa; and also the relations existing between these middens and the 'vis-kraals'..."*

Goodwin (1935b: 367-368)

Their investigations at Matjes River rock shelter (Dreyer 1933) and Oakhurst (Goodwin 1938a) were of sites showing a succession of Later Stone Age industries (Figure 2). Goodwin had taken the lead in formulating a culture-stratigraphic framework for the Stone Age in South Africa and between 1923 and 1929 he consulted widely with all interested parties. The culmination was his joint publication with van Riet Lowe in the Annals of the

South African Museum (Goodwin & van Riet Lowe 1929). Dreyer who had close museum ties would have been aware of Goodwin's ideas and better than most he would have appreciated that culture-stratigraphy was a powerful tool in relative dating.

The results of the investigations of Dreyer and his successors, Hoffman and Meiring, are discussed in more detail in Chapter 3. Dreyer (1933:209) recognised a succession of cultures. From the youngest to oldest, labelled A-E, these were: Strandloper variant of the Smithfield B, Smithfield B, Wilton without pottery, Matjes River variant of the Smithfield A and a possible Middle Stone Age horizon.

The Matjes River rock shelter excavations produced a large number of human skeletons. The precise number is not known but they probably number more than 40 (Brink, J. S. pers. comm.). Inskeep (1986:230) has described the rock shelter as a cemetery site, comparable in the number of burials to the Tsitsikamma and Whitcher's caves excavated by FitzSimons. It was Hoffman's (1958) contention that the skeletal remains from each of the layers A-E could be related to a different kind of people, a view critiqued by Singer (1961). From the obituary that Hoffman (1957) wrote on the death of Dreyer, the significance of the Matjes River rock shelter was seen more in the number and diversity of the skeletal remains than in the artefacts. The culture-stratigraphy was a means for relative dating of the burials. The approach of these investigators was not surprising given that they were zoologists and physical anthropologists rather than archaeologists. However, at a gross level, they documented the main culture-stratigraphic divisions.

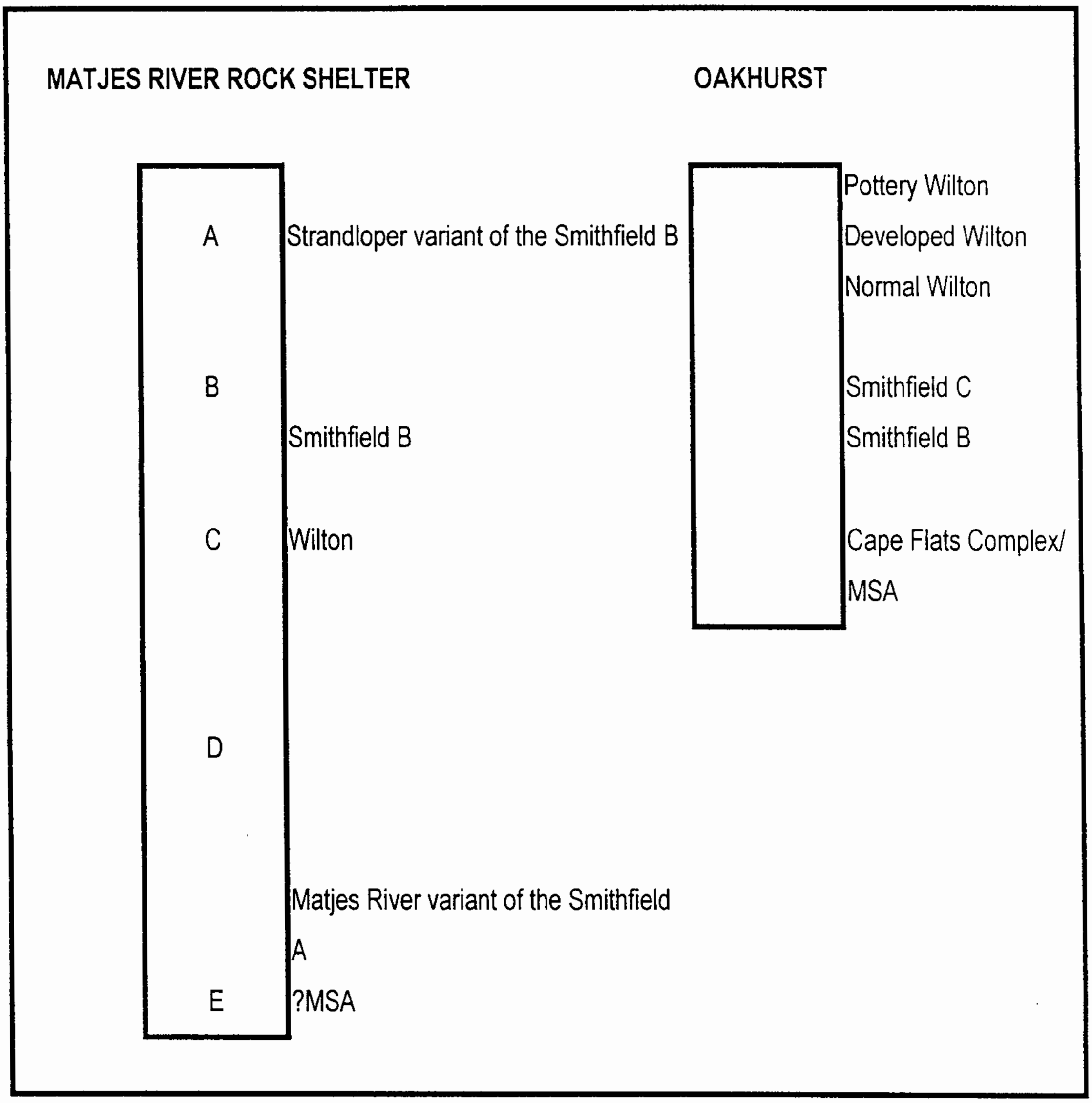

Figure 2: Diagrammatic comparison of the culture-stratigraphy of Matjes River rock shelter (Louw 1960) and Oakhurst (Goodwin 1938a)

Goodwin (1938a: 236) excavated Oakhurst over a period of three years from 1932 to 1935. In his joint publication with Van Riet Lowe (Goodwin & Van Riet Lowe 1929) Goodwin had described the Wilton and Smithfield as the two main cultures of the Later Stone Age yet he was uncertain of the relationship between them. In investigating Oakhurst he may have hoped to clarify this relationship, especially if he was aware of Dreyer's initial results. This fieldwork was to prove the main opportunity Goodwin had in his career to test his ideas on the Stone Age sequence that he developed from studying museum collections.

The cultural divisions recognised by Goodwin were from youngest to oldest, Pottery Wilton, Developed Wilton, Normal Wilton, Smithfield C, Smithfield B and Cape Flats Complex or Middle Stone Age. This reflected Goodwin's expectation that through time artefacts reduced in size. Thus, the Wilton, with the smallest size of formal tools and the final stage of this trend, was represented at the top of the Oakhurst sequence. In a later paper Goodwin (1952b) linked the Wilton to the Khoekhoe and the Smithfield C to the San and this indicates he saw these archaeological entities in ethnic terms. Assuming that Khoekhoe were later immigrants and the San the older people, it followed the Wilton should overlie the Smithfield. Goodwin's (1938a) interpretation of the Oakhurst sequence was in obvious conflict with the sequence of cultural units recognised at Matjes River rock shelter by Dreyer (1933) where the Smithfield B occurred in the top of the sequence. New studies (Deacon, J. 1972, 1982) have reduced the significance of the Wilton/Smithfield dichotomy as perceived by these early workers. Cultural labels and not cultural differences were at the root of the problem of relating the two southern Cape sequences. The results of the studies at Oakhurst are discussed in detail in Chapter 3.

Oakhurst is an inland rather than a coastal site although it is close enough to the coast to have been a base for collecting marine foods. Apart from ancillary excavations at Glentyre and Forest Hall near Oakhurst, Goodwin excavated several other coastal sites in the 1930s, including Cape St. Blaize Cave at Mossel Bay (Goodwin 1935a) and Klip Kop Cave at Hermanus (Goodwin 1938b: 218). Leith (1898: 265) and other earlier excavators at Cape St. Blaize Cave had left little midden deposit undisturbed and interest there centred on the Middle Stone Age layers (Keller 1969).

Goodwin (1953:61) also excavated Nero's Cave at Kalk Bay on the Cape Peninsula and contrasted this cave deposit with the open station shell midden deposits he excavated at Humansdorp. He remarked that open station shell middens are more scattered with each shell heap having a sand core, whereas in the confined space of a cave subsequent packing-down of shell concealed natural separations. This shows understanding of the need to study all kinds of occurrences. In a further paper (Goodwin 1946) discussing the Humansdorp middens near the mouth of the Slang River, he showed an interest in the variability in the shellfish content of discrete heaps and in the quantities of shellfish it was possible to consume at a sitting. This paper is interesting because it is the first description of the large circular stone hearth features found along the coast and inland at Boomplaas (Deacon *et al.* 1978) and associated with Khoekhoe herders.

One of Goodwin's (1946) most insightful contributions to the study of coastal middens was his discussion of prehistoric fishing methods. He appreciated the importance of tidal fish traps and their association with middens. On the evidence of the frequency of fish bones at Oakhurst, he had suggested the use of tidal fish traps began during Wilton times. The weakness in this argument is that it discounts a long history of line fishing as an alternative fishing method. Fish traps (Avery 1975) continue to be used in the present. They require a considerable investment of time in their maintenance and this may have been possible only for relatively settled coastal communities, engaged in intensive use of coastal resources and herding. They probably came into use late in prehistory and other explanations for the increase in fish bones at Oakhurst may be sought.

2.5. MODERN STUDIES

In the 1950s radiocarbon dating became a tool available to archaeologists. It became possible to date sites with great precision and improvements in the method have made radiocarbon dating routine in application. We now know that most coastal midden deposits fall within the time range of the last 12 000 years because this is the most recent period when sea-levels have been close to the present (Deacon & Lancaster 1988).

Matjes River rock shelter was one of the first African Stone Age sites to be dated by radiocarbon. Clark (1959:188) considered the dates from this shelter were too old. He was hesitant to accept that Later Stone Age middens could be as old as 10 000 years. Subsequent age determinations from the site, discussed in Chapter 4, show that the initial age estimates were reliable even if run using the now outmoded solid carbon method. The antiquity of coastal midden occurrences was confirmed through the dating of the stratified open station coastal midden in the south-western Cape at Gordons Bay excavated by Van Noten (1965, 1974). There are currently several hundred radiocarbon age determinations for coastal middens and their antiquity is no longer in dispute.

Inskeep (1967a: 71) commented that at coastal midden occurrences in South Africa almost no systematic work had been done on fish, shellfish and Crustacea remains, firstly, as elements of diet and, secondly, as reflectors of human activity. He maintained that there was a need for new excavations and had initiated his own excavations at Nelson Bay Cave in 1964. There was scope for a new range of studies. Extensive research had been done on middens in California but more influential as a model directing the type and quality of work to be done in South Africa was the study by Wilfred Shawcross on the Galatea Bay midden in New Zealand.

The Galatea Bay (Shawcross 1967) report is an example of a complete quantitative analysis of the contents of a midden - shellfish, fish, animal bones and stone artefacts. This study also discussed questions of the season and duration of occupation. This archaeological study was not prompted by an abundance of coastal midden sites, as is the case in South Africa, but by the need to maximise the information from one of the few sites available for research purposes. It showed what a wide range of information could be got from the detailed analysis of a coastal midden occurrence.

Students under the direction of Inskeep excavated Bonteberg (Maggs & Speed 1967), a small rock shelter on the Cape Peninsula. This was an initial attempt at the systematic sampling of a local midden occurrence, complemented by a full description of the shellfish species composition. A significant result of having adequate samples available for study was that Grindley (1967) was able to show that crayfish, *Jasus lalandii*, had been "*farmed down*". This indicated that the inhabitants of the site had been using the marine resources on an intensive scale.

Shellfish, the most visible remains in middens, are the same species as found on the modern coast and are readily identified. There is also a large body of information available on the ecology of the coastal zone and the shellfish fauna. This information became pertinent when attempts were made to quantify the remains in middens. In terms of diet, shellfish was not necessarily the most significant component. For example, the middens at the mouth of the Storms River (Deacon, H. J. 1970) showed that a diverse range of fish was caught. The shellfish and fish species reflected the immediate coastal habitat at two different locations studied. The range of fish species, some found only in deep water, together with stone sinkers, provided direct evidence for line fishing as opposed to simply the collecting of chance finds of stranded individuals. This was a further indicator that prehistoric groups were exploiting the coastal resources more efficiently than apparent from the somewhat prejudiced observations recorded by seventeenth century writers. Fishing, sealing and fowling were as or more important than shellfish collecting at the coast.

From initial surveys in the new phase of investigation it became apparent that middens were concentrated at rocky headlands along the coast with a lower frequency along sandy stretches (Avery 1977b; Robertshaw 1979). Midden-type accumulations occur inland but only to a distance of about 5 km as in the case of Oakhurst. This appears to be the limit for the siting of a base for shellfish collecting.

As modern studies have progressed, the main focus has been on ecological interpretations. As Hewitt (1920) and Goodwin (1952b) had noted evidence for the seasonal use of the coast, patterns of seasonal transhumance became a central theme in hunter-gatherer archaeology when the results of Lee's (1965) ethnographic study of the subsistence ecology of the !Kung San became available. This study showed that camps were occupied for a matter of weeks and that movement between camps was in a seasonal round. Visits to particular areas were scheduled to coincide with the abundance of different foodstuffs. The influence of this ethnographic model was particularly evident in the approach known as site catchment analysis developed by Higgs and Vita-Finzi (1966) and promoted by students of Higgs in their work elsewhere. The 1960s was a period of scientific optimism. There was a new interest in foragers and in the power of ethnographic models that is evident in the publication of *Man the Hunter* (Lee & DeVore 1968). This was the beginning of the "*New Archaeology*" with its emphasis on processes, systems and hypothesis testing.

Two of Higgs' students, Carter and Parkington, were responsible for introducing seasonal mobility models in South African archaeology. Carter (1970) proposed a model of regular movement in the Later Stone Age between the mountain zone of the Drakensberg and the midlands of Natal. This assumed people followed the movement of herd animals determined by the seasonal changes in the quality of the grazing. It postulated that foragers lived in large groups in the summer in the mountains and that in the winter these groups disbanded and as smaller groups dispersed in the midlands. The model implied that the rock paintings in the Drakensberg rock shelters were made during the summer aggregation phase and that in the dispersal phase in the midlands ritual activities were less.

Although Carter (1970) predicted dispersed occupation of the midlands, sites there proved difficult to find. Cable (1982) who undertook a complementary study of the archaeology of the southern Natal coastal zone in the last 4000 years suggested that the midlands served as a transitory zone between the coast and mountains rather than a focus for occupation. This implied a scale of seasonal movement even greater than Carter had envisaged. However, relatively few sites are known in the coastal zone and finding sites in this well-vegetated area is difficult. Cable saw the coast as offering alternative marine resources to the terrestrial resource of the mountains.

An alternative view is that the midlands and the coast were less densely settled than the mountains in the Later Stone Age and that these zones were not inter-connected through any pattern of seasonal movement. The distances involved in moving between the coast and the Drakensberg are on a much larger scale than ethnographically documented seasonal movements in band territories in the Kalahari. This is a point made by Opperman (1984) in his research in the Drakensberg foothills in East Griqualand. He was able to show that the "People of the Eland" (Vinnicombe 1976), the painters in the Drakensberg, were mountain San. Their territories did not stretch beyond the mountain zone. This was an effective refutation of the Carter-Cable seasonal mobility model.

In 1968 Parkington (1972) began research at De Hangen Cave, a project which was later to extend from the mountains inland to the coast between the Berg and Olifants rivers. It was hoped that the De Hangen site would provide a long sequence of occupation and guide further archaeological research. However, it proved to contain only a shallow deposit. The interpretation of the material prompted Parkington to envisage a connection between inland and coastal sites as segments of the same subsistence round and settlement system under a seasonal mobility model like that of Carter. Inland and coastal sites were thus inter-related phenomena and seasonal mobility was a communal strategy (Parkington 1976:138). To test a seasonal mobility pattern it was necessary to excavate numbers of sites (Parkington 1972:242; 1981) and to show that at some times of the year particular sites were occupied and at other times of the year sites of the same age but in a different setting were occupied. Thus, occupation of a site like De Hangen should be in a different season from occupation of sites at the coast. A further requirement would be to show paired seasonal sites were occupied by the same people in the same seasonal round, something beyond the resolution achieved in any archaeological investigation, let alone this one.

The seasonal mobility models have encouraged the analysis of floral and faunal remains albeit with an emphasis on the seasonal indicators of occupation. Many annuals and perennials have a well defined growth rhythm and produce tissues like inflorescences, flowers, leaves and corms in specific seasons. Where preserved these can be used to indicate the season of occupation (Wells 1965, Deacon, H. J. 1976). Plant remains have been used to argue for spring and summer occupation of sites in the Drakensberg as well as at De Hangen (Parkington & Poggenpoel 1971:28). A limitation is the growing season tends to favour spring and summer indicators and from plant remains it is difficult to prove or disprove occupation in other seasons.

Animals as different as seals and birds are seasonal breeders and have been used as indicators to bolster mobility models. For example, targeting easily got seal yearlings or black pups in the winter months was suggested to be one of the subsistence strategies that drew people to coastal sites (Parkington 1976). The age profile of specimens can be determined by measuring the mandible length and samples from the coastal Elands Bay Cave that were found to be consistent with winter occupation. Parkington's mobility model rested heavily on the assumed connection between the two different aged sites that had been investigated, De Hangen and Elands Bay.

Further south, on the Langebaan and False Bay coasts, analysis of bird remains from open station middens (Avery 1977a, 1981, 1987; Robertshaw 1978:146; Avery and Underhill 1986) and a cave site (Avery 1981:85) suggested summer rather than winter occupation. When a range of seasonal indicators of occupation at Langebaan was taken into account (Robertshaw 1978) no defined season of occupation was indicated. Robertshaw, for example, pointed out that mechanistic arguments that red tides would be a reason to avoid the coast in summer, became less persuasive if it is appreciated that any hazard could have been minimised by avoiding filter feeders and collecting other species of shellfish like limpets.

Several authors have criticised seasonal mobility models as too rigid in their predictions. Robertshaw (1979:246) accused the "*Higgs school of economic prehistory*" of making too much of the comparison of the season of occupation at single sites in the different ecozones. This was a criticism from an archaeologist who went into the field expecting to bolster a mobility model. On a different level, Humphreys (1987) has warned against some of the assumptions implicit in seasonal mobility models. One assumption is that environments have remained constant in spite of considerable year to year variability. Another is that models assume that people acted in ways defined by some chosen ethnographic analogue and this dismisses the importance of individual choices and other social factors. People are not 'cultural dopes'. While it is accepted that foragers practised transhumance, it is improbable that they subjected themselves to a design for living that would have conformed to any optimal model.

Coastal middens are essentially food refuse dumps and they are a source of information on diet. Diet has been inferred directly from the isotope signals in dated human skeletal remains and from the contents of the middens themselves. Both approaches are necessary. Isotopes only distinguish between broad kinds of foodstuffs while the content analysis of middens provides specific identification of the foods that were used. The contribution of different items to the diet is less easily quantified in any content analysis because there are foodstuffs that may have been consumed but that leave no residues. Honey, universally a highly rated food, is an example. This problem of "*missing evidence*" is a limitation in reconstructing diets from archaeological remains and has led to debates among archaeologists and between archaeologists and isotope analysts.

The application of stable carbon isotopes and other chemical analytical techniques in dietary tracing developed from the use of carbon isotope ratios to correct for fractionation in age determinations (Vogel 1978). Marine foods, for example, are isotopically enriched (higher $^{12}C/^{13}C$ ratios) relative to terrestrial foods and the degree of enrichment in skeletal remains can be used to infer the proportional intake of marine and terrestrial foods in the diet (Sealy 1989). In the south-western Cape, there is a clear temporal trend. The numbers of individuals, who had a relatively high intake of marine foods and who therefore lived permanently near the coast, increases through the late Holocene. Such people would have been more restricted in their movements than predicted by a coast to mountain seasonal mobility model (Sealy 1986:83; Sealy & Van der Merwe 1986). Apart from this trend to settle in the coastal zone, isotopic studies also hint at dietary differences between the sexes (Sealy & Van der Merwe 1988). The evidence is not conclusive because of the size of the available sample of dated skeletons but women appear to have consumed more terrestrial foods.

Shellfish are small parcels of food but they provide a source of protein, fats and carbohydrates (Wilson 1990) apart from possible essential trace elements like iodine. Shellfish are easily harvested but in terms of returns for energy expended, collecting shellfish has a high cost (Wilson 1990).

The question that has plagued researchers is the importance of shellfish in the daily diet. Buchanan (1985, 1987, 1988:105) in a bold attempt to evaluate the food resources represented in the middens at Elands Bay has suggested that shellfish provided as much as 75% of the food intake of people living at the coast. This figure has been considered as unrealistically high by other researchers. Noli (1986, 1988) has argued that terrestrial plant food, even if not archaeologically visible, would have contributed a significant number of the calories required. Further Noli and Avery (1988:396) have pointed out that living on a high protein diet can lead to protein poisoning and even death. As a source, Buchanan used an article by Speth and Spielmann (1983) that put the possible protein intake as high as 90%. In a later paper Speth (1987) reduced this figure considerably. Protein accounts for only 30% of the diet of the Inuits (McGilvery 1983) who have high meat and, it must be added, fat consumption. This would seem to be the upper limit of protein intake. The question of the quantity of shellfish consumed per individual per day has not been satisfactorily resolved. Shellfish contain fats and lipids in the 5% range, with protein making up as much as 70% and carbohydrates the remainder (Wilson 1990:129) but, short of undertaking physiological trials on human subjects, the limits for consumption of shellfish with this combination of fats, proteins and carbohydrates is unknown. Wilson (1990) devoted a lengthy appendix in his thesis to a criticism of the methodology of Buchanan, a criticism that muddies rather than clarifies the topic.

The importance of shellfish in forager economies is indicated in the phenomenon of so-called megamiddens. Megamiddens have been described as containing "*extraordinary homogeneous deposits of shell with dispersed* *but abundant charcoal in a variably sandy matrix and focused on mussels .... lacking in domestic artefactual debris*" (Henshilwood *et al.* 1994:103-104). The shellfish in an example of a megamidden recently sampled at Melkbosstrand (Goosen 1997), included a wide range of species and not only mussels. The midden was the product of unselective stripping of all available shellfish from the rocks. The most important attribute of a megamidden may be the lack of selection in collecting. Henshilwood *et al.* (1994) have shown in replication trials that mussel meat, cooked in the shell and dried, can be preserved for later consumption. This provides an explanation for the occurrence of megamiddens.

A number of megamiddens have been recorded along the south-western Cape coast and, in the main, these appear to date to between 3000 and 2000 years ago, a period of suggested population expansion (Jerardino 1996). A megamidden, classed as a type 3 site, was recorded in Henshilwood's survey (1995) of the Garcia State Forest but dates somewhat earlier, to 4000 years ago. All megamiddens in all coastal regions are not of the same age.

In a recent study of Mike Taylor's Midden, near Elands Bay, Jerardino and Yates (1997) have pointed out that this location was not only a shellfish-processing site but also a base camp where stone knapping and the processing of animal food took place. It seems obvious that those harvesting the shellfish would have lived close by and would have carried out other day to day tasks. Thus, this evidence is hardly reason for the contention of Jerardino and Yates (1997) that the term megamidden is misleading. Middens everywhere are the refuse dumps and the living places are usually less archaeologically visible. Megamiddens, as a descriptive term for unusually large shell heaps that accumulated over tens or hundreds rather than thousands of years is a useful informal label. As in all archaeological studies of food residues, questions of how many people and how many days, weeks, months or years were involved, go largely unanswered.

2.6. FUTURE DIRECTIONS

Ecological and seasonal mobility concerns have dominated midden studies. These concerns are essentially ahistorical and there has been a tendency in the literature to underestimate the need for a sound empirical culture historical framework for the study of middens. Dismissed as normative thinking, or mere description, and falling short of the goal of explanation (Parkington 1972), a culture history framework is necessary to constrain model building. Temporal trends are as important as spatial patterns in understanding prehistory. A product of the New Archaeology with its naive positivism and determinism, seasonal mobility models have lost some of their appeal and empirical data have shown considerable variability among the people living at places on or near the coast at different times.

Post-processualists have criticised the New Archaeology because the role of people and human choice is underestimated. With the roots of midden studies in the New Archaeology the emphasis has been on the economy and not the people. Undue attention has been given to sampling the trash heaps and not enough to uncovering the associated but more ephemeral habitation areas. It is expected associated settlements will receive more attention in future studies.

Coastal sites are special only in the use of marine foods. Like other archaeological sites, their investigation cannot take place in a theoretical vacuum. Interpretative models in South African archaeology derive primarily from San ethnography. The initial focus in ethnography on group size, subsistence, mobility, territory and demography has shifted to an interest in social relations and group dynamics. This has pitted the traditionalists or post-positivists that believe San ethnography is about real people against the radicals, anthropologists and archaeologists that as post-modernists attempt to deconstruct the Bushman stereotype. The Great Kalahari Debate (Barnard 1996) as this confrontation has become known has spilled over into South African archaeology. It is difficult for archaeologists working in the Later Stone Age to escape the influence of developments in San ethnography because they are studying San history. The radial critique is timely if it helps to avert some of the inherent problems in the use of ethnography in archaeology. The danger is that Later Stone Age studies become little more than reinforcing the hunter-gatherer stereotype.

There is a need, perhaps as in Goodwin's time for good empirical observations at coastal sites. However, this need is not a goal in itself. There has to be a reason to investigate another midden even if made necessary in the course of cultural resource management. Hypotheses need to be formulated and the underlying theory made explicit if midden studies are to progress beyond concerns with trash heap economics and reveal something of the "*midden-makers*".

An example that reflects both the traditional approach and an attempt to move in new directions is Jerardino's (1996) recent study of middens along the western Cape coast in the last 4500 years. Her concerns are with people and social transformation. In spite of an avowed rejection of normative thinking, she has provided a culture history framework for the Elands Bay and Lamberts Bay area through surveys and excavation of a large number of middens and a cave site, backed by numbers of radiocarbon dates. This has made it possible to show changes in the location and size of sites with time. In a discipline where the individual is elusive and success is in resolving coarse groupings of people these data are difficult to interpret other than in a normative sense, assuming groups of people behave according to norms. The collective units she uses are populations, a common but purposely vague archaeological label for a collection of people of unknown size in some landscape at some time in the past. Without assuming these Later Stone Age populations conformed to the norms of foragers as understood from San ethnography, it would be impossible to say anything interesting about them.

The scenario she offers is of a local population established or re-established in the area some 4000 years ago. This population was organised in small groups with a mixed economy. The occupation in the cave site at this time is interpreted as evidence for an aggregation centre which ethnography suggests would have functioned to strengthen social bonds through ritual observances. As environmentally optimal conditions were approached between 3000 and 2000 years ago, this population underwent expansion. This had the effect of introducing social and economic stress. Further stress was experienced as environmental conditions deteriorated and as herders establish themselves in the area and the social interactions between foragers and herders ranged from co-operative to competitive.

In this outline it is impossible to do justice to the many insights Jerardino's study offers on coast dwellers. It illustrates how difficult it is to break away from some form of environmental determinism and the tyranny of ethnography. A recently completed thesis by Binneman (1997) has compiled evidence for symbolic construction of communities in the south-eastern Cape. This is an attempt to move in a new direction. Archaeologists use a mix of assumptions and concepts in their models and perhaps the future lies in unbundling some of these "*givens*". It is a daunting task. The studies of coastal midden sites are at an interesting stage. There is a loss of innocence and in the future they are destined to become better grounded in theory.

2.7. PERSPECTIVE

Shell middens are one of the most obvious archaeological features in the landscape and were recognised as such at an early stage of antiquarian interest. It took an antiquarian interest to value them as cultural resources and they are still undervalued in the public mind. Two hundred years of study has shown that each midden is uniquely important in itself and its associations with other occupation features. The label Standloper as a cover all for the "*midden-makers*" has made it difficult to promote a wider understanding of the variety of occurrences and the diversity of people associated with them.

This review has attempted to give a general perspective on midden studies rather than emphasise studies done in the southern Cape. The next chapter is a discussion of midden occurrences in the surrounds of Matjes River.

CHAPTER 3

THE PLETTENBERG-KEURBOOMS REGION

3.1. INTRODUCTION

The Plettenberg-Keurbooms region, where the Matjes River rock shelter (Figure 3) is located, combines mountains, plains, rocky coasts and sandy shores. A mild climate and a lush mosaic of forest and fynbos make it the node of the garden route and a popular tourist destination. This setting was also a draw for hunter-gatherers in the past, as the number of archaeological sites attest. The environmental setting, discussed in this chapter, is part of the explanation of why there is a relatively continuous record of Holocene occupation from sites in the region. Matjes River rock shelter apart, there are several noteworthy long sequence sites and together these have been important in developing an understanding of the Later Stone Age culture-stratigraphy not only of the region but of the whole sub-continent. It may not have been a favoured centre of Stone Age occupation as much as a region where a population persisted through the Holocene.

The other Holocene sites of direct interest are Oakhurst and Nelson Bay Cave (Figure 3). Oakhurst is located approximately 40 km west of Plettenberg Bay. As discussed in Chapter 2, Goodwin excavated this site during the 1930s. More detail of the stratigraphy and finds from Oakhurst is given in this chapter. Nelson Bay Cave, only 10 km from the Matjes River rock shelter, is on Robberg Peninsula on the opposite side of Plettenberg Bay. Since 1964, it has been the focus of two separate but overlapping major research projects, directed by Inskeep (1965, 1987) and Klein (1974) respectively. Although the main field research was carried out in the 1970s, excavations there extended into the 1980s. The collections of artefacts and fauna collections continue to be of research interest. Nelson Bay Cave is one of the best-documented long sequence sites with Later Stone Age materials. These data are very relevant in comparisons with those from Matjes River rock shelter. They obviated any priority for another large-scale excavation at a nearby site. The regional setting, past environments and the archaeology of these sites are discussed below.

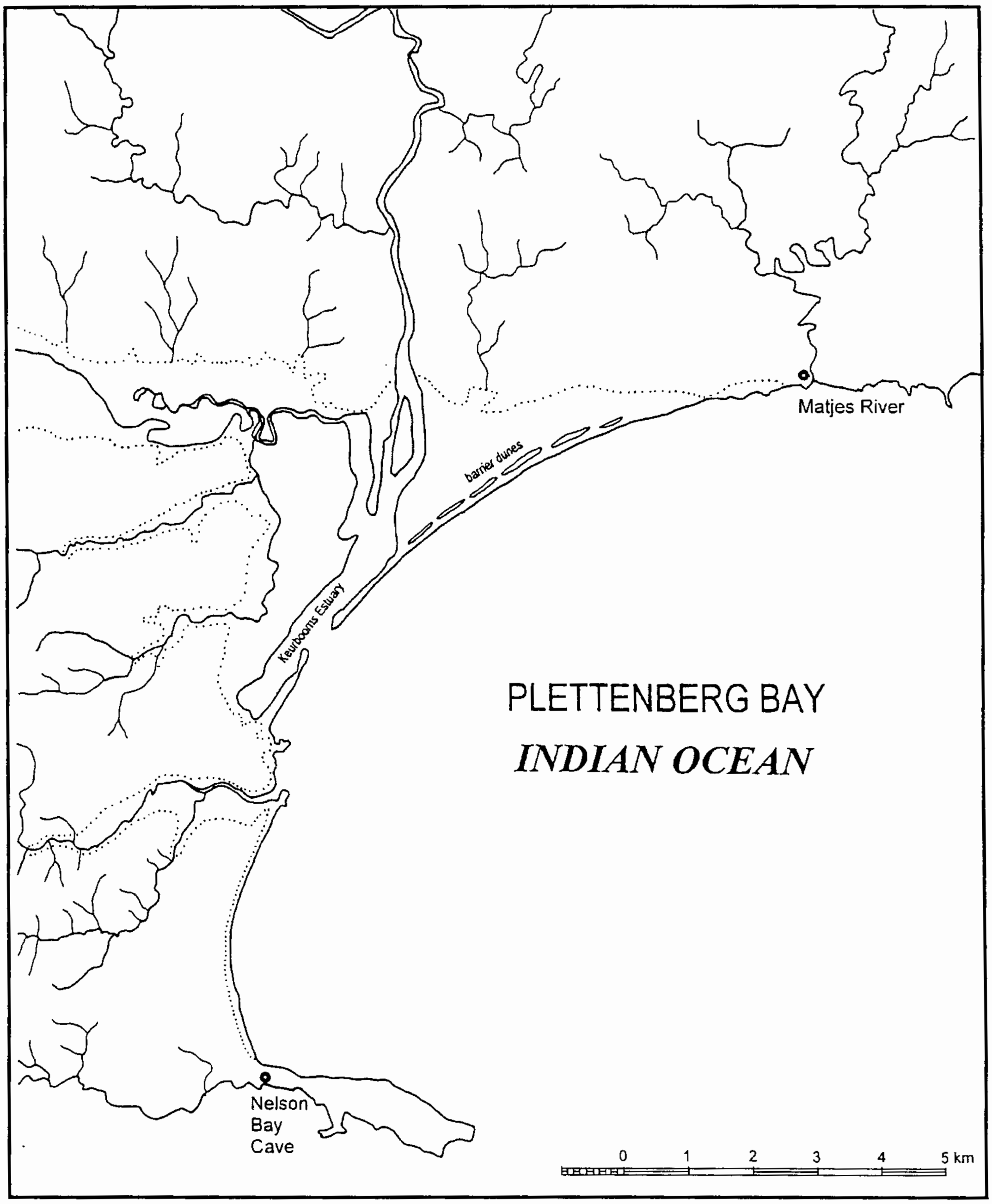

Figure 3: The Plettenberg-Keurbooms region

3.2. REGIONAL SETTING

The dominant lithology (Reddering 1981) of the region is sandstone of the Table Mountain Group with some areas underlain by shale of the Bokkeveld Group, both belonging to the Cape Supergroup. These sediments were folded during an episode of mountain building, known as the Cape orogeny, in the Permian and Triassic (c. 245 million years ago). The Outeniqua, Langkloof and Tsitsikamma Mountains that form the inland margin of the region are the eroded remnants of this episode of mountain building. At the end of the Jurassic (Reddering & Rust 1988), the coast was outlined as the African and South American plates moved apart and this Gondwanide fracturing episode created onshore and coastal depocentres in fault-controlled basins and half-grabens. In the Robberg Formation (Reddering 1981), on the Robberg Peninsula at Plettenberg Bay, an early stage in the accumulation of sediments is represented and the modern courses of the Piesangs, Bitou and Keurbooms rivers cut into unconsolidated Cretaceous valley fills. The roof-rock of Nelson Bay Cave is conglomerate of the Robberg Formation.

Planation of the region followed the creation of new base levels for erosion and the coastal platform is a stepped feature rising from some 200 m near the coast to 400 m in the foothills of the mountains (Deacon, H. J. *et al.* 1992). The modern drainage is deeply incised into the platform, not only into softer Cretaceous fills but also into harder rocks of the Cape Supergroup. Since the late Cretaceous the major deposition has been offshore and on the shore erosion has been the dominant process. Locally in coastal embayments along the southern Cape coast, as at Wilderness and Knysna, later Cainozoic deposits of coastal sands, calcarenites, have accumulated (Martin 1968). Some of the ferruginous sands in the region, like those of the Brakkloof Formation (Butzer & Helgren 1972) at Robberg may represent equivalent but possibly younger Middle Pleistocene deposits.

The wide, combined estuary of the Bitou-Keurbooms rivers is a feature of the region and has been the subject of detailed sedimentological study (Reddering 1981; Reddering & Rust 1988). The present estuary, a back-barrier lagoon, occupies perhaps half of the embayment and it is fringed by two and possibly three generations of barrier dunes between Plettenberg Bay and Keurboomstrand. The estuary outlet has migrated over distances of a kilometre or more in modern times (Reddering 1981) but the position of the outlet in mid Holocene and in former interglacial times, when sea levels were higher than the present is uncertain. In a roadcutting at the entrance to Keurboomstrand the easternmost margin of the embayment is exposed. The road leading to Keurboomstrand from the present position of the estuary follows a swale between a calcarenite coastal barrier dune and deeply weathered dunal materials lying against the edge of the coastal platform. These are undisturbed, old Pleistocene deposits and the estuary was not significantly closer to the Matjes River rock shelter at any time in the Holocene. However, throughout the Holocene the estuarine tidal mud flats would have been within foraging range of the rock shelter. The rivers and the estuary are large enough and deep enough to have been a barrier to easy movement in this coastal zone. It is barriers of this kind that may have marked the boundaries of residential group territories and it is unlikely that the same residential group occupied Nelson Bay Cave and the rock shelter at Matjes River.

The Matjes River drains the area immediately east of the Keurbooms estuary. The catchment is relatively small. Although, in common with other rivers along the coast, it occupies a drowned channel, there are bedrock outcrops in the floor of the valley about 1 km from the coast. The rock shelter is high up (45 metres above sea level) on the western cliff near the mouth of the river. It is an overhang formed by intersecting prominent joint zones in sandstone of the Kouga Formation of Table Mountain Group. The basal deposits in the rock shelter and present-day active spalling of the wall rock suggests that haloclastic weathering is and has been part of the process in carving out the shelter.

3.2.1. PRESENT ENVIRONMENT

The Plettenberg-Keurbooms region lies within the restricted part of South Africa that receives rainfall throughout the year. Figures made available by Mr R. Taljaard of the Department of Agriculture from the Geographic Information System (GIS) holding the computerised long term records of the Weather Bureau, show the rainfall to be evenly distributed throughout the year. Though very variable, precipitation tends to be slightly higher during the February-March and September-October periods (Figure 4). The mean annual long-term rainfall recorded at Plettenberg Bay is 1115 mm. The effectiveness of the rainfall is enhanced by a low surface evaporation rate.

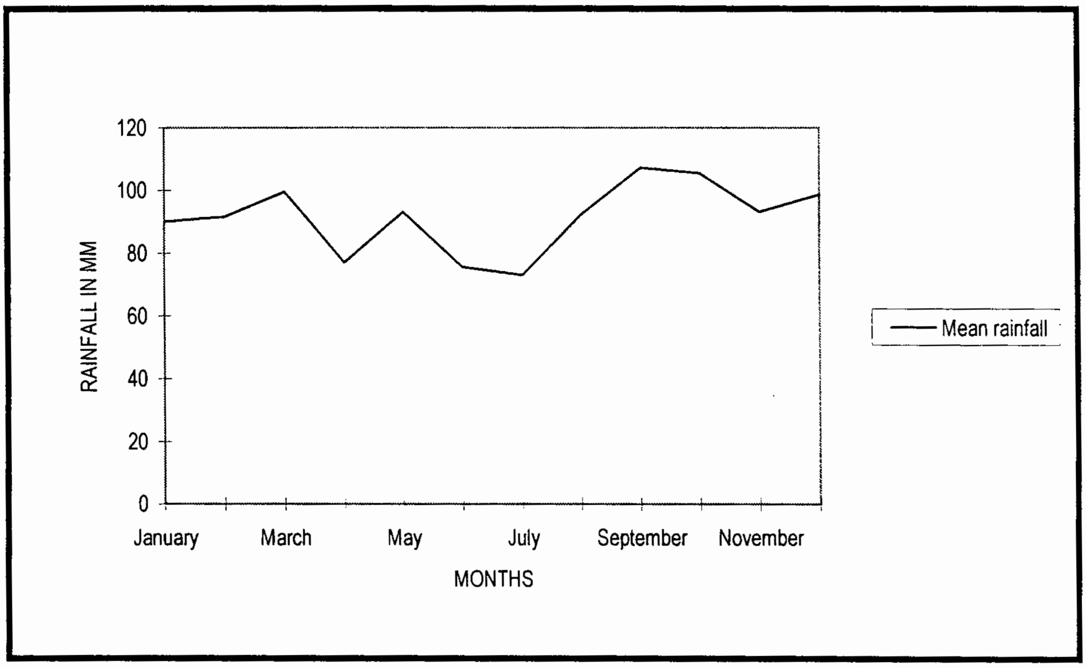

Figure 4: Mean monthly rainfall

The mean monthly temperatures vary within a small range and show little inter-annual variation (Figure 5). Frost is unknown. The hottest month is February with an average daily maximum temperature of 24.3°C and hot weather is often relieved by sea breezes. The coldest month is July when the average daily maximum temperature drops to 17.6°C (GIS data). Night-time temperatures fluctuate around 11°C, which makes this one of the most temperate regions in southern Africa.

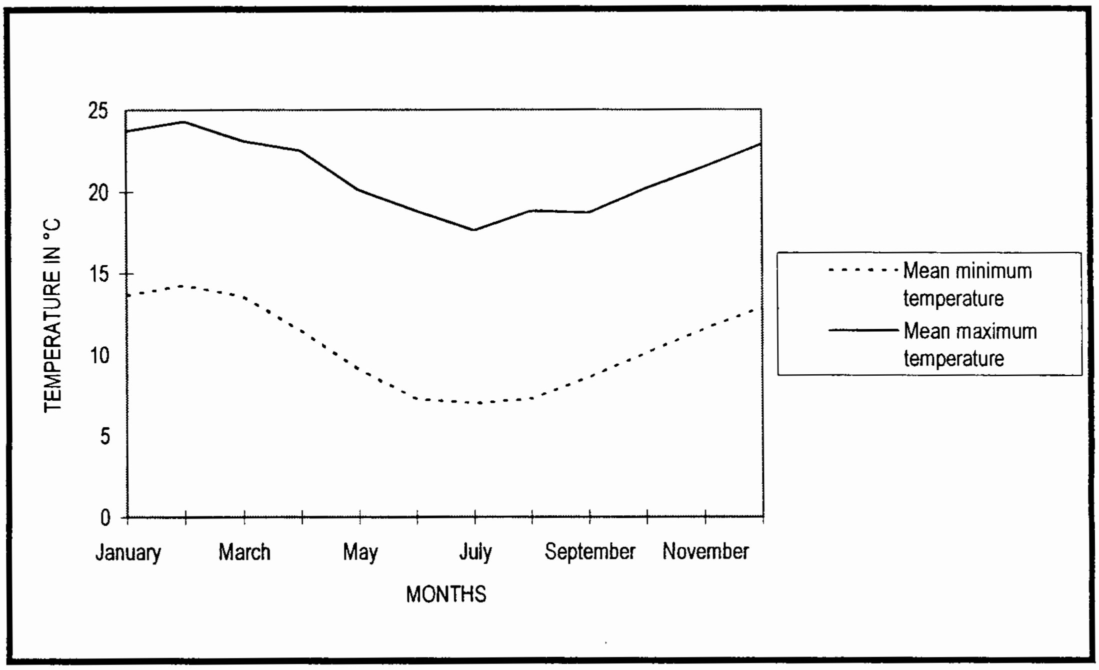

Figure 5: Mean monthly temperature

Cowling and Holmes (1992:32) have classified the regional vegetation as Afromontane forest with thicket (Figure 6). The climatic regime favours non-Cape Floristic Region taxa and vegetation types other than the dominant fynbos of the Cape shrublands. This limits the diversity of the plant communities and species richness is low. However, it is the small-scale variations in the vegetation mosaic, not mapped on a regional scale by botanists, that would have been important to the Stone Age foragers.

Historical records, before the advent of modern farming, are a somewhat sketchy source of information on the fauna and flora. In 1630, one of the earliest visitors, Antonio Pinheiro de Sampaio (Raven-Hart 1967) recorded deer (antelope), wolves (hyenas), sea-horses (seals), buffalo, wild boars (bush pigs), monkeys, tigers (leopards), elephants and various birds. He wrote that:

> *"The soil is excellent, without any rocks, although with various hills: these and the valleys have many herbs and plants ... Trees are many and large. Rich rivers water it everywhere, and there are abundant and lovely springs."*

Antonio Pinheiro de Sampaio (Raven-Hart 1967:133)

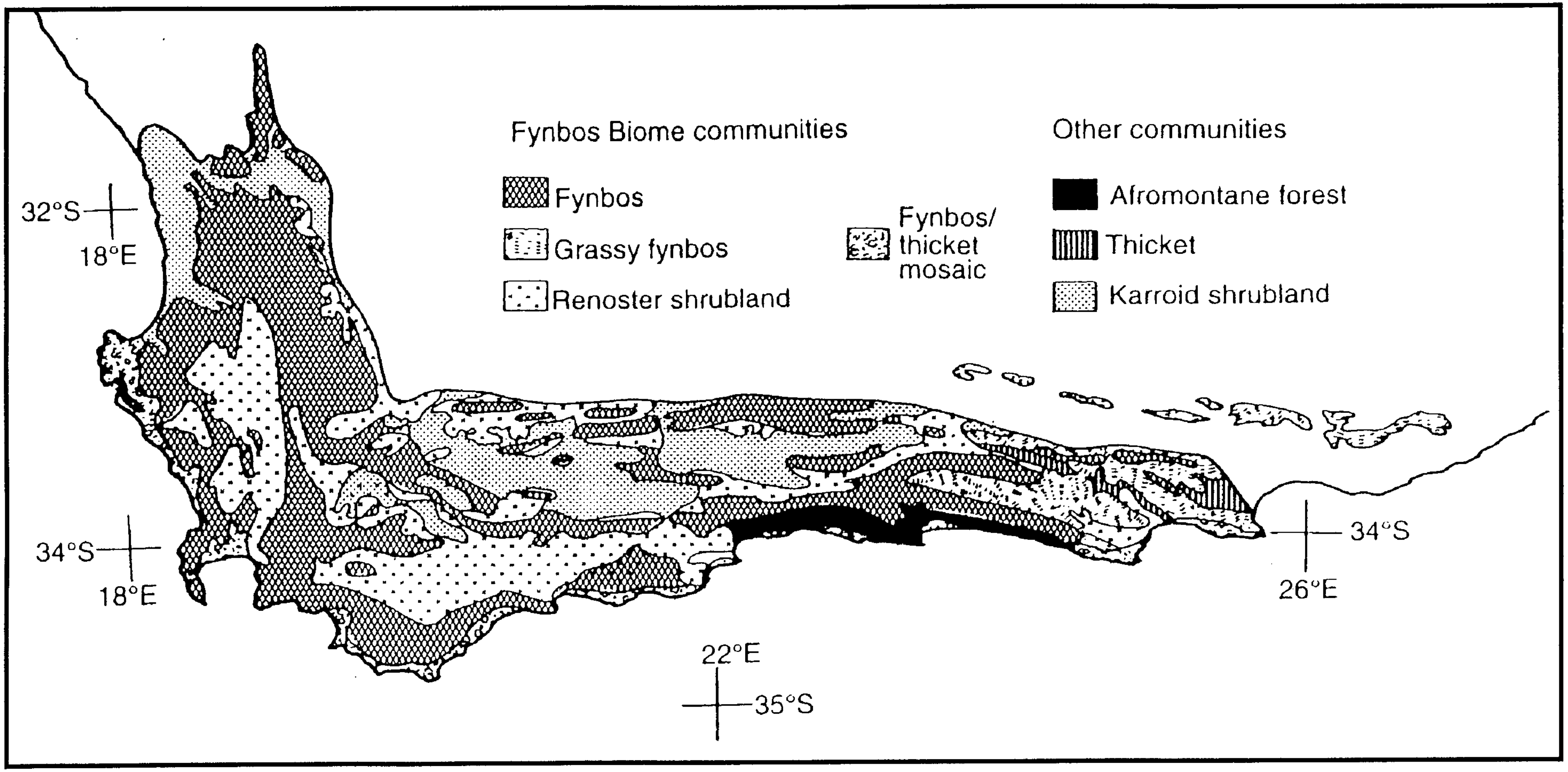

Figure 6: Major vegetation communities in the Cape Floristic region (after Cowling & Holmes 1992:24)

In November 1772 Thunberg (1986:91) recorded that good open grazing veld was available on the shore of the bay and that the area abounded in grass and wood. The Khoekhoe hunted buffalo. Barrow (1968) journeyed through the area in 1804 and left the following description:

> *"...the district of Plettenberg Bay is a rich field for the naturalist. The greatest part of the forest trees still remain unexamined ... the Plain of the Hartebeests abounds with that noble species of the antelope tribe from which it takes its name; and every thicket is filled with the beautiful Bosbok."*
>
> Barrow (1968:82)

The mention of open areas, grass, wood and game is common to these early accounts and these were the resources valued by the settlers. The frontier of European expansion had extended east of Plettenberg Bay in Thunberg's time but then, and even in Barrow's time, the environment was relatively pristine.

It is probable that the mosaic of grassland, scrubland and forest existed in the region from prehistoric times. Much of the true forest probably lay in the kloofs sheltered from berg winds and therefore, the effects of fire. Even within the forested areas there would have been patches of fynbos. Such patches are known locally as "*islands*" and it is debated whether they are the result of fire or edaphic factors (Phillips 1931:102).

The variability is not only reflected in the vegetation, but also in the fauna occurring in the region. Stuart (1981:5-51) lists eleven species of carnivores which include the leopard, serval, aardwolf, Cape clawless otter and forty other species of mammals. These include the bushbuck, Cape hyrax, steenbok, forest shrew, klipspringer and the Cape grysbok (Duvenhage & Morant 1984:59-60). Beacon Island in Plettenberg Bay was a whaling station at the beginning of the century and whales still calve in the bay. Pods of dolphins were observed daily during a four-month excavation period and the name Robberg suggests there were seal colonies onshore. Twenty-eight species of fish have been recorded along this coast that is favoured by anglers and include elf, spotted grunter, cob, flathead mullet and baardman (Biden 1954).

3.2.2. PALAEOENVIRONMENTS

Various proxy indicators are used by archaeologists to obtain information on palaeoenvironments. The results obtained from different research fields are seldom in complete accord and this is a potential source of confusion. In part this is due to the different levels of resolution possible with the indicators used. The period of interest, the Present Interglacial or Holocene, defined as the last 10 000 radiocarbon years, on all indicators and in global terms, was markedly warmer than any time during the last some 100 000 years (Deacon & Lancaster 1988). There were environmental changes on a smaller scale than that between glacials and interglacials in the Holocene and it is these that are of concern here. Smaller scale changes can only be documented in data providing fine resolution. Such data are in short supply anywhere in southern Africa although there are probably more such data available from the southern Cape than elsewhere.

There are patterns of change in climates that make the early Holocene, ten to five thousand years ago, different from the late Holocene, the last 5000 years. The controls, still poorly understood, are hemisphere-wide - like the strengthening and weakening of the El Niño-Southern Oscillation (Sandweiss *et al.* 1996). It is the early Holocene changes that are most relevant to Matjes River. The mid Holocene, broadly between 6000 and 4000 years ago, is a period to which a number of observations relate and it is convenient to be able to refer to it as distinct from the early and late Holocene.

During the early Holocene the temperature increase affected the whole Southern Hemisphere and reached a peak between 7000 and 6500 BP (Scott 1993:233). The smoothed Uitenhage aquifer data for the solubility of noble gasses in fossil waters (Partridge 1993:240) suggests that the temperature during this altithermal peak exceeded the Holocene average by 2°C. However, *Patella tabularis* shells from Nelson Bay Cave (Cohen & Tyson 1995) dated to between 8600 and 6300 BP recorded lower summer and winter sea temperatures than those of today. These results are impossible to reconcile without assuming that changes in ocean water temperatures were partly independent of changes in land temperatures. It is possible that sea surface temperatures show a lag effect of a thousand or more years due to the high specific heat of the waters of the oceans. This is suggested because some 5800 years ago, the shell data (Cohen & Tyson 1995) indicate sea surface temperatures were significantly warmer. Both summer and winter temperatures were more than 2°C warmer than those recorded in the region today during non-El Niño years. The Holocene high sea-level, dated to the mid Holocene in the Keurbooms estuary (Marker & Miller 1993:100), also occurs after the altithermal peak and would be consistent with higher sea surface temperatures.

The early Holocene was not only warm but it was dry relative to the late Holocene and, large parts of southern Africa were effectively depopulated (Deacon & Lancaster 1988). It is significant that sequences in the southern Cape like Matjes River show human occupation in this time range. Scott (1993) suggests the entire subcontinent may have received a significant part of its rain during winter and that summer rainfall climates appear to have developed in the north first and then spread southwards to their present limits after 5000 years ago. The mid Holocene was thus marked by a change to a biseasonal precipitation regime. This change accompanied an increase in effective precipitation in the late Holocene that reflects the strengthening of anti-cyclonic circulation; a pervasive control on climates in these latitudes of South Africa It is during this period that the present-day synoptic patterns of climate had their inception (Deacon, H. J. 1995:125).

The Cango Cave speleothem, which showed renewed growth after 5500 years ago, provides a high-resolution record of temperature and vegetation changes in the late Holocene (Vogel 1983). Mean annual temperatures ranged about 1-2°C around the present day mean and the stable carbon isotope measurements show the values increased gradually to a maximum 3000 and 2000 years ago (Vogel 1983, Talma & Vogel 1990). This indicates that C4 pioneer grasses, associated with increased summer rainfall, largely replaced C3 winter rainfall grasses in the Cango Valley. This change was the southernmost expression of a shift in seasonal precipitation, which Scott (1993:234) suggests began in the north, and reached the Cango Caves even later than in the Upper Karoo. The $\delta^{13}C$ maximum was associated with forest expansion and after 2000 BP there is a decline in forest taxa (Martin 1968). Partridge (1993:241) has summarised evidence from the southern Cape that suggests grassland was the natural climax vegetation prior to the establishment of the present-day renosterveld with forests increasing only in warmer times when summer precipitation was also higher. As edaphic factors are also a consideration, this may be an oversimplification. However, it is well established that the fynbos vegetation becomes richer in grasses on a gradient of increasing summer precipitation from west to east in the biome (Cowling & Holmes 1993). Under the climate conditions of the last 5000 years both forests and sub-tropical pioneer grasses would have reached their maximum distribution (Deacon, H. J. 1995).

At no time in the Holocene was the coast more than 5 km from the present day position (Van Andel 1989:144). In the late Holocene the sea level fell from the mid Holocene high and stabilised close to modern levels after 4000 years ago. Tide-deposited sediments, exposed above the high water level along the bank of the Keurbooms estuary (Reddering 1981) are evidence for the mid Holocene high. These sediments consist of carbonate rich sand with shell fragment lenses. Allowing for the combined effects of wind erosion, compaction and the loss of 25% $CaCO_3$, Reddering (1981:107) has estimated that the original elevation of the deposits were between 2.3 and 3 m above the present high water level. These are the sediments dated to between 5140 and 3980 BP by Marker and Miller (1993:100), as noted above. Sea level changes of this order would have influenced the availability of shellfish species. The rise in sea level may explain why sandy shore species were replaced by rocky shore species in the early Holocene in the Matjes River sequence. In the mid Holocene late Holocene with sea level above or at the present level, this would have been a rocky shore.

The *P. tabularis* sea surface temperature estimates (Cohen & Tyson 1995:11) for layers dating between 3300 and 2500 BP show the maxima to have been about 1°C lower than they are today on the Nelson Bay Cave coast. The minima were also slightly lower. Summer and winter, sea surface temperatures were again low 650 years ago. It would seem that the sea surface temperatures were consistently lower than the present in the late Holocene between 4300 and 650 BP. However, this record is not as finely resolved as that provided by the Cango stalagmite.

3.3. PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

3.3.1. MATJES RIVER ROCK SHELTER

Dreyer (1933:187) laid out an excavation trench that Louw (1960:16) records as 55 m long and between 1.1 and 7 m wide (Figure 7 and Figure 8). The widest part would have been at the southern entrance. At its deepest point the excavation was said to have reached 11 m. This is almost twice the depth recorded in this excavation and it seems improbable that so much depth of deposit could have been lost by erosion. At several points where the base of the trench was cleaned out in 1994, it bottomed on clastic rubble, not bedrock but bedrock would not be much deeper. The cross-cutting excavated by Hoffman (1958:342) and Meiring was 17 m long and from 2 to 4 m wide (Louw 1960:16). Louw's (1960:19) interpretation of the stratigraphy of these cuttings is given Figure 7.

Five stratigraphic layers were recognised. The topmost, Layer A varied in thickness from 0.3 m to 2.4 m and consisted of loosely consolidated ash and seaweed bedding material (*Zostra capensis*). Layer B had a thickness of between 0.5 m to 2.4 m and was described by Dreyer (1933:189) as the mytilus layer. Hoffman (1962:284) reported that 90% of this layer consisted of mussel shells, intermixed with unconsolidated ash. Layer C varied in thickness from 0.5 m to 1.2 m and consisted of black loam with consolidated midden material. Layer D was approximately 1.2 to 4.8 m thick and consisted of well-consolidated ash. Dreyer (1933:202) referred to this layer as the "*burnt layer*" and mentioned that he had confused layer D with C, but that he corrected this mistake during the unpacking of artefacts in Bloemfontein. Layer E was estimated to be 0.4 m thick and was called the red sand layer by Dreyer (1933:208). It consisted of a sterile deposit of fallen rock covered by an ash horizon 0.1 m thick. Dreyer admitted that he did not recognise this layer as a separate entity from layer D during his first excavation. From examining the standing sections it is possible to distinguish some of the divisions made. There is a shell-rich horizon that would fit the description of a mytilus layer and a clastic rubble horizon that could be described as composed of fallen rock. The distinction between layers C and D caused Dreyer problems in the field and these appear to have differed in artefact content rather than lithology.

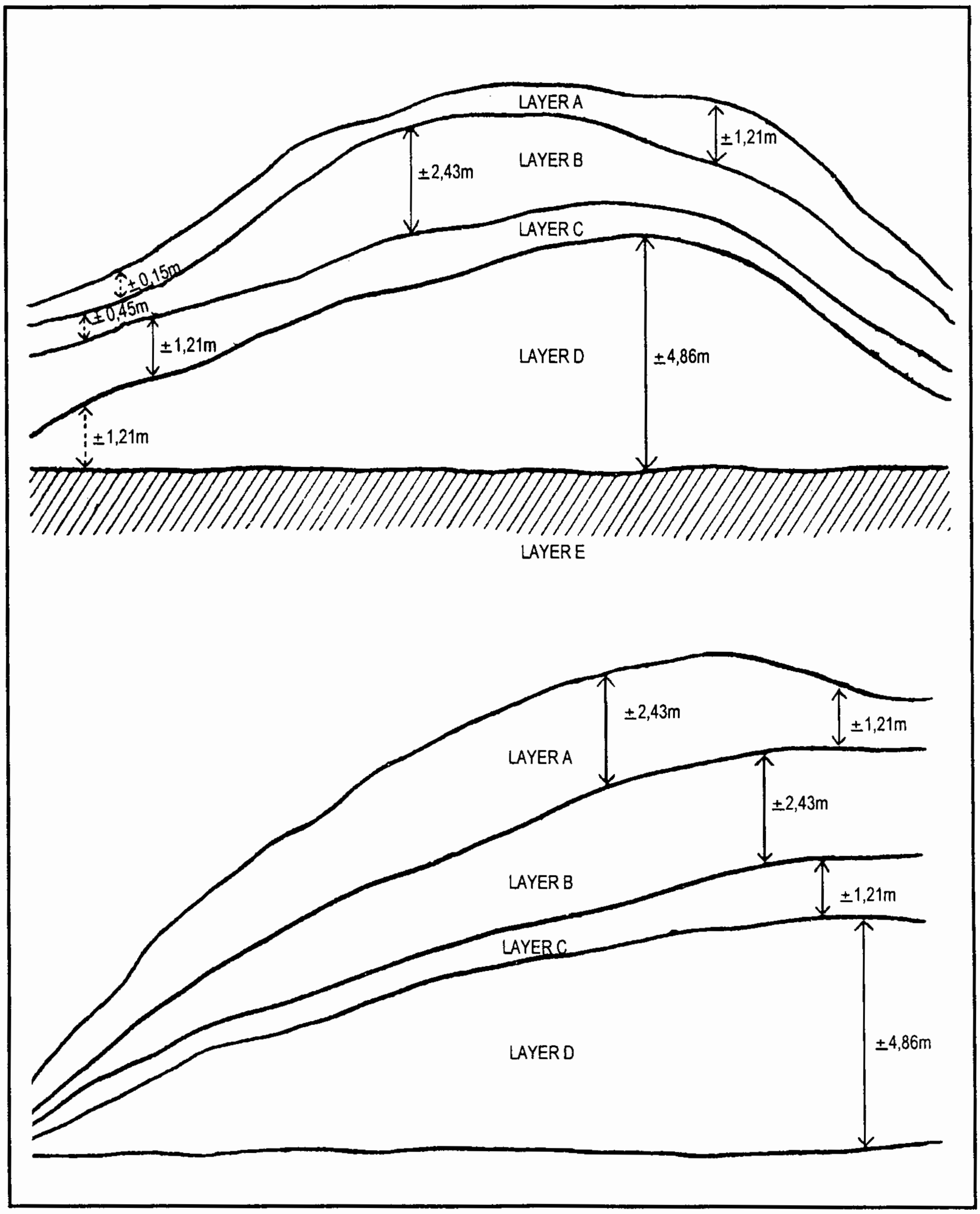

Figure 7: General diagram of Matjes River rock shelter stratigraphy (Louw 1960:19)

The Lamont Laboratory measured the initial radiocarbon dates. Hoffman (1958:318) submitted the samples. A second series of samples was collected by Inskeep in 1964 and processed at the Groningen Laboratory by Vogel (1970:463). The latter samples were from the Apex area near the intersection of the two trenches (Table 1). Although it is not possible to locate the precise positions where these samples were collected, the results from the two laboratories are comparable in range and broadly consistent with the stratigraphy.

Table 1: Radiocarbon dates at Matjes River rock shelter

LAYER	REF. NO.	DATING MATERIAL	14C DATES	SOURCE
A/B	Gr-N 5888	Shell	3555±35	(Vogel 1970:463)
C	Gr-N 5887	Shell	7050±45	(Vogel 1970:463)
	L-336F	Charcoal	5400±250	(Hoffman 1958:318)
	L-336E	Charcoal	7750±300	(Hoffman 1958:318)
D	Gr-N 5886	Shell	9450±55	(Vogel 1970:463)
	Gr-N 5872	Charcoal	9580±85	(Vogel 1970:463)
	L-336G	Charcoal	10500±400	(Hoffman 1958:318)
	L-336H	Charcoal	11250±400	(Hoffman 1958:318)
D/E	Gr-N 5061	Shell	9780±60	(Vogel 1970:463)
E	Gr-N 5871	Charcoal	10030±55	(Vogel 1970:463)

Few of the mammalian remains were kept, but none of the investigators reported the presence of any extinct species. Hoffman (1958:346) provided a species list for layers C and D. This listed buffalo, bushbuck, duiker, steenbok (?grysbok), klipspringer, oribi, hippopotamus, bushpig, hyrax and smaller carnivores. Seal and otter were also present. No frequencies were given. Fish remains were recorded as being present in layer C. It can be assumed that there were few mammal remains in layers A and B but Hoffman (1958:342) mentions a variety of buck represented in layer A.

The data published on the shellfish remains are scanty. Hoffman (1958) claimed that different species characterised the different layers and named, what he considered to be the dominant species in each layer. In layer A, the patellids appear to have been dominant shellfish remains (Hoffman

1958:342). The mytilus layer, layer B of Dreyer (1933:189), is something of a misnomer because mytilus is the generic name of the Mediterranean mussel and locally it is the common name for *Choromytilus meridionalis*, the black mussel. Both have a west coast distribution and neither was common on the south Cape coast during the mid Holocene. The brown mussel or *Perna perna* layer would be a more appropriate description for layer B. During the accumulation of layers C and D gastropods and *Donax serra*, the white or sand mussel, were suggested to be the main shellfish collected (Hoffman 1958:346). Hoffman identified a change in shellfish species through the sequence that is confirmed in this study. His expectation that the shellfish in each layer was different may have been because he held that a succession of different people or races occupied the site.

Dreyer (1933:187) recorded that only a small part of layer A was left unexcavated and listed two fragments of coarse pottery and an ornamental bone tube as the only finds from this unit. All the excavated material may not have been recovered (Louw 1960:123). Hoffman (1958:342) and Meiring did not excavate in this layer so as to preserve a witness section but they obtained a variety of artefacts from the layer (Louw 1960:122). Listed are two thumbnail (convex) scrapers, two rubbing stones, nine large quartzite flakes and a saw edge, possibly a serrated or notched flake. It may have been on the morphology of the scrapers that the industry was classified as the Strandloper variant of the Smithfield B.

Hoffman (1958:345) recorded three potsherds in layer B as being "*the first and only occurrence of pottery in the Matjes River Shelter*". In the table of artefacts Louw (1960) listed two potsherds. The occurrence of pottery indicates that some surface deposits, probably relating to layer A rather than to layer B, were less than 2000 years old. The small number of shards is an indication of minimal occupation at this time. No backed tools were found in layer B but six scrapers (Louw 1960:113), two endscrapers, one large skinscraper and three coarse endscrapers, were recovered. The common artefacts were hammers and choppers on quartzite pebbles and cobbles. About twenty-three bone implements were also found. Dreyer (1933:189) classified the artefact industry in this layer as Smithfield C because of the presence of segments or crescents. There is no mention of segments from this layer in subsequent publications (Hoffman 1958; Louw 1960) and in those publications the industry is designated as Smithfield B. This reflects something of the confusion that existed over the definition of Later Stone Age industries (Deacon, J. 1979:77).

Layer C was reported (Louw 1960:107) to be rich in artefacts. In the formal tool category different types of small scrapers predominated with a low but persistent frequency of backed tools. Notable were ornaments made in bone, stone, marine shell and ostrich eggshell. Louw (1960:111) illustrates shell crescents from this layer. This is a type that has been reported from other sites but they may not be artefacts. A large cobble associated with one of the graves was painted with two indistinct human figures (Louw 1960:132, Meiring 1953:81). The industry in this layer was labelled Wilton and the makers of these artefacts the Keurbooms people – "*to avoid confusing the human remains with the lithic culture*" (Meiring 1937:74; Louw 1960:17). The artefacts from layer C are typical of other Wilton assemblages in the southern and eastern Cape (Deacon, J. 1979:76).

In layer D segments are absent and the diagnostic artefacts were found to be large scrapers of the "*Smithfield A-type*". While Louw (1960:78) considered the presence of endscrapers made on reworked Middle Stone Age points which only occurred in the upper part of the unit significant, Sampson (1972:219; 1974:264-269) who later re-analysed the collection in the National Museum does not mention such artefacts. He too divided layer D into an upper (1.2 m to 3.1 m depth) and lower (3.1 m to 4.93 m) division. The upper part included a high proportion of endscrapers, frontal scrapers and sidescrapers and abundant shell and bone ornaments. Quartzite was the dominant raw material, but about 10% of the artefacts were made on chalcedony and quartz. In the lower part of the layer there were numbers of miscellaneous utilised flakes, a few sidescrapers, two bone spatulas and some cut-marked bone. The stone artefacts were made entirely on quartzite. Louw (1960:75) suggested that *"the culture of this layer be classified as a*

Matjes River Variant of Smithfield A". Sampson (1974:269) assigned the artefacts from both his divisions of layer D to the Oakhurst industry, a term he has proposed to replace the Smithfield A. The term used here, following Inskeep (1987), J. Deacon (1982) and other researchers working in the area, is the Albany industry.

From layer E, Louw (1960:73) lists only 45 artefacts, too small a sample to be diagnostic of any industry and these artefacts are best considered chance inclusions in a culturally sterile layer. There is the suggestion in the literature (Dreyer 1933:202) that a Middle Stone Age, Mossel Bay industry occurs at the site. Louw (1960:79) adequately explained the find of any Middle Stone Age artefacts as pieces that had been picked up outside the shelter and re-used. There is no Middle Stone Age lag deposit at the base of this sequence. Although layer E is a non-occupation horizon and only 100 mm thick, two skulls (Dreyer 1933), different from all the "*Bushman types*" excavated in the upper layers came from this layer. These can only have been from intrusive graves from layer D. It is interesting that Dreyer saw these skulls as morphologically different from later remains. They are the oldest human remains from Matjes River and it would seem that the end-Pleistocene skeletal morphology was less gracile than were those from the Holocene.

For Dreyer and his associates the significance of the excavations at Matjes River was in the human remains. Dreyer (1933:188) described the few rotted skeletons he excavated in layer A as being of recent Bushman type. The human remains excavated from layer B were called Pre-Bushman (Dreyer 1933:190), a term accepted by his associates. A discriminate analysis (Bräuer & Rösing 1989) suggests that the layer B sample is more closely related to the San than to the Khoekhoe and thus not Pre-Bushman in any sense. With hindsight it is incredible that the human skeletal remains from layer C were described by Meiring (1937:75) as "*not comparable to those of Bushman, Hottentots or Bantu, but do show ... a remarkable resemblance to the late Palaeolithic Men of North Africa and Southern Europe*". Equally naive is Louw's (1960:109) classification of the skeletons as hybrids with Bushman and Hottentot affinities. These were his Keurbooms people. The human remains were dated to between 7500 and 9500 BP (Protsch & Oberholzer 1975) and it seems likely that their sample included skeletal remains from layer D and possibly layer E rather than layer C. Bräuer & Rösing (1989:38) suggested that these skeletal remains show robust elements in addition to the distinct Khoisanoid features but that they do not possess the significance which Meiring (1953) ascribed to them. It was Hoffman's (1958) contention that different evolutionary stages could be recognised in the morphology of the skeletons found in the five layers recognised at the site. Singer (1961) was particularly severe in his review of the book by Louw (1960) which reiterated Hoffman's ideas. In dispute was the racial designation of the skeletal material. Singer argued that the morphological variability has to do with variability in the population sampled and not to the presence of distinct races.

Louw's (1960) monograph on the Matjes River rock shelter received poor reviews in the South African Archaeological Bulletin. Singer (1961), in his comment on the quality of the physical anthropology stated that it was "*a most despairing example of misguided enthusiasm, lack of experience in handling skeletal material and inability to assess data. The book reads like a chronicle of errors, contradictions and pseudoscientific misstatements.*" Inskeep (1961) reviewed the archaeology and wrote that "*as the reader plods on to the end of this thesis he is led to the sad conclusion that we know really very little about the archaeology of the Matjes River Rock Shelter. This is a tragedy ...*" Sampson (1974:265) added his criticism on the extremely variable quality of the different excavations and the lack of stratigraphic control.

These are hard comments that dismiss or severely down grade the early research at Matjes River rock shelter. The original excavation was to the standard of the pre-Goodwin era in South African archaeology and perhaps less well controlled than Hewitt's excavation at the Wilton rock shelter (Leslie-Brooker 1987). There seems to have been little justification for the cross-cutting made in the 1950s and it is tragic that this caused large-scale collapse of the sections, creating a conservation problem. This thesis is part of the programme to redress some of the shortcomings in previous work done at the site.

3.3.2. OAKHURST

The Oakhurst shelter is situated on the farm of the same name about 40 km west of Plettenberg Bay. The shelter faces east and is approximately 5 km from the sea and some 3 km from a series of lakes running parallel to the coast. Goodwin (1938a:232-245) excavated Oakhurst in the course of six visits from 1932 to 1935. He undertook the excavation at the invitation of the director of the South African Museum, Dr. Gill, and the owner of the farm, Mr. Dumbleton, a land surveyor. Goodwin (1938a) published his findings together with reports by Drennan on the human skeletal remains, Schofield on the pottery and Barnard on the faunal remains. No further excavations have been undertaken at the site, but the artefact collections were re-analysed by Fagan (1960) and Schrire (1962).

Goodwin (1938a:303-324) reported the sequence of industries as Wilton at the top, Smithfield C in the middle units and Smithfield B at the base. The Wilton unit consisted of loose ashy loams and Goodwin (1938a:304-313) divided it into three sub-units on the basis of the artefact content. The Wilton with pottery was confined to the top 0.2 m of the deposit and was underlain by a developed Wilton in a layer approximately 1.0 m thick. The normal Wilton, stratified below this, was about 0.2 m thick. The underlying Smithfield C unit had a thickness of about 0.4 m and consisted of loose ashy loams. It could be separated from the Wilton units on the basis of artefact content. A "*buff-black-buff*" layer over most of the excavated area separated the Smithfield C from the underlying Smithfield B layers. The latter were approximately 0.7 m thick and consisted of hard, compacted materials.

Inskeep relocated the rock shelter in 1961, drew the section and collected four radiocarbon samples, which were dated by Vogel (Schrire 1962). Another drawing of the section was made by H. J. Deacon and M. Leslie-

Brooker in 1976 and related to the culture-stratigraphy (Rightmire 1978). A number of additional radiocarbon age determinations on collagen were obtained in the reappraisal of the human remains by Patrick (1990). These age determinations are listed in Table 2, in order of depth below surface. The collagen samples taken from burials do not reflect the true stratigraphic position but the depth of the burials below the surface.

Table 2: Radiocarbon dates at Oakhurst

DEPTH IN m	REF. NO.	DATING MATERIAL	14C DATES	SOURCE
0.71	Pta 3718	Collagen	6180±70	(Patrick 1990:35)
0.91	Pta 520	Charcoal	3450±55	(Schrire 1962)
1.01	Pta 4354	Collagen	7120±60	(Patrick 1990:35)
1.06	AA 2115	Collagen	4830±250	(Patrick 1990:35)
1.14-1.45	AA 2119	Collagen	4870±210	(Patrick 1990:35)
1.14-1.45	AA 2116	Collagen	2065±105	(Patrick 1990:35)
1.22	Pta 4426	Collagen	5990±70	(Patrick 1990:35)
1.27	Pta 4347	Collagen	4880±70	(Patrick 1990:35)
1.37	Pta 377	Charcoal	7910±70	(Schrire 1962)
1.44	Pta 4467	Collagen	4900±60	(Patrick 1990:35)
1.52	Pta 4367	Collagen	5450±70	(Patrick 1990:35)
1.55	AA 2117	Collagen	4995±215	(Patrick 1990:35)
1.62	Pta 4449	Collagen	4530±70	(Patrick 1990:35)
1.72	Pta 3719	Collagen	5330±60	(Patrick 1990:35)
1.75	Pta 4348	Collagen	4880±70	(Patrick 1990:35)
2.59	Pta 410	Burnt bone	8950±90	(Schrire 1962)
2.79	Pta 3724	Collagen	9100±90	(Patrick 1990:35)
2.8	Pta 4431	Collagen	4100±60	(Patrick 1990:35)
3.35	Pta 375	Charcoal	8270±55	(Schrire 1962)

Goodwin (1938a:305) commented that the faunal remains were not easily identifiable and did not list species occurring in the different stratigraphic units. He reported the teeth and tusks of bushpig, skulls of small antelope, a small carnivore, porcupine teeth, swamp rat teeth as well as zebra and buffalo, animals which do not occur in the region today. Wells (1960:306) re-examined the faunal remains and, in addition to the above, he listed genet cat, hyrax, blue duiker and the extinct blue antelope. In the sequence no changes in the mammalian fauna were reported.

The shellfish (Goodwin 1938a:322) included *D. serra*, *P. perna* (*sic* black mussel), *Turbo sarmaticus* (alikreukel), *Haliotis midae* (venus ear), *Solen capensis* (razor shells) and various patellids. The dominant shellfish species in the Wilton units was not recorded but it appears to have been *P. perna*. In the underlying Smithfield C units, it is recorded that *D. serra* replaced *P. perna* in dominance. In the basal Smithfield B units only *Pinctada capensis* (oyster) and *S. capensis* were recorded.

Goodwin (1946:135) was impressed by the marked increase in fish remains in the developed and pottery Wilton units and considered this was due to the use of tidal semicircular stone fish traps or "*vywers*". Fish remains show an initial increase in the underlying normal Wilton but are reported as absent in the lower part of the sequence. Preservation may be a factor as Goodwin (1938a) noted only two burnt fish otoliths from the basal Smithfield B unit. Other less dense fish bone did not preserve.

The pottery from the top of the sequence was analysed by Schofield (1938:300), who was the leading authority on pottery at the time. He noted two shapes; a typical narrow necked, pointed base, bag-shaped form with lugs, the kind of pottery known to occur widely along the coast, and a wide necked form of coarse ware. He saw similarities in the pottery from the site to the pottery from Ovamboland in northern Namibia. However, he was adamant that this was a homogeneous assemblage and one he could confidently relate to the Khoekhoe on historical evidence. Goodwin (1938a:323) contended that, as no cattle bones were recovered, the pottery could only have got into the deposit through trade or cultural contact between the occupants and the Khoekhoe herders. He may be correct but the analyses of the fauna did not preclude the occurrence of sheep bones.

The distinction of the different phases of the Wilton, the pottery, developed and normal Wilton (Goodwin 1938a:323), was made on the artefact content of the strata. For example, the normal Wilton was characterised by more numerous segments (crescents) in quartz and chalcedony than found in the overlying layers. "*Shell crescents*", had a higher incidence in the developed Wilton and the presence of pottery was sufficient to distinguish the final phase. The occurrence of segments, by Goodwin's own definition (Goodwin & Van Riet Lowe 1929) the *fossiles directeurs* of the

Wilton, made the identification of this industry secure. In a re-analysis of the collection Schrire (1962) noted that in the underlying Smithfield C industry segments make up some 5% of the formal tools so this tool type was not restricted to the Wilton levels. Goodwin (1938a:222) reported 5000 rather than the 500 small convex scrapers that Schrire found in her resorting of the collection from the Smithfield C layers. A high frequency of small convex scrapers relative to segments appears to have been the reason for designating these layers as Smithfield C and not Wilton. By definition the occurrence of endscrapers in the lowest levels indicated a Smithfield B industry. From a reading of Goodwin's writings, it appears that he had an implicit rather than explicit belief that stone tools reduced in size with time. Thus, it was logical for him to assume the Smithfield B was the industry preceding the Smithfield C.

The Oakhurst collection and that from the nearby smaller, Glentyre shelter at the Wilderness, were re-examined by Fagan (1960). He concluded that both sites preserved a single Later Stone Age culture, a late phase of the Wilton, and not three different cultures. He assumed that the deposits did not cover a long time range and may have been unaware of the evidence from Matjes River rock shelter. In an attempt to redress the contradiction in the interpretation of the Oakhurst site Schrire (1962) carried out a more detailed re-analysis of the collection, using a different methodology. Radiocarbon dates available to her showed the sequence covered much of the Holocene and with the exception of the developed Wilton unit she was able to support Goodwin's original cultural divisions. This left open the question of the relevance of recognising such divisions.

Rightmire (1978) recorded 14 adults and 17 juveniles in the sample of human remains from Oakhurst. Patrick (1990:34) gives different counts. She records that there were a total of 46 interments which produced 23 adults and 25 juveniles. The remains are fragmentary and for his morphometrical study, using the statistical technique of discriminate analysis, Rightmire (1978) was able to include only three of the most complete adult crania. The fragmentary state of the remains is understandable because of disturbance of older burials by younger grave shafts; diagenesis in the acid soils of the shelter and the quality of curation in the half century since the excavation was completed.

Morphological interest in the remains was in whether they showed variability that was consistent with a single evolving regional population or multiple replacements by different populations. The conclusion drawn by Rightmire (1978) and by Hausman (1980) and supported in a later study by Bräuer and Rösing (1989) is that all the skeletal material can be described as Khoesan. This rules out migration and replacement models. Hausman (1980:162) considered this to be a Holocene population undergoing diversification through cultural and biological processes. She noted that San crania from prepastoralist contexts, inland and in the coastal zone, can be morphologically differentiated and suggested that different sub-populations occupied those zones. However, she concluded that the greatest morphological variability correlated with the introduction of pastoralism inferred for skeletons associated with pottery.

Patrick (1990) carried out an osteological study and undertook stable isotope analyses of the remains. The results show the people had a low life expectancy (33 years), a predominantly marine diet and in porotic hyperostosis and enamel hypoplasiae showed evidence of episodic dietary stress. An important conclusion is that the people living at Oakhurst in the early Holocene were under more stress than the late Holocene occupants. Patrick (1990:183) accounted for this by suggesting that in the last 4000 years less stressful lives were made possible by increasing diet breadth through the introduction of fish and small terrestrial mammals. It has been noted that fish remains appear to be more common in Goodwin's Wilton levels but fishing was certainly practised in the early Holocene. This explanation begs the question why resources like fish did not make a meaningful supplement to the diet in earlier times. An alternative explanation for the alleviation of stress in the late Holocene would be environmental change. The late Holocene, as discussed in this chapter, was a period of higher precipitation and this would have resulted in increased productivity of the habitats. Reduced stress implies higher fertility and population growth. Osteological analyses like this of Patrick (1990) offer an opportunity to test archaeological scenarios that consider demographic changes. The scenario proposed by Jerardino (1996) is an example discussed in Chapter 2.

It is a tribute to the quality of the research that Goodwin initiated at Oakhurst, that the varied data have stimulated wide-ranging studies and new insights into Holocene prehistory. Most later workers would accept the distinction he made between the lowest industry (Smithfield B) and his overlying industries.

3.3.3. NELSON BAY CAVE

Nelson Bay Cave is located on the southern side of the Robberg Peninsula, near Plettenberg Bay. From records housed in the South African Museum, Rudner and Rudner (1974) have established that between 1880 and 1932 19 caves and rock shelters on the peninsula were excavated. From these records it is not clear at what sites any finds were made. Mounds of disturbed deposit in Nelson Bay Cave show this was one site that had been excavated by skeleton seekers. In 1964 Inskeep (1965:575) initiated the first systematic excavation of Nelson Bay Cave and these excavations were continued in subsequent years. Inskeep published the final report in 1987. To open the cave deposit to natural light, Inskeep excavated in the youngest Stone Age deposits, piled up at and nearly blocking the entrance. These deposits date to the last 6000 years. At the invitation of Inskeep, from 1970 to 1972, Klein (1972a:136) excavated a sequence of older deposits located towards the back of the cave. This was in an attempt to expose the Middle Stone Age strata below a thinner cover of younger materials. The topmost levels in the excavation of Klein date to 5000 years and the lowest strata to an estimated 120 000 years. There is thus some overlap between the two excavations. Units 104 to 148 in the bottom of the Inskeep (1987) excavation that are radiocarbon dated to between 5800 and 4500 years ago, correspond to the two uppermost units (BSC and IC) of the Klein (1972a) excavation. It is the deposits excavated dating to the early Holocene in the Klein excavation that have most relevance to the research at Matjes River rock shelter.

3.3.3.1. Inskeep's excavation

Inskeep (Inskeep 1965, 1987:273; Inskeep & Vogel 1985:103) excavated 148 stratigraphically distinct units. The units have been grouped into larger sets in accordance with the frequency and/or intensity of use of the cave. Units 2 to 21 and 22 to 30 have been dated to between 500 and 2000 BP. These units are shell middens associated with pottery and sheep remains. Units 31 to 63 were primarily shell heaps with occasional hearths and ash spreads. They date to between 2000 and 3300 BP. Units 64 to 103, dated to between 3300 to 4500 BP, make up a further set recognised. Below unit 99 the deposits are ashy, but above this unit the deposits are shelly with occasional hearths and ash spreads. Inskeep (1987:38) described the lowest group of units, 104 to 148 and dated to between 4500 and 5800 years ago, as an ashy deposit with few remains.

The sheep remains, a total of 10 individuals from units 22-24, 27 and 29 (Klein in Inskeep 1987:244) were considered to be the oldest dated remains of domestic animals in South Africa. This result assumed an association of the sheep remains with a date on charcoal from a hearth. Accelerator dating of sheep tooth material, however, gave a result of 1100±80 BP (Gowlett *et al.* 1987), somewhat younger than dates for other occurrences (Sealy & Yates 1994). The sample of sheep remains is too small to provide an age profile. This would indicate whether dedicated pastoralists had managed the flocks or not. The small number of individuals suggested to Inskeep (1987:259) that they were obtained by hunter-gatherers through capture or barter from pastoralists. This is a similar argument to that Goodwin offered to account for the pottery at Oakhurst.

The fauna from the other units of the Inskeep excavation includes the bovids, duiker, grysbok, blue antelope, vaalribbok, mountain reedbuck and buffalo. In addition there are small carnivores, hyrax and bushpig. The Cape fur seal occurs throughout, although in greater frequencies during the last 2000 years. From the faunal assemblage Klein (Inskeep 1987) inferred that the environment was forested with patches of open grassland. Relative to the early Holocene, these deposits show decreased hunting of other than the smallest class of bovids and an increased reliance on hyrax and seal. This may be an indication of intensification in the use of local food resources. Intensification, a vague archaeological term for increased diet breath and for foragers targeting specific species, would be consistent with scenarios proposing more restricted territories and high densities of people. Midden studies on the western and southern Cape coasts show intensification in the use of resources in the late Holocene.

As would be expected on this rocky coast in the late Holocene, the shellfish from the Inskeep (1987:214) excavation is dominated by *P. perna* with fewer patellids. *D. serra*, rare after 3300 BP, makes up some 16% of his oldest samples. Fish remains are present throughout the Holocene at Nelson Bay Cave. This is contrary to Goodwin's (1938a) observation at Oakhurst. However, in the occurrence of stone sinkers after 4500 BP and in the increase in fish remains after 3500 BP there may be some support for the role played introducing new fishing methods as Goodwin suggested. The fish fauna is diverse and more than 10 species have been identified. The species are of larger fish like yellowtail, fish that are caught in gullies like galjoen and smaller easily caught fish like steenbras and blacktail. Although the relative frequencies of different species fluctuate it would need statistical analysis to show what trends in species composition are significant. There are two periods, one at 5300 BP and another at 3300 BP, when for about 400 years, no fish remains are recorded (Inskeep 1987:231-234). This may be an artefact of sampling rather than of cultural significance.

The analysis of the artefacts from the Inskeep (1987:282) excavation points to significant changes in raw materials and tool types at about 3300 BP. The introduction of pottery, however, does not correspond to any marked technological change in the artefacts. In the units accumulated after 3300 BP quartzite is the dominant raw material used in formal tool making but the number of classes is small. These units include a range of bone tools and ornaments. The contrast is with the underlying units, which include more classes of Later Stone Age Wilton tools, made predominantly in non-local chalcedony. These tools include small convex scrapers, segments, double-segments and drills. This excavation bottomed in the Wilton levels.

3.3.3.2. Klein's excavation

Klein (1972a:136) excavated eleven Later Stone Age units which were grouped by J. Deacon (1978) in three major culture-stratigraphic entities, the Robberg, Albany and Wilton industries. The Wilton industry (units RA, BSC and IC) has been dated to between 5000 and 6000 BP in this excavation. These units are a series of middens and brown humic soils. The Albany industry (units GSL, CS, BSBJ, J and RB) has been dated to between 8500 and 12 000 BP. There is a gradual increase in the quantity of shell from the base upwards in these units. The Robberg industry (units YGL, YSL and BSL) has been radiocarbon dated to between 16 000 and 18 000 BP. The first two units are yellow loams from which shell is absent but BSL includes small quantities of shell. The latter unit may reflect the shoreline approaching the cave but the shell could be intrusive from a younger layer.

The Wilton units yielded oribi in addition to those species recorded in the Inskeep excavation. In the fauna from the Albany units the same species are represented with the addition of eland and warthog. In the Holocene deposits (Klein 1972a:138) there is a high frequency of small bovids, notably *Raphicerus* (grysbok). Large bovids are more common in the underlying Robberg units. They include alcelaphines (wildebeest-hartebeest family) as well as equids, not represented in the Holocene faunas. This suggests an end-Late Pleistocene environment (Klein 1972b) was relatively open and grassy. The Robberg units at this site corresponds to the furthest regression of the sea at the Last Glacial Maximum and the coast would have been about 100 km to the south (Van Andel 1989).

Shellfish, marine birds and fish remains (Klein 1972b:194) were recorded from the units grouped in the Albany industry although they are more prominent in the overlying deposits. *P. perna* and the patellids make up the bulk of the shellfish remains in the early Holocene units (Klein 1972b:189). However, there is a pronounced peak in the frequency of *C. meridionalis* (black mussel) in the CSM and the GBL units dated to about 10 000 years ago. The change in the composition of the mussel fauna is mirrored at Matjes River rock shelter and is discussed in greater detail in Chapter 6. Musselcracker in particular is well represented in the early Holocene units but the fish fauna is less diverse than in the overlying Wilton units (Klein 1972b:192). Among the artefacts that are associated with the Albany industry at Nelson Bay Cave are double pointed bone tools that possibly served as fish gorges. They are possible evidence for line fishing

Janette Deacon (1978:108) analysed the stone artefacts from Klein's excavation. In the presence or absence of certain artefact classes, major shifts in raw material usage and environmental changes (Klein 1972a; 1972b), she was able to show abrupt changes between the industries. In the units dated to between some 5000 and 8000 BP the assemblage is characterised by the presence of backed microliths, a preference for small scrapers over large scrapers, a great variety of formal tool classes and various of utilised pieces and edge-flaked pieces in large numbers (Deacon, J. 1978:100). A diverse range of raw materials was used. This assemblage has been assigned to the Wilton industry. In the units dated to between about 8000 and 12 000 BP, artefacts were made almost exclusively in quartzite. Large scrapers and miscellaneous retouched pieces are the only formal tool classes recognised. There is an absence of backed tools but a high frequency of bone tools. This assemblage was assigned to the Albany industry. In the units dated to between 12 000 and 18 000 BP there are relatively high frequencies of artefacts in the raw material quartz. Small scrapers are more common than large scrapers, backed tools occur but the frequency of formal tools is low. This assemblage was assigned to the Robberg industry. Noteworthy in the Robberg assemblage is the occurrence of small pyramidal cores and the bladelets struck from them. It is these elements that define the Robberg industry and Nelson Bay Cave is the type site of this industry.

CHAPTER 4

EXCAVATION

4.1. EXCAVATION PROCEDURES

The re-investigation of the Matjes River rock shelter had two objectives, firstly, to re-habilitate the site and, secondly, to obtain new information on the stratigraphy, dating and contents of the deposits. In the interests of conservation the scale of excavation was purposely limited and was directed at detailed sampling of the strata. Large-scale excavations had been carried out previously (Louw 1960:15) and the intention was not to repeat this exercise. However, the available reports do not provide the kind of detailed information needed for interpretative displays at the site. The limited scale excavation reported here was designed to supplement earlier research and to allow an interpretation of the site in line with recent developments in archaeology.

The rock shelter was surveyed and a baseline established along the length of the shelter. A secondary grid was laid out in the main area chosen for excavation, at the point which earlier researchers called the "Apex" (Figure 8). This was originally the highest point of the deposits and is at the junction of the Dreyer excavation along the back wall and the Hoffman-Meiring cross-cutting that runs at right angles to the back wall. Excavation was restricted to quarter metre grid squares: AG 7, AF 7, AG 8, AF 8, AG 9 and AF 9 (Figure 8). The intention was to excavate a vertical column with an area of approximately one square meter through the full sequence. Practical considerations made it necessary to excavate in steps and the area of the excavation was reduced with depth. Smaller scale cuttings were made at

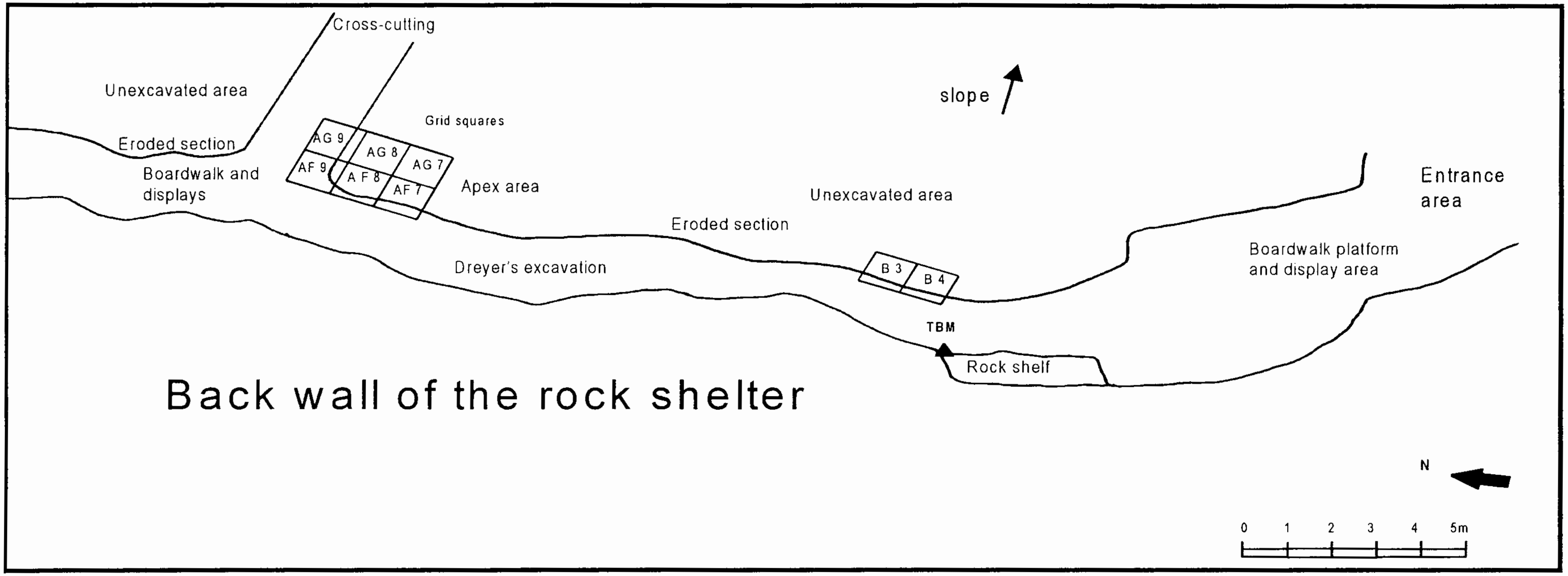

Figure 8: Surface plan of the Matjes River rock shelter

other points in the shelter to intersect layers not represented in the Apex section. With one exception these involved cleaning out the fill of Dreyer's excavation to expose the sequence. The exception was the box section near the entrance in member EE that consists of grid squares B3 and B4 and forms part of the analysed material presented in this thesis.

Standard excavation procedures were adopted. The deposits were excavated by trowel and brush. All material was sieved through a bank of sieves with mesh sizes of 20 mm, 10 mm and 3 mm. The material in each sieve fraction was transferred to sorting trays. Preliminary sorting and packaging of finds in the categories stone, bone, shell and charcoal was carried out at the site. In addition to collecting charcoal from *in situ* deposits for dating purposes, samples of charcoal were collected from the screens during sorting. The fines from sieving were collected in plastic bags and these bags have been used in the stabilisation of standing sections at the site.

All finds can be related to the square grid co-ordinates and features were drawn. Depths were recorded relative to a temporary bench mark (Figure 8) and measurements were made using a Wild level and a water level. The excavation followed the natural stratigraphy and the discrete layers, the minimal excavation units recognised, were labelled by a letter and number code. Few of the excavated units had a thickness of more than 30 mm. Features like hearths within an excavation unit were excavated separately and labelled as ash features (AF plus number) in the unit in which they occur. The paper label for each bucket or part bucket from each unit has been kept and is the record of the volumes removed.

The procedures provide a good understanding of the stratigraphy and a good control for sampling. The high resolution excavation of the deposits gives good control for radiocarbon dating and shell analysis. The scale of the excavation was too limited to provide adequate samples of artefacts and fauna. Larger scale sampling is possible in the future if it is shown to be warranted. However, the next logical phase of research would be the reevaluation of the older collections and assessment of the value of those samples. The results of this excavation will aid in that evaluation.

4.2. SITE FORMATION PROCESSES

The Apex section does not sample material significantly younger than 7000 years. The dip of the deposit is steeply towards the south and younger deposits are preserved in this area, near the entrance. The stratigraphy illustrated in Louw (1960) cannot be related to the section now exposed (see Figure 7). There has been considerable slumping and most of the deposits younger than 7000 years have eroded away or were removed in the earlier excavations. Louw's section along the back wall, although much simplified, indicates the younger deposits were better developed in the area excavated by Dreyer (1933). However, it is difficult to escape the conclusion that those younger deposits were much smaller in volume than those accumulated before 7000 years ago.

The standing section along the back wall shows an obvious stratigraphic division between the "*Top Shell Midden*" (TSM) and the "*Lower Shelly Loam*" (LSL). An early assumption was that this division equated with a significant temporal break in occupation of the rock shelter. Radiocarbon dating shows a possible 1000 year age difference between units above and below this interface (see Section 4.4.). Contributing to the gross difference between the upper and lower deposits is site formation processes and the mode of accumulation of what are mainly cultural deposits. The TSM is a tip of shell-rich debris and has a significant dip component whereas the LSL deposits include more primary occupation features such as hearths.

4.3. STRATIGRAPHY

The stratigraphy in the Apex section (Figure 9) is complex in detail and the discrete units form a layered pile of sediment lenses. The TSM consists of loosely consolidated shell heaps intermixed with ash layers whereas the LSL consists more of consolidated loams with shell and ash layers.

RADIOCARBON AGE DETERMINATIONS

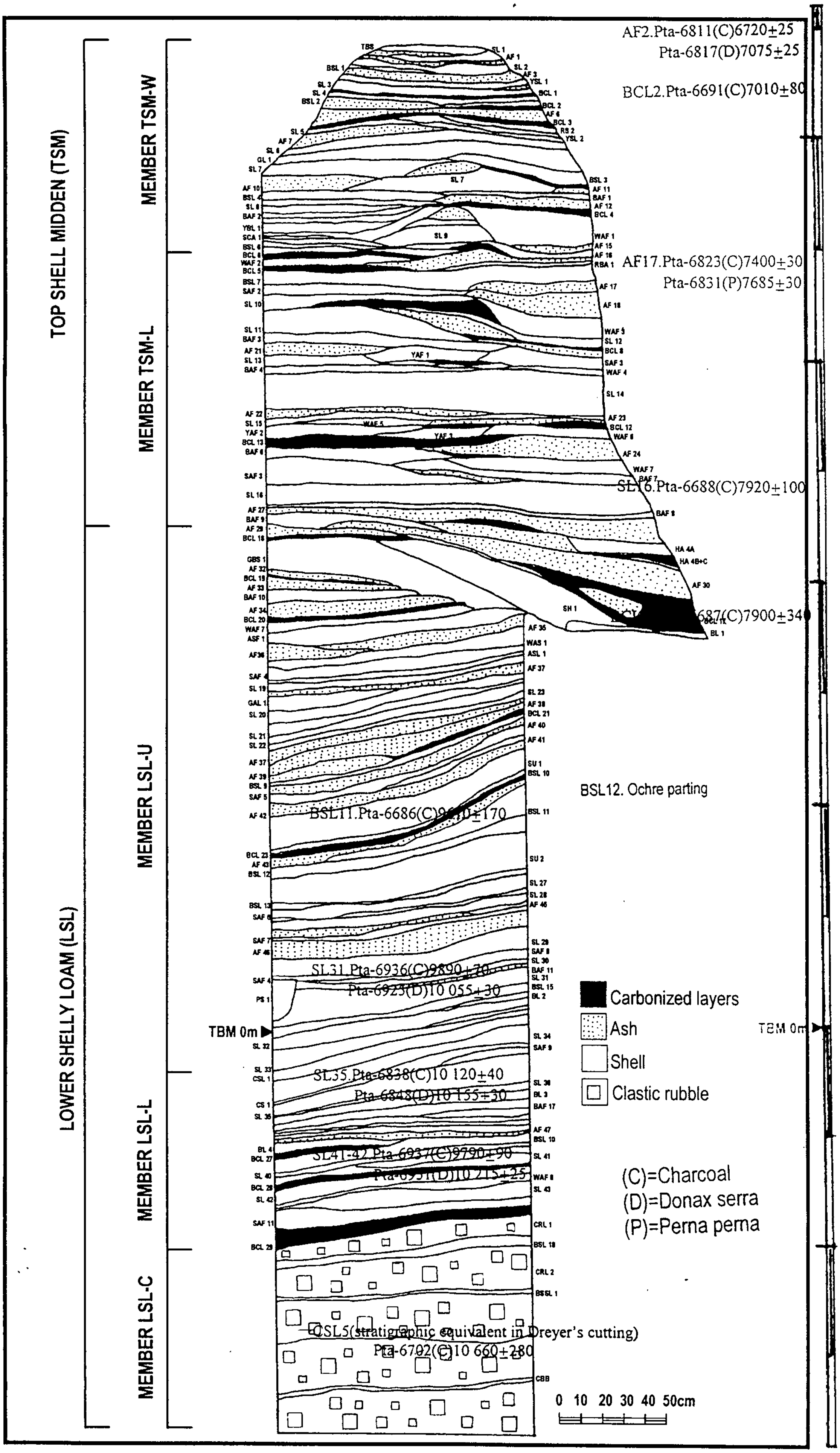

Figure 9: Stratigraphy of the Apex section

A total of 215 different units were recognised in the excavation of the Apex profile. Some units were of very localised extent and only a few millimetres thick. Other units, as much as 50 mm thick, covered the whole of the excavated area. The units have been grouped into six members to facilitate inter-site and intra-site comparisons. These groupings are not wholly arbitrary and reflect the gross stratigraphy and the content of the deposits.

MEMBER EE: This member is exposed only in the small section of an additional excavation (Figure 10) cut in square EC at the entrance to the rock shelter. It represents the top 600 mm of the midden and includes units YAS1 to CS3. The deposits are loosely compacted ash and shell lenses.

MEMBER TSM-W: This member represents the top 961 mm of deposits preserved in the Apex profile. It has been defined on the basis of the occurrence of small convex scrapers. It includes units TBS to BSL6. The deposits are loosely compacted shell lenses, discrete ash features and brown humic soil units. Units SL1 and AF2 contain sea grass partings (*Zostera capensis*) interbedded with the shell and ash. The *Z. capensis* horizon is a marker that can be traced to the south in the standing section along the back wall.

MEMBER TSM-L: This member has a thickness of 1037 mm and is the lower portion of the TSM material in the Apex profile. It includes units SL10 to BAF9. The deposits are loosely compacted shell lenses, discrete ash features and brown humic soils. The base of BAF9 and top of AF29 coincides with the break between the TSM and LSL.

MEMBER LSL-U: This member is 2280 mm thick. It includes units AF29 to SL33, a prominent thick shell bed. The deposits contain brown humic soils, loosely compacted and comminuted shell lenses and ash features.

MEMBER LSL-L: This member is 810 mm thick and includes units CSL1 to BCL29. The deposits are again brown humic soils and lenses of comminuted shell. There are associated ash features. Units SL43, SAF11, BCL29 (the lowermost three units in this member) are rich in roof clasts but these clasts are matrix supported.

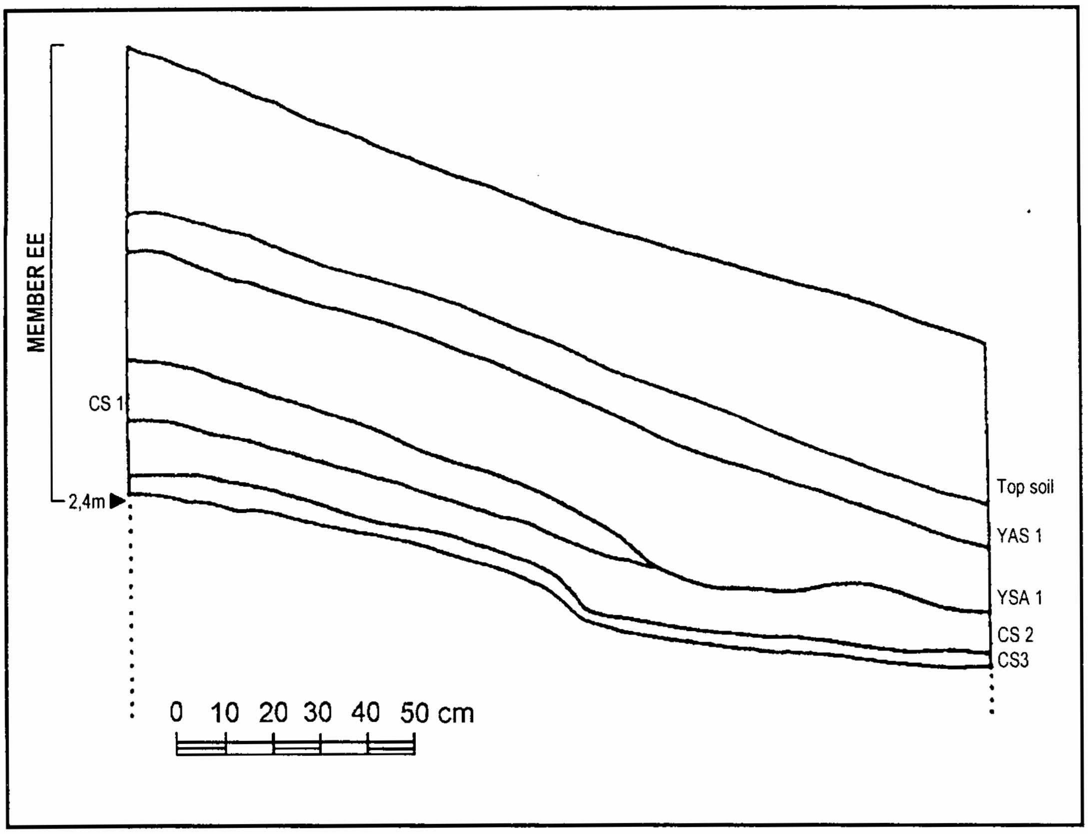

Figure 10: Stratigraphy of square EC

MEMBER LSL-C: This member represents the basal 940 mm of the Apex profile. It includes units CRL1 to CRL4. The deposits are beds of coarse clasts with thin dark-brown humic partings associated with small quantities of shelly material. No cultural material was recovered from this member. Bedrock was not exposed because of the caving of these clast-rich units. It can be assumed that bedrock is close to the excavated depth. This seems to be in accord with the depths recorded by Louw (1960:17-18) for the maximum depth of the main excavation by Dreyer.

4.4. DATING

A total of 19 samples (Table 3), 11 charcoal and 8 shell samples, have been radiocarbon dated. The Quaternary Dating Research Unit, EMATEK, CSIR in Pretoria ran the samples in collaboration with J. C. Vogel. Duplicate shell samples were provided from units with radiocarbon age determinations made on charcoal. One *Perna perna* sample, Pta-6917, was wrongly labelled as coming from SL 35, a unit which does not include material of this species. The correct label for this packet is CS3 and this correction is made in Table 3 for radiocarbon dating.

The radiocarbon ages are consistent with the stratigraphy. The *P. perna* and *Donax serra* dates from the CS2 unit in the EE member, the small cutting in the entrance area, are older than the single charcoal age determination. This may simply reflect sampling resolution in a cutting for stratigraphic purposes. In the Apex excavation where the stratigraphy could be finely resolved and the volumes of deposit were sufficient to provide paired shell and charcoal samples, the shell age determinations are older. The difference ranges between 425 and 35 years with a mean of 291 years. The correction usually applied in determining the radiocarbon age of shell samples assumed an apparent age of 500 years for modern material. In the 7000 to 8000 year range the apparent initial age due to the reservoir effect and isotopic fractionation by the organisms may be closer to 300 years on this evidence.

Table 3: Radiocarbon dates

MEMBER	UNIT	REF. NO.	DATING MATERIAL	DATES		CALIBRATED		
				14C	±		BC	
EE	CS2	Pta-6856	Charcoal	4740	50	3524	3504, 3423, 3387	3370
	CS2	Pta-6877	*P.perna*	4615	20			
	CS2	Pta-6920	*D.serra*	4665	20			
	*CS3	Pta-6917	*P.perna*	5720	70			
TSM-W	AF2	Pta-6811	Charcoal	6720	25	5588	5578	5571
	AF2	Pta-6817	*D.serra*	7075	25			
	BCL2	Pta-6691	Charcoal	7010	80	5878	5787	5711
TSM-L	AF17	Pta-6823	Charcoal	7400	30			
	AF17	Pta-6831	*P.perna*	7685	30			
	SL16	Pta-6688	Charcoal	7920	100			
LSL-U	BCL17	Pta-6687	Charcoal	7900	340			
	BSL11	Pta-6686	Charcoal	9610	170			
	SL31	Pta-6936	Charcoal	9890	70	9060	9048	9031
	SL31	Pta-6925	*D.serra*	10055	30			
LSL-L	SL35	Pta-6838	Charcoal	10120	40	9047	9018	8950
	SL35	Pta-6848	*D.serra*	10155	30			
	SL41+SL42	Pta-6937	Charcoal	9790	90			
	SL41+SL42	Pta-6951	*D.serra*	10215	25			
LSL-C	CSL5	Pta-6702	Charcoal	10660	280			

The time-depth curve (Figure 11) provides an interesting pattern and an indication of a temporal gap between 8000 and 9000 years ago in the top of the LSL-U member. The plotted dates for TSM give a consistent slope in the accumulation of 2.5 m of deposit in some 1200 years. This is a rate of accumulation of 2.1 m per 1000 years. There are two samples from the base providing virtually identical ages - Pta-6688 7900±100 BP and Pta-6687 7900±340 BP. The latter is from a cut-and-fill feature with a maximum depth of about 0.5 m. This feature has been mapped as being in the top of member LSL-U (Figure 9). However, the dating associates it with TSM rather than

LSL . Sample Pta-6687 has not been included in the time-depth plot (Figure 11).

There is no check sample from LSL-U, stratigraphically immediately below the cut-and-fill feature. Sample Pta-6686 9610±170 BP comes from a meter below this feature. If the rate of accumulation for TSM is applied this sample should be only 480 years older but is 1700 years older. The rate of accumulation in the LSL member calculated between the lowest age determination Pta-6702 10660±280 BP and Pta-6686 is 1.7 m per 1000 years, comparable to that in TSM and this would seem the norm for the site. Either deposition slowed markedly in the top of the LSL-U unit or, as seems more probable, there was a 1000 year hiatus in deposition.

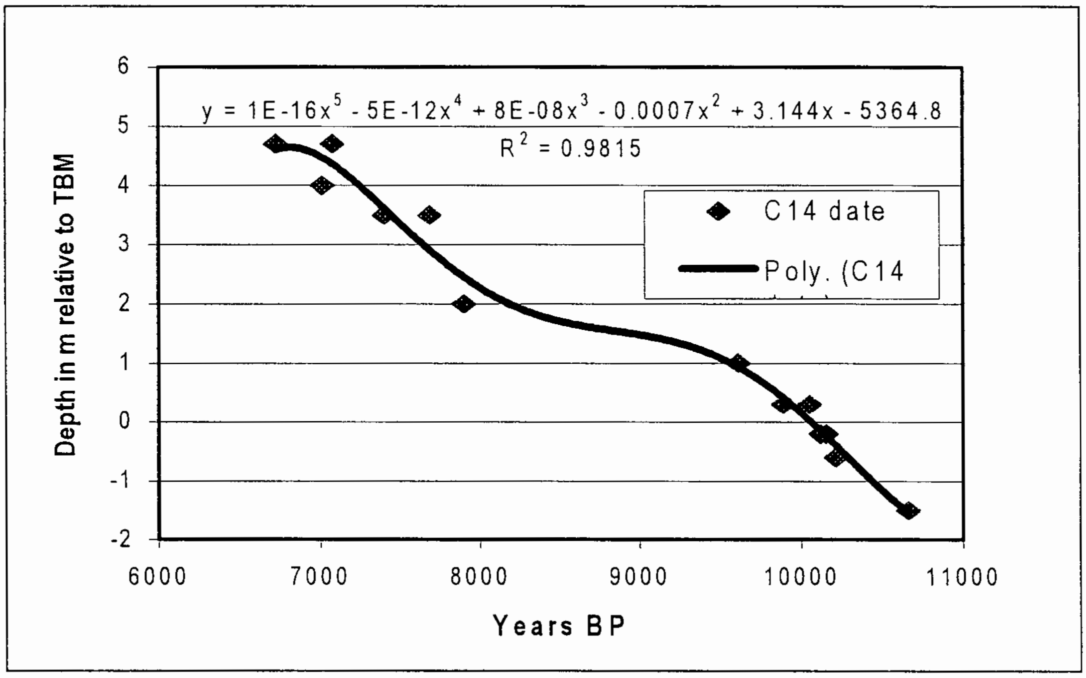

Figure 11: Time-depth curve, Apex section

The time-depth curve shows the anomalous age of sample Pta-6937 9790±90 BP. This is significantly younger that the paired shell sample Pta-6951 10215±25 BP, which is more consistent with the dating of the stratigraphically younger and older charcoal and shell samples. Sample Pta-6937 is a minimum age and it is not included in Figure 11.

4.5. CONCLUSION

The high-resolution excavation of the Matjes River rock shelter made it possible to recognise a total of 220 different units. The apparent stratigraphic break between TSM and LSL in the Apex section corresponds to a cut-and-fill feature mapped as in the top of LSL-U. A plot of the radiocarbon dates with depth indicates rates of accumulation between 2.1 m and 1.7 m per 1000 years and this is consistent with either a marked slowing down in the rate of deposition in the topmost meter of the LSL unit or, more probably, a hiatus in deposition of approximately 1000 years. This would mean that the Apex sequence does not include occupation between 8000 and 9000 years ago. An additional age determination from the top of the LSL-U member will provide confirmation of any hiatus.

CHAPTER 5

ARTEFACT ANALYSIS

5.1. INTRODUCTION

This chapter discusses the artefact sample from the 1994 excavation and makes comparisons with the artefact finds from Nelson Bay Cave and Oakhurst, the two major archaeological sites in the immediate vicinity. As the 1994 excavation was on a limited scale, the sample of artefacts for analysis is small but still informative. The potential to extend this study through the re-analysis of the collections from the previous excavations at Matjes River rock shelter, housed in the National Museum, Bloemfontein, has been noted. The proper curation of the older collections is now receiving attention and this will make the re-analysis feasible. The 1994 sample lacks the painted stones and varied bone and shell artefacts that Louw (1960) reported in the museum collections.

Although the archaeological deposits preserved in the shelter are relatively deep, all those sampled in the Apex section are older than 6500 years and those in the entrance area 5000 years or older old. Layers that were sampled for radiocarbon dating by Inskeep in 1964 in the cross-cutting, dated to 3555±35 BP (Vogel 1970:463). These have since eroded away. The only source of information on the contents of the late Holocene layers that were present at the site is probably the old collections.

This analysis follows the approach to lithic studies that has become standard for the Later Stone Age as outlined below and in Appendix 1.

5.2. APPROACH TO LITHIC ANALYSIS

The end Pleistocene-Holocene culture-stratigraphy of the southern and eastern Cape is as well documented as any on the African continent. There are numbers of well-stratified and well-dated rock shelter sequences excavated since the 1960s and these have produced adequately sized artefact samples. The present situation is very different from that in 1928 when Dreyer began his pilot excavation at Matjes River. The Dreyer-Goodwin era, discussed in Chapter 2, laid emphasis on artefact types that served as "*zone fossils*" in investigating the relationship of the two main cultures of the Later Stone Age, the Wilton and Smithfield. Their conflicting interpretations of the culture-stratigraphic sequences at Matjes River rock shelter and Oakhurst was the product of an acceptance of a Wilton-Smithfield dichotomy as a "*fact*" and a belief that the cultures defined on the basis of the artefacts represented discrete races or tribes.

Inskeep (1967b:570) reviewed the shortcomings in Later Stone Age studies in a paper presented at the Burg Wartenstein Conference in 1965. In line with the general proposals that came from that conference, he called for a standardised terminology for describing artefacts, for the frequency of artefacts in classes in industries to be specified and for metrical data on artefact variation to be given. As she worked under the direction of Inskeep, Schrire's (1962:185-189) re-assessment of the different artefact industries in the Oakhurst sequence can be seen as an attempt to put these ideas into practice.

Later Stone Age typological studies were given a new impetus through the re-excavation and the detailed analysis of the artefact finds from the Wilton name site (Deacon, J. 1972). The research of Janette Deacon (1982) was extended to the coastal site of Nelson Bay Cave and occurrences inland. It is her typological framework that has been widely adopted in Later Stone Age studies. This is followed here with some modifications (Appendix 1). As the typologies of the Later Stone Age industries have become better known and dated, the Smithfield-Wilton dichotomy, which was central to Goodwin's concept of the Later Stone Age, has fallen away (Deacon, J. 1982) (see Chapter 2).

5.3. THE LATER STONE AGE

The Later Stone Age is a stage term that defines the attributes of artefact classes and the techniques of production that are different from the preceding Earlier and Middle Stone Age stages. Although the original definition (Goodwin & Van Riet Lowe 1929) stated Later Stone Age artefacts were made on blades, it is more the absence of prepared cores that has come to distinguish Later Stone Age industries from older industries. Within the Later Stone Age a number of industries or industrial complexes have been recognised. These record the appearance in the archaeological record of sets of innovations that appear to signify increasing complexity in technology. The three sub-stages or industries that are widely recognised are the Wilton, Albany and Robberg (Deacon, J. 1984).

Radiocarbon dates from Matjes River rock shelter accord with those from Melkhoutboom in indicating that the Wilton industry, with its characteristic small convex scrapers and backed elements (segments) dates from 7400 BP. The Wilton-type microlithic assemblages, called "Interior Wilton" (Sampson 1974) persist into historic times in some areas of Southern Africa, such as Lesotho. In other areas like the central Karoo, assemblages characterised by longer scrapers ("Smithfield B"-type) and small backed bladelets, dating to the last some 1000 years and associated with pottery, have now been labelled as Smithfield (Sampson 1974). Such stone industries continued to be made in the contact period as they are found with European trade goods.

H. J. Deacon (1969) pointed out that southern African artefact assemblages that had been lumped as "Smithfield A" belonged to different traditions separated by several thousands of years. The term "Albany industry" suggested by H. J. Deacon and J. Deacon is used here to refer to Dreyer's Matjes River "Smithfield A" type assemblages that on stratigraphic

Albany District of the eastern Cape, where several relevant assemblages occur. It replaces the earlier informal and more ambiguous term “Pre-Wilton” as used by H. J. Deacon (1969) and Klein (1972a, 1972b). Sampson (1974:258) has proposed the label Oakhurst Complex at a higher classificatory level to encompass the Oakhurst, Lockshoek and Pomongwe industries and in his culture-stratigraphic scheme the Oakhurst industry would be equivalent to the Albany.

Albany assemblages, characterised by the presence of relatively few formal tools (mostly large, morphologically variable scrapers) made on flakes or flake blades from unprepared cores, have been found immediately above Robberg levels at Nelson Bay Cave (Klein 1972a, 1972b), Melkhoutboom (Deacon, H. J. 1976) and Boomplaas. Radiocarbon determinations from Nelson Bay Cave date the beginning of the Albany to between 12 000 and 11 000 BP. Albany industries have been found below Wilton assemblages at Uniondale Shelter (Leslie-Brooker 1987), Buffelskloof (Opperman 1976), Kangkara Cave (Deacon, J. 1982) and Oakhurst.

As noted in Chapter 3, the Robberg industry was first identified at Nelson Bay Cave where it occurs in deposits dated to between 18 500 and 12 000 BP. It has also been recognised in the basal levels of Melkhoutboom, Boomplaas (a relatively rich occurrence), Kangkara, Elands Bay and in the Drakensberg uplands of the interior. Named for the Robberg Peninsula on which Nelson Bay Cave is located, Robberg assemblages are characterised by the systematic production of small bladelets from standardised single-platform bladelet cores. Where quartz is an important raw material it may be associated with the occurrence of bipolar cores, so reduced by flaking that they are classed as *pièces esquillées* or core reduced pieces. At Nelson Bay and Kangkara (Deacon, J. 1982), the Robberg levels are separated from the underlying Middle Stone Age levels below by a depositional hiatus of uncertain, but appreciable duration. A date of 22 000 years for the end of the Middle Stone Age (Deacon, H.J. 1995) is also the best estimate for the oldest Robberg occurrences.

The Later Stone Age is now understood in terms of three successive industries (Deacon, J. 1984) rather than two cultures as in the Goodwin era. These industries are archaeological abstractions that have no simple relationship to ethnographically known social entities. They were widely diffused modes of artefact making that are typologically distinctive. On the typology of these industries it possible to seriate Later Stone Age artefact occurrences in southern Africa. The artefact samples from Matjes River can be classified in two of these industres. This site is noteworthy because the sequence of occupation deposits include the transition from the Albany to the Wilton industries at the contact between the TSM-W and TSM-L members.

5.4. LITHIC ARTEFACT ANALYSIS

5.4.1. RESULTS FROM MATJES RIVER ROCK SHELTER

The stratigraphic sequence in the shelter was divided into six members, EE (4500-5800 BP), TSM-W (6700-7400 BP), TSM-L (7400-8000 BP), LSL-U (9000-9940 BP), LSL-L (9940-10 000 BP) and LSL-C. The EE member is represented in a step cut into the eroded slope near the entrance area. The step was made to clarify the stratigraphy and produced only a limited artefact sample. The sample from LSL-C (>10 000 BP) consists of 38 untrimmed flakes and is too small to be informative in most analyses.

Quartzite is the dominant raw material in all members (Figure 12). This is because quartzite beach cobbles are an abundant local source of raw material. In the waste category, untrimmed flakes predominate and from 87% to 100% of these are made in quartzite. Quartzite accounts for between 48% and 85% of the artefacts in the utilized category (Table 13, Table 14, Table 15, Table 16). Chalcedony and quartz are better represented in the two upper members but do not make up more than 10% of the waste. However, in these members there is selection of these non-quartzite materials for making formal tools (Figure 13, Figure 14). There are only two examples in the formal tool class from the sequence below TSM-W and both are quartzite. Veins in the country rock near the cave are a local source of quartz. The sources of chalcedony are less obvious and were certainly more distant.

The artefact samples from the site can be characterised as having a high frequency of quartzite untrimmed flakes. Few quartzite pieces are in the chip (<10 mm) size. Untrimmed flakes in all raw materials account for about 95% of the waste category and, in the site as a whole for more than 95% of the artefacts in all categories. This makes the samples of the artefacts from the different members similar and the main differences are in the frequency of non-quartzite tools which take on extra significance.

Complete untrimmed flakes from each member were measured and descriptive statistics of length (maximum dimension from the butt or striking platform), width (maximum dimension of an enclosing rectangle at right angles to length), height (maximum thickness of the flake), width/length ratio ([w/l]x[100/1]) and relative thickness (([H/L]x[H/W])/2) were calculated. These are the measurements used by J. Deacon (1982:581-590) in her study of the Nelson Bay Cave samples. The data show a trend for longer flakes to occur in the stratigraphically lower members. Shorter flakes occur in the TSM-W and EE members. There are so few untrimmed flakes other than in quartzite that in taking the measurements no attempt was made to distinguish between raw material types.

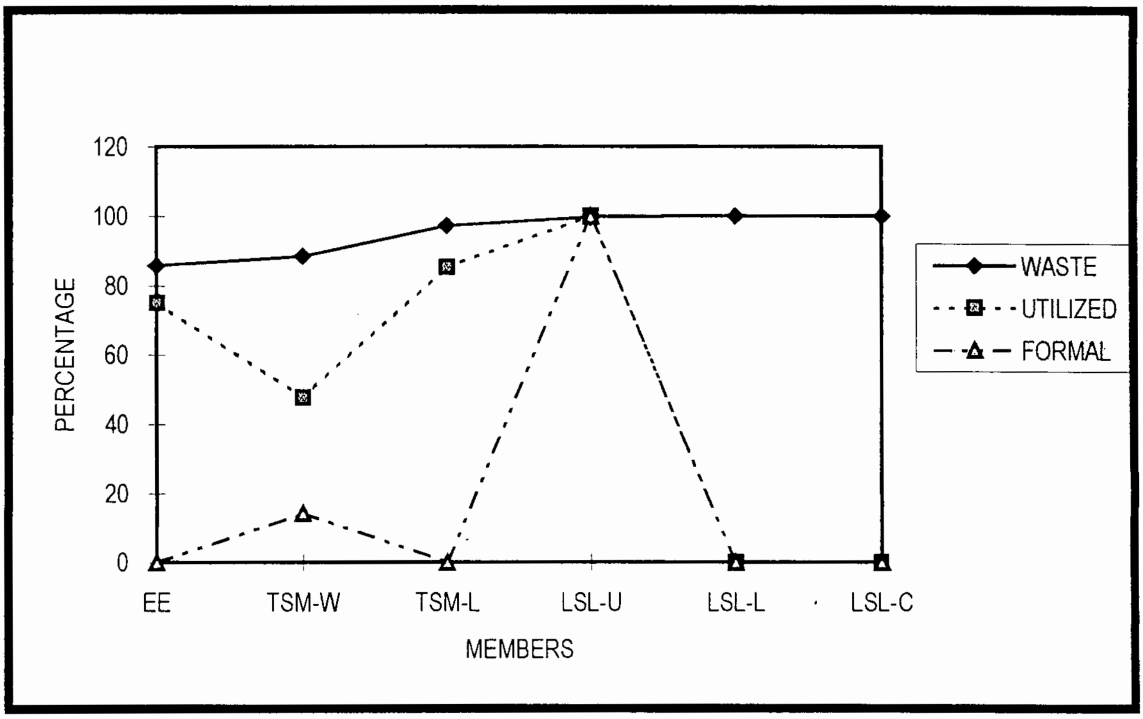

Figure 12: Percentage quartzite in each category

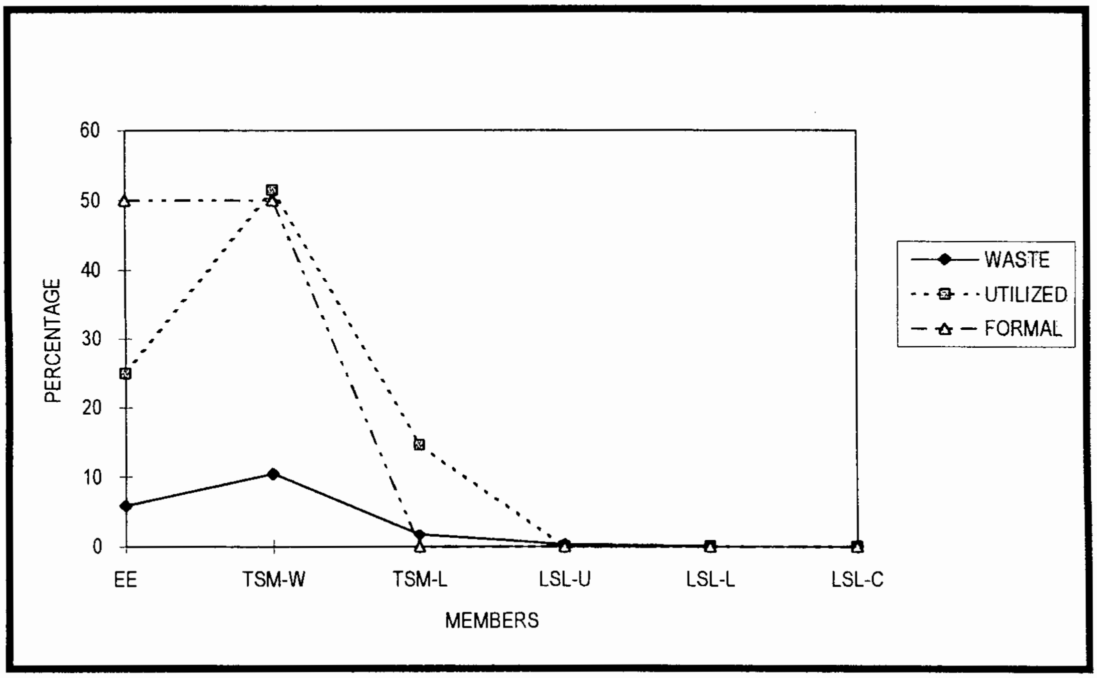

Figure 13: Percentage chalcedony in each category

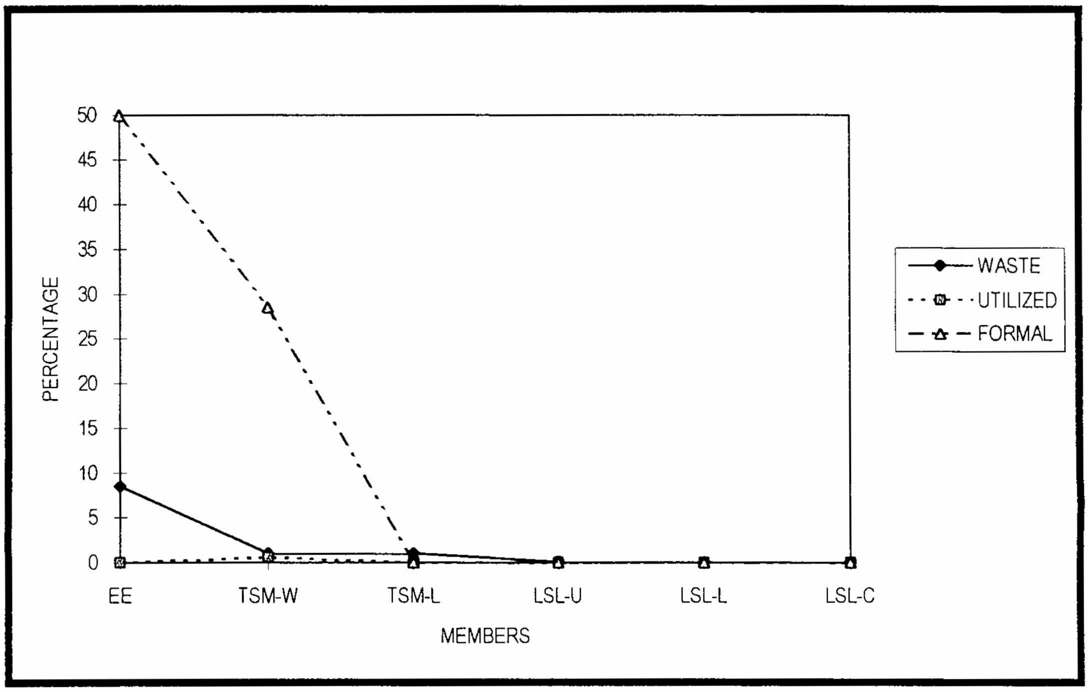

Figure 14: Percentage quartz in each category

The untrimmed flakes were classified into complete, broken and overhit categories. The percentages of quartzite flakes and flakes in all raw materials in these classes do not differ significantly. For every complete untrimmed flake, there were at least five overhit and two broken examples (Table 4, Table 5 and Appendix 2: Table 17). Overhit flakes are flakes which have been split at the point of percussion to form a "*split*" or "*siret*" edge. In LSL-U and LSL-L, the lower part of the sequence, the percentage of overhit flakes is 66.8% and 71% respectively. There is an association between longer quartzite flakes and the incidence of overhitting. As the term describes, overhitting is the result of attempting to force a longer flake from a core. Such flakes are a common product in the casual (and inept) flaking of quartzite in replication experiments. The incidence of overhitting indicates no attempt to standardise flake production.

Table 4: Percentage (total) of broken: complete: overhit Untrimmed flakes of quartzite

MEMBERS	BROKEN:	COMPLETE:	OVERHIT
EE	29.1% (75)	8.1% (21)	62.6% (161)
TSM-W	20.1% (281)	31.6% (442)	48.1% (672)
TSM-L	24.1% (399)	14.8% (245)	59% (978)
LSL-U	23.1% (702)	9.6% (291)	67.2% (2036)
LSL-L	19.1% (35)	9.8% (18)	71% (130)
LSL-C	23.6% (9)	10.5% (4)	65.7% (25)
MEAN	*23.1% (1501)*	*14% (1001)*	*62.2% (4011)*

Table 5: Percentage (total) of broken: complete: overhit Untrimmed flakes

MEMBERS	BROKEN:	COMPLETE:	OVERHIT
EE	29.1% (86)	9.8% (29)	60.6% (179)
TSM-W	21.3% (316)	35.4% (525)	46.8% (693)
TSM-L	24.3% (404)	15.5% (257)	59.7% (990)
LSL-U	23.1% (707)	9.5% (292)	66.8% (2037)
LSL-L	19.1% (35)	9.8% (18)	71% (130)
LSL-C	23.6% (9)	10.5% (4)	65.7% (25)
MEAN	*23.4% (1557)*	*15% (1125)*	*61.7% (4044)*

Table 6: Percentage (total) of classes of Untrimmed flakes of quartzite

MEMBERS	No cortex:	Platform:	Dorsal:	Side:	Entire dorsal
EE	74% (191)	18% (47)	0.3% (1)	4% (10)	3% (8)
TSM-W	60.4% (843)	30.6% (427)	1.2% (17)	5.1% (72)	2.5% (36)
TSM-L	54.6% (886)	34.4% (558)	0.9% (16)	5.2% (85)	4.7% (77)
LSL-U	53.1% (1610)	43.1% (1308)	0.2% (8)	2.2% (69)	1.1% (34)
LSL-L	57.3% (105)	41.5% (76)	0% (0)	1% (2)	0% (0)
LSL-C	68.4% (26)	28.9% (11)	0% (0)	2.6% (1)	0% (0)
MEAN	*61.3% (3661)*	*32.7% (2427)*	*0.4% (42)*	*3.3% (239)*	*1.8% (155)*

Table 7: Percentage (total) of classes of Untrimmed flakes

MEMBERS	No cortex:	Platform:	Dorsal:	Side:	Entire dorsal
EE	77.2% (228)	15.9% (47)	0.3% (1)	3.3% (10)	2.7% (8)
TSM-W	63.4% (939)	30.2% (448)	1.2% (19)	5.3% (79)	3.2% (48)
TSM-L	55% (910)	33.8% (560)	0.9% (16)	5.1% (86)	4.7% (78)
LSL-U	53% (1617)	42.8% (1308)	0.02% (8)	0.2% (69)	1.1% (34)
LSL-L	57.3% (105)	41.5% (76)	0% (0)	1% (2)	0% (0)
LSL-C	68.4% (26)	28.9% (11)	0% (0)	2.6% (1)	0% (0)
MEAN	*62.3% (3825)*	*32.1% (2450)*	*0.4% (44)*	*2.8% (247)*	*1.9% (168)*

Most of the untrimmed flakes have either no cortex or cortex only on the striking platform (Table 6, Table 7 and Appendix 2: Table 18). In the total sample the average percentage of flakes with no cortex is 62.3% and the percentage of flakes with platform cortex is 32%. The conclusion is that most of the primary preparation of cores occurred away from the site. This is supported by the observation that the number of cores recovered is low. All cores can be classified as irregular and they show no trends in the size, shape or number of sequential flake removals. Of the cores, 73% are made in quartzite and 27% in chalcedony.

In the utilized category the most common artefacts are utilized flakes. Edge-damaged flakes are more numerous than steep damaged and notched flakes and account for 41.9% of all utilized flakes (Figure 15). Steep damaged and notched flakes account for 39.2% and 18.6% of all utilized flakes respectively.

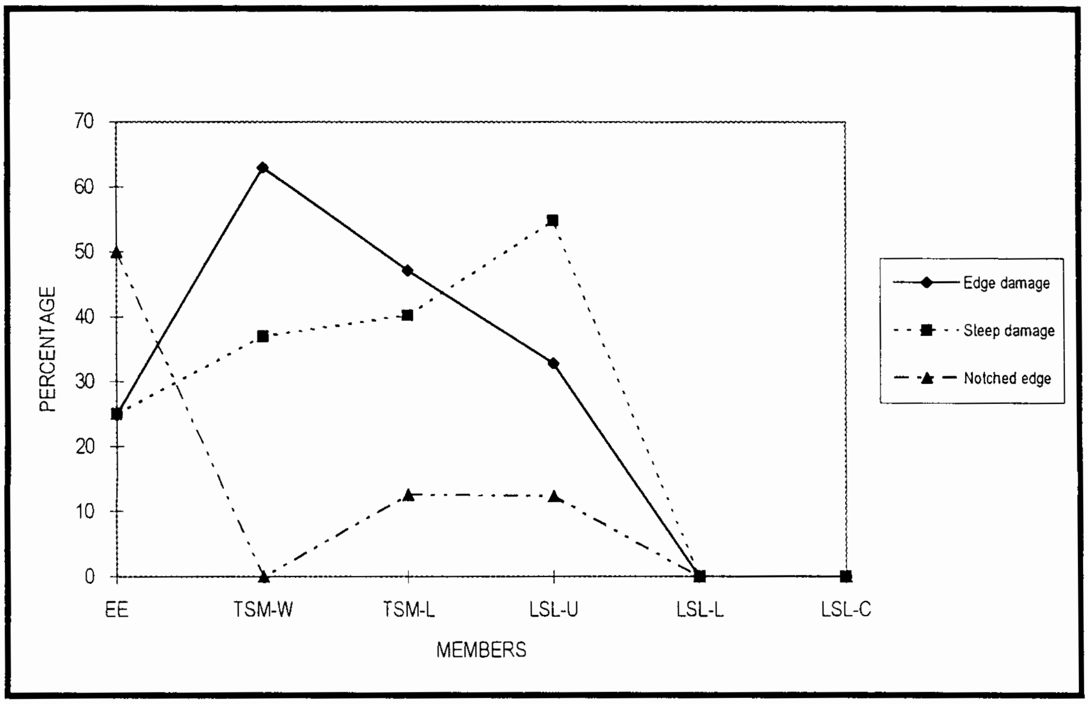

Figure 15: Percentage frequencies in classes of Utilized flakes

A single heavy edge flaked piece made from quartzite occurred in member LSL-U. There are four *pièces esquillées* from the excavation, two in chalcedony and one in quartz in member TSM-W and one in chalcedony in member TSM-L. A lower grindstone was found in LSL-U. Three anvils were also recovered, one from TSM-L and two from LSL-U. These finds account for 2.2% of the total utilized category.

The frequency of formal stone tools in all members is low. It is in this context that the five-fold increase in formal tools in the top members (EE and TSM-W), dating to 7400 BP and younger and associated with the Wilton industry should be seen. Apart from the 15 scrapers found, the only other formal stone tool was an adze. The frequencies of formal stone tools at coastal sites in general are low relative to the frequencies of unstandardised coarse quartzite flakes. Part of the explanation may be in the range of activities carried out at coastal sites which included shellfish gathering and fishing. The excavation at Matjes River rock shelter mainly sampled the time range prior to 7400 BP and in the Albany industry, as discussed by Inskeep (1987), formal stone tools have a low frequency.

Measurements of the formal tools (Table 8,Table 9) were recorded following the method of J. Deacon (1982:581-590). The two scrapers that measured longer than 20 mm were excavated from the LSL-U member, while those shorter than 20 mm in length came from members EE and TSM-W. A reduction in scraper size parameters would be expected over the time range covered by this sequence.

Table 8: Scraper attributes

MEMBER	UNIT	TYPE	RAW MATERIAL	LENGTH	WIDTH	HEIGHT	W/L RATIO	RELATIVE THICKNESS
EE	CS3	Convex	Chalcedony	16	17	10	106.25	0.606
		Convex	Quartz	16	18	9	112.5	0.531
TSM-W	TBS1	Convex	Silcrete	13	16	4	123	0.278
		Convex	Quartz	12	14	5	116.6	0.386
		Convex (b)	Quartz	-	-	-	-	-
	SL1	Convex	Chalcedony	13	15	5	115.3	0.358
		Large	Quartzite	60	39	14	65	0.29
	SL2	Convex	Chalcedony	19	24	8	126.3	0.377
		Convex	Chalcedony	12	17	5	141.6	0.355
		Convex	Chalcedony	14	16	6	114.2	0.401
		Convex	Chalcedony	15	17	4	113.3	0.25
	SL4	Convex	Chalcedony	13	16	5	123	0.348
		Convex	Quartz	10	13	5	130	0.442
LSL-U	BCL17	Large	Quartzite	48	29	14	60.4	0.387
		Large	Quartzite	23	29	9	126	0.35

Table 9: Adze attributes

MEMBER	UNIT	RAW MATERIAL	LENGTH	WIDTH	HEIGHT	W/L RATIO	RELATIVE THICKNESS
TSM-L	BCL5	Chalcedony	53	34	18	64.1	0.434

5.4.2. MICRO-EVOLUTIONARY CHANGE ON A REGIONAL SCALE

As noted at Nelson Bay Cave, Janette Deacon (1982:119) has shown changes in raw material usage in the sequence by comparing the relative frequencies of artefacts in fine-grained material such as quartz, chalcedony and silcrete to those in quartzite. In the Albany units (GSL, CS, BSBJ, J, RB) quartzite accounts for between 86% and 98% and in the Wilton units (RA, BSC, and IC) from 78% to 88% of all the artefacts. Quartz (Deacon, J. 1978:92) is more common in the Wilton units, with the frequency rising to 13% in IC. Chalcedony was used in small quantities, only exceeding 6% of the sample in IC. However, there was marked selection of this material in the formal tool class. At Oakhurst (Goodwin 1938a:318) the main raw material used was a white quartz, but the proportion of quartzite increases with depth, being highest in the layers of equivalent age to those at Matjes River rock shelter.

Untrimmed flakes (Deacon, J. 1982:138) account for over 85% of the waste category and for 85% of all classes in all categories at Nelson Bay Cave. Of the untrimmed flakes from the site, 78% are made in quartzite. Changes in the sequence are indicated in the incidence of non-quartzite elements in categories like cores but are best evidenced in the size variation in untrimmed flakes. In her analysis Janette Deacon has shown that the untrimmed flakes in the Albany units where quartzite is the dominant material are longer than in the Wilton units. The trend in the Matjes River rock shelter samples is very similar.

The most common class in the utilized category at Nelson Bay Cave is utilized flakes (Deacon, J. 1982:155). Edge-damaged flakes are consistently more numerous than other sub-classes and account for as much as 60% of all utilized flakes. Irrespective of the raw material, one out of every 25-30 flakes discarded at the site was utilized to the extent where edge damage is visible to the naked eye. This is higher than the incidence of utilized flakes recorded at Matjes River rock shelter where the quartzite is more felspathic and does not retain a robust edge suitable for resharpening. Heavy edge-flaked pieces that are an important artefact sub-class at Nelson Bay Cave are represented by a single example in the smaller Matjes River samples. Another class in the utilized category *pièces esquillées* (Deacon, J. 1978:96) is represented in the Wilton and top RB Albany units at Nelson Bay and occurs in the TSM-W member of the same age at Matjes River. The class is more prominent in the equivalent Oakhurst samples (Schrire 1962:188) where it can be related to the use of quartz. Quartz lends itself to use of the bipolar flaking technique which produces more crushed pieces or *piecès esquillées*. *Pièces esquillées* are not a typological class as much as a product of a stage in a reduction sequence and would be better included in the waste category. At all these sites grindstones occur but such equipment is more common in the late Holocene units.

The relative frequency of formal tools in the Albany units at Nelson Bay Cave (Deacon, J. 1982:161) is less than 1% and it follows that few would be expected in the 1994 sample from Matjes River rock shelter. At Nelson Bay Cave the Albany industry includes large scrapers and miscellaneous retouched pieces but lacks the small scrapers, backed microliths, borers and sinkers found in the Wilton units. This is the range of types that would be expected in the old collection from Matjes River and in the collection from Oakhurst on fuller typological study.

5.5. NON-LITHIC ARTEFACT ANALYSIS

5.5.1. RESULTS FROM MATJES RIVER ROCK SHELTER

The number of bone tools is small (Appendix 2: Table 19). A bone point was found in each of the members TSM-W (7400 BP), TSM-L (8000 BP) and LSL-U (9000 BP). Fish gorges were found in TSM-L (7860 BP) and in LSL-U (9300 BP).

There are 23 isolated ostrich eggshell beads recovered in the excavation at the Matjes River rock shelter (Appendix 2: Table 19) and all are of a similar size. In addition, there are numbers of beads of *Nassa (Nassarius)*. This is a small mollusc that is abundant in *Zostera capensis* weed beds at low tide in the muddy sand of the Keurbooms Estuary (Day 1969:167). In the LSL-U member 158 worked and 435 unworked *Nassa* (*Nassarius*) shells (Appendix 2: Table 19) were recovered. Three worked beads were also found in the basal TSM-L units. On this evidence *Nassa (Nassarius)* beads occur in the time range between 8000 and 10 000 years ago. It is interesting to note that the same beads have been found inland as far afield as Melkhoutboom (Deacon, H. J. 1976:53) and Boomplaas (Deacon, J. 1982:215) in the time range between 12 000 and 8000 BP and again after 4000 BP. They are absent from those deposits and Matjes River rock shelter in the period corresponding to the high phase of the Holocene transgression.

The class of perforated *D. serra* shells refers to the occurrence of shells with a hole, made from the inner surface and close to the apex of the shell. The hole is commonly about 15 mm in diameter and is roughly circular. No attempt was made to smooth the edge of the hole. These shells occur in small numbers in members TSM-L and LSL-U. Inskeep (1987:180) has offered the plausible suggestion that these perforated shells were parts of rattles worn on the lower leg. As part of their dance regalia, Kalahari communities make leg-rattles of skin pouches containing pebbles or ostrich eggshell fragments. These thick-walled, dense shells are like shell castanets and it is this property that lends credence to the suggested function.

5.5.2. MICRO-EVOLUTIONARY CHANGE ON A REGIONAL SCALE

At Nelson Bay Cave, the low frequency of stone formal tools in the Albany units is associated with a high frequency of bone tools (Deacon, J. 1978:100) and notably fish-gorges (Deacon, J. 1982:209-210). The two fish gorges from Matjes River rock shelter are of the same age. Louw's (1960) report suggests that there is an equivalent range of bone tools to those reported from Nelson Bay Cave and the Oakhurst rock shelter in the old collection.

The ostrich eggshell beads from these sites show no change in the size, finish or methods of manufacture (Deacon, J. 1982:215) except late in the sequence at Oakhurst (Schrire 1962:189) and Nelson Bay Cave where the occurrence of larger beads is associated with pottery and presumably pastoralism (Inskeep 1987). *Nassa (Nassarius)* beads are not common in the late Holocene at Nelson Bay Cave. Inskeep (1987:178) records only six beads from the mid Holocene and none in deposits dating to the last 4000 years. This is surprising given the proximity of the site to the Keurbooms Estuary. Again none has been reported from the early Holocene but this may be a curatorial problem (J. Deacon pers. comm.). This kind of evidence may indicate differences in the access to resources. Groups occupying Robberg Peninsula may not have had access to estuarine resources in the late Holocene if the outlet was close to the Lookout rocks and the main expanse of mudflats was on the opposite eastern bank and in the territory of others. The 1994 excavation did not sample deposits younger than 4000 years but the old collection may indicate whether *Nassa (Nassarius)* beads occurrred in the late Holocene at Matjes River rock shelter.

5.6. CONCLUSION

The top units of the 1994 excavation in the Apex section date to 6700 BP and sample the earliest phase of the Wilton industry. This industry is also represented in the EE member in the cutting in younger deposits at the south end of the rock shelter. Markers for the industry are the occurrence of small convex scrapers and a high incidence of non-local stone raw material. The greater thickness of the deposits sampled in the Apex column is older than 7400 years and has yielded very few formal artefacts in any material as is to be expected in a coastal site in this time range. However, the occurrence of longer scrapers and fish gorges is noteworthy.

The finer stratigraphic resolution and the number of radiocarbon dates at Matjes River rock shelter makes it possible to define the Wilton/Albany interface with greater temporal precision than was possible in the Nelson Bay Cave sequence. The dating is 7400 BP and this is a younger estimate than that conventionally cited for the Nelson Bay Cave sequence. This estimate accords with the dating of this interface in the Melkhoutboom (Deacon, H. J.

1969) and the Buffelskloof (Opperman 1976) sequences. The meaning of this industrial change is discussed in Chapter 7.

The stone artefacts in the Matjes River rock shelter samples from all units are predominantly in the felspathic quartzite of the Kouga Formation. This may be a reason for the very high incidence of overhit flakes. There was no attempt at control of the flake products. Flakes tend to have feathery edges and not to show edge modification as clearly as the flakes in better quality quartzite in the Nelson Bay Cave sample. Even if raw material quality can explain the frequency of overhit flakes it is noteworthy that no attempt was made to obtain better quality quartzite available within a few kilometres.

Although local factors influence availability of resources like raw materials, the similarities in the finds of stone and bone artefacts from the early Holocene levels of the three sites considered are remarkable. These stone artefact industries were made by groups who shared the same concepts of style in technology.

CHAPTER 6

SHELLFISH ANALYSIS

6.1. INTRODUCTION

Two species, *Perna perna* and *Donax serra* dominate the shellfish samples from Matjes River rock shelter. The brown mussel, *P. perna*, is common in the upper levels and occurs in profusion on the rocks below the cave in the present. A band of mussels about half metre-wide forms a dark line on the rocks exposed in the inter-tidal zone and the beds have not been over exploited. This easternmost corner of Plettenberg Bay is a high energy, exposed coast and is very productive. The white mussel, *D. serra*, is common in the lower deposits at the site. It occurs along sandy beaches and colonies move up and down the beach with the tides (Branch & Branch 1981:53). Sampling trials in the sands at the present mouth of the Matjes River failed to yield any specimens. They are reported to be more common along the sandy stretch of beach closer to the mouth of the Keurbooms River to the west where they are regularly collected for bait. However, sample trials there again did not produce any specimens and productivity would seem to be low. This may be due to the impact of the burgeoning settlement on the marine life of Plettenberg Bay. Changes in importance of these two species, one a rocky shore indicator and the other a sandy shore indicator, in the Matjes River sequence makes the shell analysis of interest.

In addition to these main species, there are minor elements like *Turbo sarmaticus* (alikreukel), *Oxystele sinensis* (periwinkel) and patellids of some eight different species. Important is the mussel, *Choromytilus meridionalis* (black mussel) which makes up perhaps only 1% of the mussel fauna in the present. Not easily distinguished from *P. perna*, a taxon with the same habit, it becomes a significant component in the shell samples from the lower deposits of the site. None of these species is such an obvious resource as *P. perna* along the modern coast. The *P. perna* beds like those today must existed during the accumulation of what Dreyer (1933) called his mytilus layer.

6.2. METHOD OF ANALYSIS

The excavation provided a sample column through the five stratigraphic members of the impressive shell pile. The shellfish frequencies in the basal LSL-C were grouped with those of LSL-L for reasons of sample size. A distinction was made between shellfish foodwaste species and species unlikely to have been eaten and incidentally introduced into the site. Examples are the rare *Lepas* spp. (barnacles) that attach themselves to larger species. Shells of *D. serra* and *Nassa (Nassarius)* that show evidence of deliberate modification were classified as artefacts and were discussed in Chapter 5.

All whole shells and shell fragments larger than 3 mm in size were retained, as bulk samples, for later sorting and specific identification. Minimum numbers of individuals (MNI) were calculated and the shell weight (g) of the individual species recorded for each member. The shell debris, comprising fragments larger than 3 mm, was also weighed giving some bulk measure of the shell in a unit. The identification of species was not problematic, as all are common species found along the coast. *P. perna* and *C. meridionalis* were distinguished by examining the ridge under the ligament. This is not pitted in *P. perna* but it is pitted in *C. meridionalis* (Day 1969:44).

The MNI values for the bivalves *D. serra*, *P. perna* and *C. meridionalis* were calculated by dividing the total number of hinges by two. Preliminary sorting of left and right hinges showed these to be evenly distributed. A sample of a 100 *D. serra* and 100 *P. perna* shells from each member was measured using the method proposed by Hall (1980:280-281). This method is discussed in Appendix 3.

Patellidae were sorted to species level and the MNI values calculated by counting the number of apices per species. The MNI value for *O. sinensis* was calculated by counting the columella. The number of apices was used to calculate the MNI values for *Haliotis midae*. No attempt was made to identify the different species in *Burnupena* spp. (whelks) and the MNI values for this taxon were calculated by counting the columella. The frequency data for *T. sarmaticus* were obtained by counting the numbers of columella and opercula. The element that gave the highest frequency was used to calculate the MNI. Shellfish included in the category "Other" in the tables and graphs are species like *Ostrea* spp., Fissurellidae and *Dinoplax gigas*. They made up a small percentage of the total sample.

6.3. MATJES RIVER SHELL ANALYSIS

6.3.1. SHELLFISH ANALYSIS BY MEMBER

On the south Cape coast five Intertidal zones (Figure 16) are recognised (Branch & Branch 1981:27-28). From the top to the bottom these are the Littorina, upper Balanoid, lower Balanoid, Cochlear and Infratidal zones. Each zone is defined by a unique set of species. *Littorina africana* is the marker species for the Littorina zone. In the upper Balanoid zone *Patella granularis* and *P. oculus* are the indicator species. Typical species of the lower Balanoid are *P. longicosta, O. sinensis, P. perna* and, more prominently on the west coast, *C. meridionalis*. In pools, *Burnupena spp.* is common. The Cochlear zone is dominated by *P. cochlear* and *P. argenvilliei* also occurs in this zone. *T. sarmaticus, P. tabularis* and *H. midae* occur in the Infratidal zone only exposed at spring low tides.

In the sequence the most noteworthy changes (Figure 17, Table 10) are in the relative frequencies of the filter feeders, *D. serra*, *P. perna* and *C. meridionalis*. The percentage frequency of *D. serra* increases down the

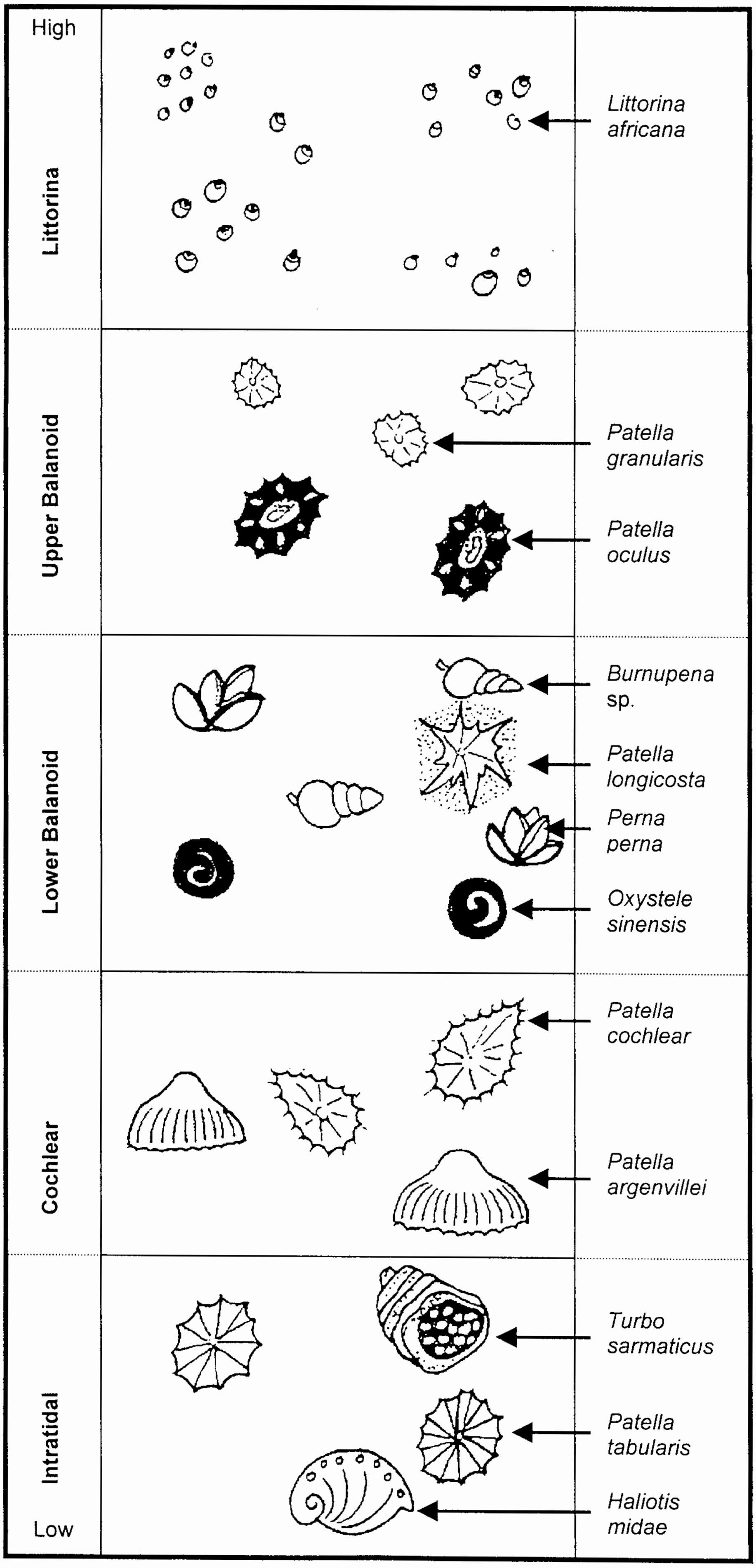

Figure 16: South coast zonation

sequence from 3% in EE to 23.9% in TSM-L to 93.7% in LSL-L. *P. perna* shows the opposite trend and the percentage frequency decreases with depth, from 86.3% in EE to 58.5% in TSM-L to 2.9% in LSL-L.

The percentage frequency of *C. meridionalis*, like *P. perna* a rocky coast filter feeder, increases down the sequence, from 0.1% in EE to 0.4% in TSM-L to 3% in LSL-L. In some sub-samples in LSL-L it may make up as much as 16%.

These changes in frequency in the shellfish can be related to ecological factors. The decrease in *P. perna* and increase in *D. serra* down the sequence is a proxy measure of the extent of the habitat available for a rock-clinging species versus the habitat available to the sand-burrowing species. The increase in *C. meridionalis* in the lower units is discussed in a later section. The rise in sea levels in the early Holocene is a plausible reason for major changes in the coastal ecology. It is more difficult to evaluate factors like the position of the Keurbooms Estuary in affecting the productivity of the shore. The estuary outlet is close to the Lookout rocks at Plettenberg Bay now but it has occupied different positions during this century (Reddering 1981). The nutrients supplied by the Keurbooms River to Plettenberg Bay would have influenced the productivity of shellfish prior to the construction of dams and plantation development in the catchment area.

Even when the sea level was 40 m below the present, Matjes River rock shelter would have been within the 5 km range, the limit that the inhabitants would have walked to collect shellfish (Van Andel 1989). The human factor, preference for one species over another (Meehan 1982:81) can bias collecting activities. In this case, the results would always favour the easily collected *P. perna* when available. Digging in the sand to a half metre depth to collect *D. serra* is more effort. Human factors would be evident in the selection of species of the Infratidal zone. These are most easily collected at

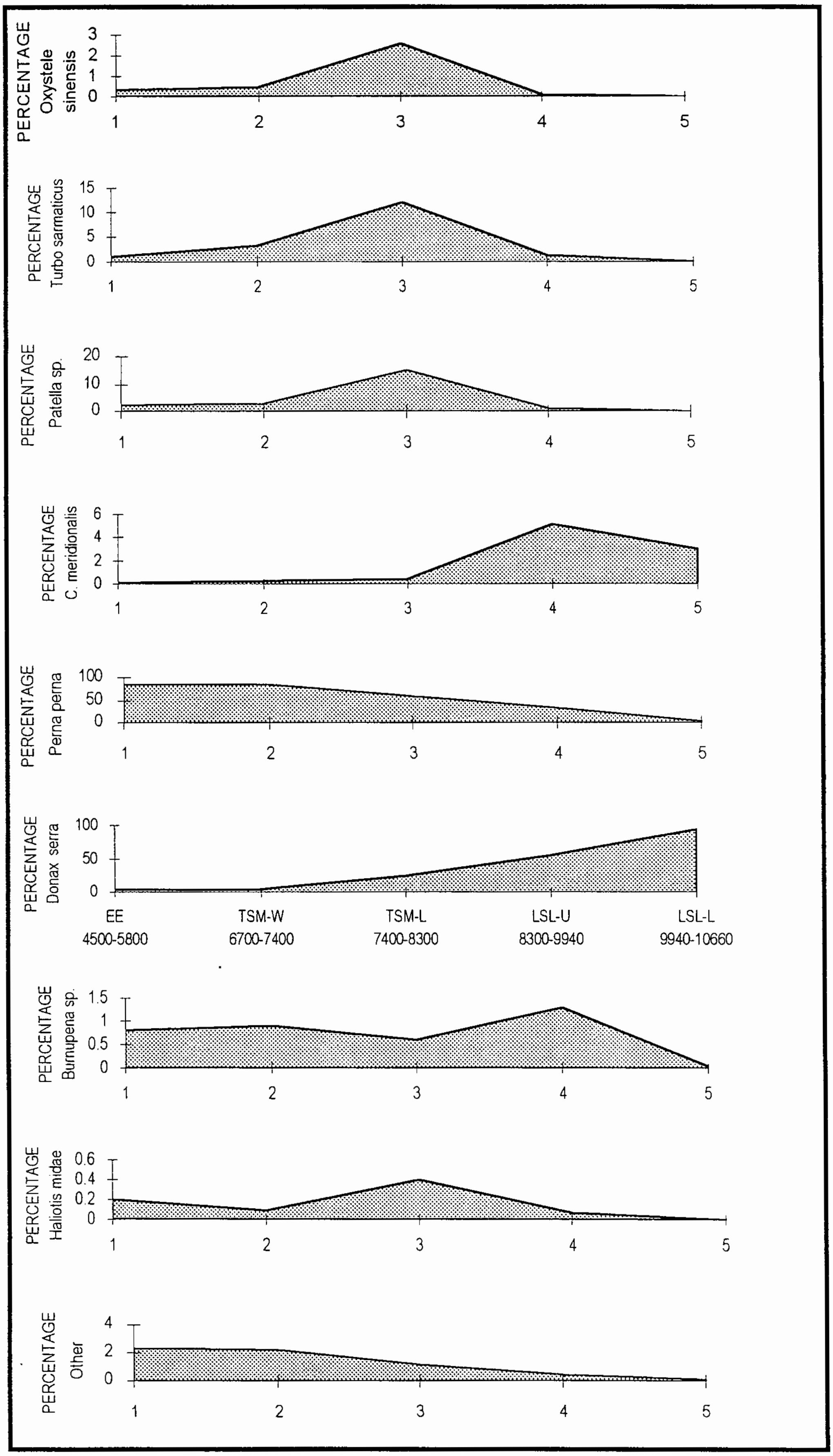

Figure 17: Percentage frequencies of shellfish species

Table 10: Frequencies and percentage frequencies of shellfish species

SPECIES		EE	TSM-W	TSM-L	LSL-U	LSL-L
Donax serra	f	419	692	5144	16925	4354
	%	*3*	*4.5*	*23.9*	*55.1*	*93.7*
	weight in g	2463.3	5437.3	31953.9	41282.4	7868.4
	weight in %	*7.3*	*14*	*23.9*	*56.7*	*95.2*
Perna perna	f	11747	12865	12570	10755	135
	%	*86.3*	*84.9*	*58.5*	*35*	*2.9*
	weight in g	26035.6	25355.1	36067.5	21877	196.3
	weight in %	*78.2*	*65.4*	*27*	*30*	*2.3*
Choromytilus meridionalis	f	27	45	88	1578	140
	%	*0.1*	*0.2*	*0.4*	*5.1*	*3*
	weight in g	36.8	51.4	24.1	226.1	81.3
	weight in %	*0.1*	*0.1*	*0.01*	*0.3*	*0.9*
***Patella* spp.**	f	363	430	3249	393	3
	%	*2.6*	*2.8*	*15.1*	*1.2*	*0.06*
	weight in g	3230.1	3895.3	36735.2	4554.5	104.5
	weight in %	*9.7*	*10.5*	*27.5*	*6.2*	*1.2*
Oxystele sinensis	f	48	89	560	31	0
	%	*0.3*	*0.5*	*2.6*	*0.1*	*0*
	weight in g	146.7	454.3	2639.5	146.7	0
	weight in %	*0.1*	*1.1*	*1.9*	*0.2*	*0*
Haliotis midae	f	36	15	92	22	0
	%	*0.2*	*0.09*	*0.4*	*0.07*	*0*
	weight in g	81.6	59.2	679.1	45.5	0
	weight in %	*0.2*	*0.1*	*0.5*	*0.06*	*0*
***Burnupena* sp.**	f	111	149	143	405	2
	%	*0.8*	*0.9*	*0.6*	*1.3*	*0.04*
	weight in g	280.3	267.8	247	1274.6	2.3
	weight in %	*0.8*	*0.6*	*0.1*	*1.7*	*0.02*
Turbo sarmaticus	f	131	507	2615	418	0
	%	*0.9*	*3.3*	*12.1*	*1.3*	*0*
	weight in g	693.3	2741.2	24499.1	3140.5	0
	weight in %	*2*	*7*	*18.3*	*4.3*	*0*
Other	f	332	345	260	184	8
	%	*2.4*	*2.2*	*1.2*	*0.5*	*0.1*
	weight in g	323.2	484.3	435.9	161.1	10.5
	weight in %	*0.9*	*1.2*	*0.3*	*0.2*	*0.1*
TOTAL	f	13214	15137	21472	30711	4642
	weight in g	33290.9	38745.9	133281.3	72708.4	8263.3
	Total shell debris	51498.2	39721.6	92486.3	195146.4	98984.9

spring low tide. The large gastropod *T. sarmaticus*, is an indicator of this zone and is a sought after species. However, it is only relatively common (12.1%) in the sequence in the TSM-L. In the time represented by this member *T. sarmaticus* contributed significantly to the diet because it yields more meat than *D. serra* or *P. perna.* The opercula are too few in number to provide reliable size distributions but there is no indication that this was a heavily exploited population. *P. tabularis*, the largest patellid and another indicator species of the Infratidal zone, is not present in the excavated samples. This would seem to confirm that stays at the site were not particularly scheduled to coincide with spring tides.

Other shellfish species occurring in low percentages do not show any clear patterns of change in frequency through the sequence. Patellids (Table 11) make up the greater number of non-filter feeders and percentages are 2.6% or less in all members except TSM-L where they reach 15.1%. The higher percentage of patellids in TSM-L correlates with the change over from a sandy to a rocky coastal habitat. As patellids occur on flat rock banks, such habitats may have been more common at that stage in the transgression of the sea. *P. oculus* and *P. longicosta* from the upper and lower Balanoid zones are the commoner species present.

Table 11: Frequencies and percentage frequencies of *Patella* species

SPECIES		EE	TSM-W	TSM-L	LSL-U	LSL-L
P.longicosta	f	67	173	917	145	0
	%	*18.4*	*40.2*	*28.2*	*36.8*	*0*
P.tabularis	f	1	2	0	0	0
	%	*0.2*	*0.4*	*0*	*0*	*0*
P.granularis	f	14	3	18	3	1
	%	*3.8*	*0.6*	*0.5*	*0.7*	*33.3*
P.barbara	f	93	24	66	10	0
	%	*25.6*	*5.5*	*2*	*2.5*	*0*
P.miniata	f	18	35	118	10	0
	%	*4.9*	*8.1*	*3.6*	*2.5*	*0*
P.argenvillei	f	42	4	10	1	0
	%	*11.5*	*0.9*	*0.3*	*0.2*	*0*
P.cochlear	f	41	12	6	1	0
	%	*11.2*	*2.7*	*0.1*	*0.2*	*0*
P.oculus	f	87	177	2114	223	2
	%	*23.9*	*41.1*	*65*	*56.7*	*66.6*
TOTAL	f	363	430	3249	393	3
	% of all species	2.6	2.8	15.1	1.2	0.06

6.3.2. COMPARISON OF MEAN SHELLFISH SIZE

To facilitate the comparison of mean shellfish size, samples of 100 *D. serra* and 100 *P. perna* shells from each member were measured. The method for obtaining metrical data from the fragmentary shells is discussed in Appendix 3. The mean length of *D. serra* shells varies from 59 mm in TSM-W to 60 mm in TSM-L to 57 mm in LSL-U to 58 mm in LSL-L showing no significant difference in the size of specimens collected. The range in length in each member, TSM-W from 49 to 67 mm, TSM-L from 53 to 78 mm, LSL-U from 50 to 65 mm and LSL-L from 52 to 65 mm supports there being no trend in size that may suggest farming down (see Table 12).

The *P. perna* sample from LSL-L was too small to include in the set of length measurements. The mean length of *P. perna* shells, 66 mm in TSM-W, 74 mm in TSM-L and 70 mm in LSL-U, and ranges, TSM-W from 48 to 92 mm, TSM-L from 53 to 95 mm and LSL-U from 55 mm to 93 mm, again suggests no marked temporal trend (see Table 12). The difference between the smallest and largest specimens measured is 44 mm in TSM-W, 42 mm in TSM-L and 37 mm in LSL-U. Larger specimens were collected later in time and this is not consistent with increasing exploitation of the resource.

Table 12: Summary statistics of shell length

Donax serra	TSM-W	TSM-L	LSL-U	LSL-L
Mean	10.044	10.656	9.458	9.763
Standard error	0.168741	0.172547	0.106279	0.148553
Median	10.2	10.7	9.4	9.85
Mode	9.9	10	10	10
Standard Deviation	1.687406	1.725467	1.062794	1.48553
Sample Variance	2.847337	2.977236	1.129531	2.206799
Kurtosis	0.152212	6.387603	-0.29944	-0.76452
Skewness	-0.57161	1.253183	0.346936	-0.04024
Range	7.9	12.3	5.1	5.8
Minimum	5.6	7.4	7.5	6.8
Maximum	13.5	19.7	12.6	12.6
Sum	1004.4	1065.6	945.8	976.3
Count	100	100	100	100
Confidence level	0.330725	0.338185	0.208304	0.291158

Perna perna	TSM-W	TSM-L	LSL-U
Mean	12.989	14.75	14.027
Standard error	0.214702	0.250303	0.252134
Median	12.8	14.85	14
Mode	10	15	10
Standard Deviation	2.147016	2.503029	2.521337
Sample Variance	4.609676	6.265152	6.357142
Kurtosis	-0.00016	-0.42269	-0.80597
Skewness	0.485144	-0.04073	0.043309
Range	11.3	10.7	9.8
Minimum	8.2	9.5	10
Maximum	19.5	20.2	19.8
Sum	1298.9	1475	1402.7
Count	100	100	100
Confidence level	0.420807	0.490584	0.494172

6.3.3. IMPLICATIONS OF *CHOROMYTILUS MERIDIONALIS* REPLACEMENT

In the sequence at Matjes River rock shelter *C. meridionalis* is replaced by *P. perna* at about 9500 BP. Studies have shown that *C. meridionalis* does not thrive in water temperatures that rise above 18°C (Clarke & Griffiths 1990). Modern populations of this species are restricted almost entirely to the cool waters of the west coast with the representation along the south coast being less than 1%.

The last deglaciation was not a gradual melting of the ice sheets, but was punctuated by at least two brief warm periods of accelerated melting and one cold period. The first accelerated meltwater pulse (MWP-1A) occurred around 14 000 BP and could have acted as the trigger for transient perturbations of the thermohaline circulation which lead to the Younger Dryas (Bard *et al.* 1996). The Younger Dryas of the Northern Hemisphere, a return to near glacial conditions around 12 000 BP, has a related occurrence in the Southern Hemisphere. Some authors (Jouzel *et al.* 1995; Mayewski *et al.* 1996) call this cool event, interrupting the two-step deglaciation around 12 000 to 11 500 BP, the Antarctic cold reversal (ACR) and describe it as an event separately from the Younger Dryas but occurring during the same time frame. However, new research shows that the Younger Dryas was much colder than previously thought and might also have influenced temperatures in the Southern Hemisphere (Kerr 1996:1584). From 14 600 to ±10 000 BP the Southern Hemisphere polar atmospheric circulation was not extensive enough to include large amounts of dust from the ice-free continents of the Southern Hemisphere despite arid conditions during at least a portion of the Atlantic cold reversal in Africa (Mayewski *et al.* 1996). The second meltwater pulse (MWP-1B) occurred around 11 300 BP (Bard *et al.* 1996:241) and corresponds to the end of the Antarctic cold reversal. After this pulse sea-levels rose smoothly to reach present levels around 9000 BP.

The presence of *C. meridionalis* in the base of the Matjes River rock shelter sequence is an indicator of cooler near-shore seawater temperatures at the end-Pleistocene/early Holocene. This may correlate with an Antarctic cold reversal rather than the Younger Dryas. The relatively high frequencies of this shellfish species before 9500 BP suggest that Holocene water temperatures became progressively warmer, but were still cool enough in this section of coast for *C. meridionalis*, in collectable quantities, to survive until at least 9000 BP and less certainly somewhat later. Thereafter *P. perna* was the dominant shellfish species.

As noted in Chapter 3, the replacement of *C. meridionalis* by *P. perna* is recorded at approximately the same time, 10 000 years ago, in the Nelson Bay Cave sequence. Klein (1972a:188) offered two possible explanations. Firstly that the replacement was caused by changing collecting strategies. Klein (1972a) deemed this unlikely as both these species are similar in appearance and taste. Secondly, the replacement reflects environmental change at the Pleistocene/Holocene boundary. This is the explanation favoured here.

The presence of *C. meridionalis* at Matjes River rock shelter in members LSL-U and LSL-L dated to between 8300 and 10 660 BP would be consistent with the contention of Cohen & Tyson (1995) that in the early Holocene sea temperatures were lower. However, they could not measure any *P. tabularis* shells from the units in which *C. meridionalis* was prominent. Unfortunately there was no suitable material of beginning Holocene age available from Matjes River for oxygen isotope analysis.

6.4. DISCUSSION

The shellfish analysis is significant in two respects. It provides a clear record of rising sea levels in the early Holocene and it shows that the collecting activities of the "*midden-makers*" were restricted to the immediate surrounds of the site.

The rise in sea level after the Last Glacial Maximum was rapid. It may have been 40 m below the present at the beginning of the Holocene (Van Andel 1989) but reached possibly as much as 2-3 m above the present in the mid Holocene (Reddering 1981; Marker & Miller 1993). The estimates for the sea levels and their dating are not precise and the rise in level may have been punctuated by meltwater pulses originating from Antarctica. However, transgressive seas had a marked effect on coastal ecology.

The empirical evidence from the Plettenberg Bay sites is that there was a sandy beach environment as the coast approached its present position in the Holocene. *D. serra* could be harvested from the beaches and *C. meridionalis* from the limited rocky sections. There is a probable gap in the Matjes River sequence between 9000 and 8000 years ago but after this time the progression to a predominantly rocky coastal environment is evident. The occurrence of higher frequencies of *T. sarmaticus* and patellids, species that are found on rock benches or "banke" as they are called by fishermen and in rock pools, in the TSM-L member may indicate a coast with such features rather than conscious selection. As sea levels rose towards the mid Holocene high, vertical rock surfaces suitable for colonisation by communities of filter feeders, represented in the now warmer waters by *P. perna*, became established in the surrounds of Matjes River and also at Nelson Bay. By 8000 years ago the modern coastal ecology had been established.

When this study was initiated, it was expected that changes in shellfish collecting practices would reflect conscious choices of the "*midden-makers*". Such choices appear to be masked by ecological changes. Choices appear to have been determined by what was available and what was collectable. Ecological rather than cultural factors are the more powerful explanation of changes in the shellfish collecting patterns at Matjes River. Those patterns were relevant to the early Holocene. It is in the later Holocene that evidence for intensification in the use of coastal resources would be predicted. On the evidence of Inskeep (1987) this would be after 3300 years ago and it may have been more pronounced in the last 2000 years with the appearance of herding. These are later times not documented in the deposits excavated in this study.

The LSL deposits are described as loams suggesting these are occupation soils made up of humified and carbonised earth with interbedded shell lenses. It has been suggested that the TSM is a shell tip. It includes thick beds of shell with little interstitial soil. The question is whether the TSM shell pile can to be termed a megamidden. The TSM is a large pile of shell and accumulated within less than a thousand years and possibly a series of brief episodes in that time. Slow accumulation might be expected to have resulted in more interstitial soil blown or wash in to the site. The top TSM member, Dreyer's mytilus midden is dominated by a single species. This may be considered evidence for intensive shellfish processing. However, if mussels and other shellfish were being cooked and dried for delayed consumption more associated charcoal would be expected. It seems rather that the regular small ash features and carbonised partings in the Apex section are occupation residues and the shell accumulation is the tip of shellfish consumed on site.

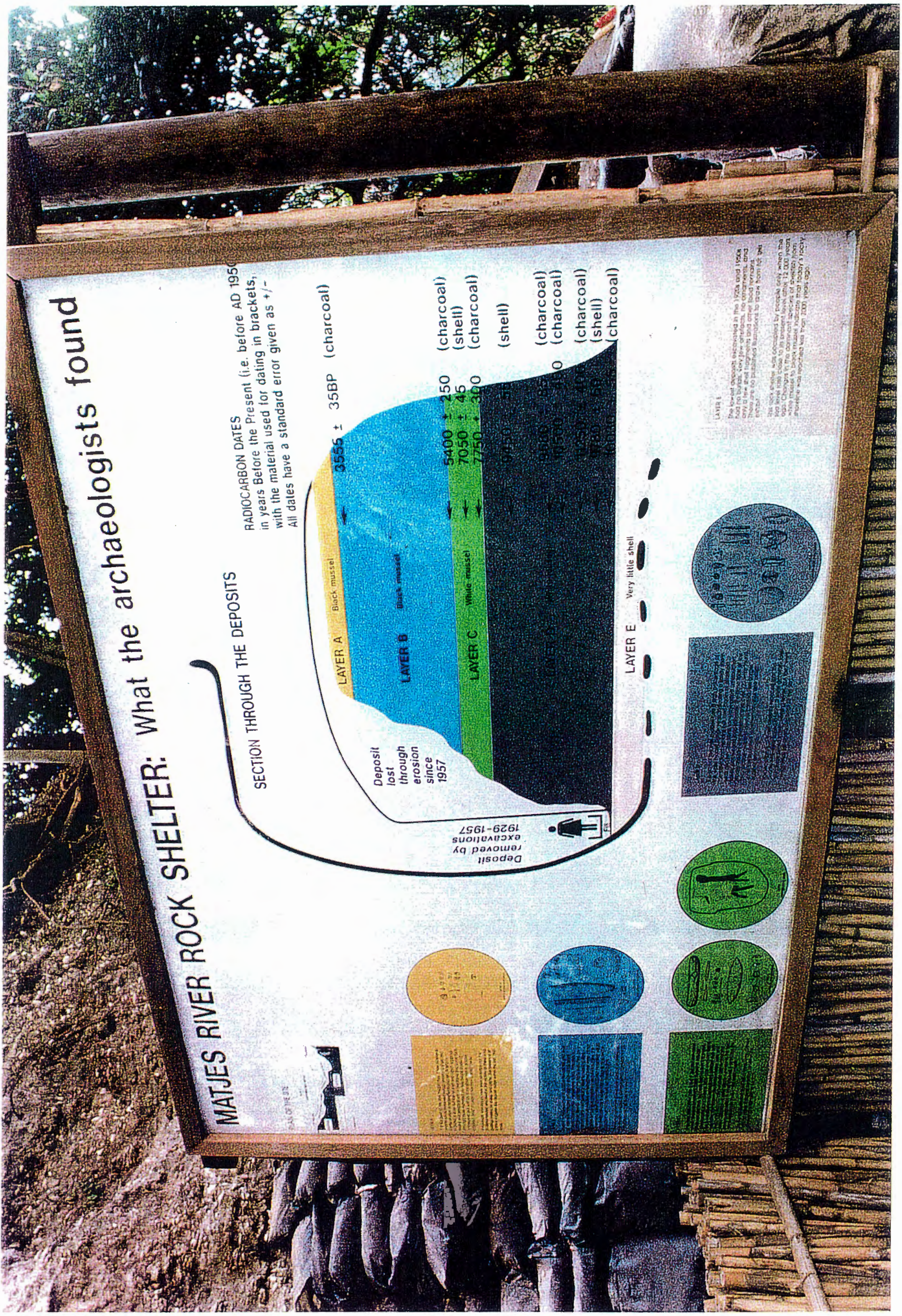

Figure 18: Information board – a mix of old and new data

CHAPTER 7

CONCLUDING DISCUSSION

This thesis is a project within a programme, a research project undertaken as part of a major initiative to rehabilitate one of the few precolonial national monuments. Not only is Matjes River rock shelter a declared monument but as one of the first South African archaeological sites to be excavated on any scale, it is a site that is known nationally and internationally. It is a textbook example of a shell midden and one of the largest in a rock shelter anywhere. Yet conservation at the site has been sorely neglected and rehabilitation could not proceed without first learning about the deposits. This thesis is part of that learning and re-assessment of the significance of the site.

The study has involved:

- Assisting in clearing the site of slump materials and mapping the extent of *in situ* deposits.
- Detailed sampling of the strata in the excavated six metre deep Apex section.
- Selection of materials for a new series of radiocarbon age estimates.
- A survey of relevant literature.
- Analyses of the finds of artefacts and shellfish.

The Matjes River deposits show an obvious separation between an upper (TSM) and a lower division (LSL). This separation is visible in the frontispiece and the cut-and-fill feature is at the interface. Above the interface are loose shelly materials that are easily eroded and standing sections had to be stabilised. Some two metres of this deposit accumulated in a thousand years. Although the drawn section (Figure 9) shows these strata to be horizontal, they dip at an angle of 25° towards the south or entrance and probably more steeply down the slope to the river to the east. The Apex is indeed a pinnacle, a high point, below which deposits were spread down slope. In the excavated section at the Apex there are shell lenses as well as ash spreads, hearths and carbonised horizons. Down the dip, the strata exposed in the eroded edge of Dreyer's cutting include fewer hearth and ashy lenses and the shell beds are more massive with inter-fingering brown loams. This suggests the 1994 Apex excavation intersected the margin of an occupation area centred in the northern part of the site. The down dip deposits are tipped materials rather than primary occupation deposits. The TSM deposits accumulated as a cone and dips are steepest in the TSM-W member. This is a perspective on the site formation processes that operated during the accumulation of part of the deposits. It was gained from excavating a limited area in thin units and close examination of more extensive standing sections. This is justification for the excavation programme adopted.

The top member recognised in the 1994 cutting, TSM-W, is almost a metre thick and dates to between 7400 and 7000-6700 years ago. This is the best match for Dreyer's mytilus layer or layer B on the shellfish content. The dates and the artefacts, however, match the Wilton layer or layer C. All layers younger than 7400 years are *Perna perna* or mytilus-rich even those stratigraphically higher than those intersected in the Apex excavation. In the underlying TSM-L, dating to between 8000 and 7400 years the shellfish samples are a mix of species, patellids, *Turbo sarmaticus*, *Donax serra* and *P. perna*. This is not a mytilus layer *sensu* Hoffman (1958) with 90% of the shellfish *P. perna*. It should correlate with layer C of earlier workers on the basis of the shellfish but as it is associated with an Albany and not a Wilton industry, it would equate with layer D on the artefact content. There are difficulties in relating the stratigraphy and the contents of the units excavated in 1994 to those recognised in the earlier excavations. It would be misleading to continue to refer to a mytilus layer with particular culture-stratigraphic significance at the site.

The TSM is of interest in two respects. It includes the transition between the Wilton and Albany industries. The transition is at 7400 years ago, a dating consistent with other well resolved sequences in the region. This industrial change is recorded during the accumulation of the cone of conformable deposits and no difference in the pattern of occupation of the shelter is recorded. The changes in the artefact sets between Later Stone Age industries have been linked to the appearance of innovations (Deacon, J. 1984) that are primarily stylistic. This makes it improbable that the Wilton marked the appearance of a distinct Keurbooms people (Louw 1960).

The change in the shellfish is the other reason for interest in the TSM. In the TSM-L there is a transition from collecting mainly the sandy shore indicator species, *D. serra,* to collecting the rocky shore indicator, *P. perna*. At this time sea levels were rising and approaching the mid Holocene high. The sea level would have been close to the present day mean and the coast taking its present position. Ecological changes in the shore environment and not human choice are the simplest explanation for the switch in shellfish collecting patterns. The diversity of shellfish and the prominence of *T. sarmaticus* in the samples from this member may be reason to argue that choice was involved. However, as the turban opercula are not notably reduced in size, any selection of this shellfish was not intense. The association of patellids with *T. sarmaticus*, they have similar habitat requirements of pools in planed rock benches rather than vertical surfaces, suggests the shellfish fauna again reflects what was collectable on the shore at the time. Measurements were made of the size of *D. serra* and *P. perna* from this and other members and sizes are similar in all samples. There is no evidence in the sequence for a reduction in the size of individuals collected. This would be the consequence if the collecting had increased in intensity or there had been selection for these species. In the absence of contrary evidence the only acceptable conclusion is that the coastal ecology was the primary determinant of what was brought back to the shelter.

The interface appears to be a disconformity. In the Apex excavation a feature that is probably a sleeping hollow is at the interface but in the wall of Dreyer's cutting the interface is visible as a distinct line. A time-depth plot of the radiocarbon age determinations indicates an anomaly. The radiocarbon samples above the interface date younger than 8000 years and the sample a metre below the interface to 9600 years. The calculated rates of accumulation of the deposits at the site are between 1,7 and 2,1 m per thousand years. If a metre of deposit accumulated in 500 or 600 years the estimate for the age of the disconformable top of the LSL deposits would be 9000 years. The disconformity represents a 1000-year gap in the record of occupation of the site. A more precise estimate would be possible through additional radiocarbon dating. It will be important to establish whether the apparent non-occupation at Matjes River rock shelter between 9000 and 8000 years ago had regional or wider significance. The sequences at Nelson Bay Cave and Oakhurst do not have adequate stratigraphic and chronometric resolution to serve as a test. Identifying gaps in the archaeological record is of much significance as showing continuities. Both inform on the history of populations.

The deposits below the discontinuity have been grouped in three LSL members. Two of these would be the equivalent of Dreyer's layer D with the lowest, the LSL-L, correlating with his layer E. In the 1994 excavation, LSL-U is a series of relatively horizontal occupation deposits dipping east towards the river and the LSL-L is primarily a natural deposit. Although the fauna from these units has not been analysed and samples are small they include more fish and seal remains than found in the overlying units. A different sampling programme would be necessary to confirm such suggestions. Whereas the TSM members sampled the margin of a cone of occupation refuse, the excavation in the LSL members cut through layers close to the primary occupation centre. The centre of occupation was not in the north of the site as in later times. In the re-exposed sections of Dreyer's cutting which will be reported elsewhere (Deacon & Döckel in prep.) the strata are horizontal with numerous cut-and-fill features (sleeping hollows). These features would be expected against the shelter of the back wall. The deposits below the discontinuity are more carbonised, compacted and less well preserved than in the overlying layers. Conditions for preservation are least favourable in the centre of an occupation area because of human activities. Added to this, preservation falls off with depth because the lower strata are moister.

The occurrence of *Choromytilus meridionalis* in the lower deposits at the site is significant and confirms an observation made at Nelson Bay Cave. In the Late Pleistocene under conditions of lower sea surface temperatures and a weaker Agulhas current (Cohen & Tyson 1995), cooler waters may have favoured this species over *P. perna* in rocky sections of the southern Cape coast. There is no evidence for shellfish collecting practices for the Last Glacial as the relevant sites are now below sea level and would have been mostly destroyed during the Holocene marine transgression. In the Last Interglacial (Deacon, H.J., 1995) the shellfish species collected were the same as in the Holocene at Matjes River.

It seems unwarranted to suggest that the occurrence of clastic rubble, layer E of Dreyer, in the base of the sequence has any specific palaeoclimatic significance. Normal weathering processes can account for its formation. In this excavation programme bedrock was not reached because it proved impossible to excavate through the full depth of this unconsolidated material. Thin dark partings in the rubble and rare shells may be the traces of the first occupation of the site. The oldest date for the site is more than 11 000 years old (L-336H) for a sample submitted by Hoffman (1958:318). There is no reason to doubt the antiquity of the sample because any contamination would decrease and not increase the age estimate. The Matjes River rock shelter deposit is an historic archive, covering a 11 000 year period abeit with some gaps. The data obtained in this thesis project are most informative on the early Holocene period.

In the review presented in Chapter 2, the discussion of the models used to explain midden occurrences, the examples cited were mainly from the well-researched western Cape region. Discussion of the southern Cape region was postponed to this chapter. In his monograph on Nelson Bay Cave Inskeep (1987) proposed four models to explain the meaning of the changes he observed in the last 6000 years. One model can be labelled the "*different people model*" and the other three models are variations on a "*same people model*". The purpose was not to be prescriptive in theory and in being theory free his discussion borders on the post-modern. Concern for understanding the differences in raw material usage and the frequencies of formal tools in coastal versus inland sites is the reason for proposing different models.

The "*different people model*" accepts that there were separate coastal and inland populations. Prior to 6000 years ago, coastal people, the makers of the Albany industry, occupied Nelson Bay Cave. Finds of more formal microlithic Wilton artefacts made in non-local raw materials, dating to between 3300 and 5300 years ago, is explained as the consequence of seasonal visits of inland groups to the coastal people. A cessation or reduction of these contacts and a re-adaptation of the local people to a coastal lifeways explains the marked change in bone and stone artefacts, including ornaments and in economy at 3300 years ago. Environmental conditions are invoked as a determinant of the degree of contact between peoples inland and on the coast. For example, an amelioration of conditions in the late Holocene is held to account for contact after 3300 years ago. Other changes explained in this model link the appearance of pottery-making herders in the domain of the coastal dwellers in the last 2000 years, to more systematic use of marine resources and opportunities for barter and the like. Inskeep favoured a "*different people model*" as the more consistent with the evidence. The alternative "*same people models*" are weaker in their predictions but they are based on the same scenario. These models were proposed less as a conclusive interpretation than as a beginning point for further research.

The models that Inskeep proposed are not different in kind from the "*same people*" scenario offered by Jerardino (1996). Recently Binneman (1997) has come out strongly in favour of "*different people*" even suggesting different people may have occupied the same site at the same time.

Many of the studies are situated in the late Holocene when environments ameliorated, populations expanded into new areas and there is evidence for intensification particularly after 3000 years ago and with the introduction of herding. All scenarios, for that is what they are, underscore the differences between archaeological data and ethnography on the one hand and history on the other. Archaeological data are coarse. These data are too coarse, and too limited in quality and geographical scale, to overcome all the inherent problems of defining ethnicities and social formations and of quantifying demographic changes. Archaeology paints scenarios with a broad brush with details filled in by analogy.

The 1994 Matjes River rock shelter excavation was undertaken as part of a rehabilitation programme. The purpose is to provide information for visitors to the site in the form of displays of peels of the stratigraphy and explanations on information boards. The primary purpose was not a study of the local prehistory. The information gained will be used in other phases of the programme to de-trivialise perceptions of the precolonial past and to promote conservation of the archaeological heritage. It is recommended that the information noted below be taken up in the displays to be erected at the site.

1) The point has been made that this is a place of shelter. It is not a cave or a house but a similar place affording protection against the elements. We suspect that shelter was particularly needed when the winter frontal storms sweep along the coast. The shelter is formed in rocks of the Kouga Formation of the Cape Supergroup. Looking out from the shelter across the river the stepped edge of the coastal platform can be seen. This platform was planed off following the break-up of Gondwanaland. The walk to the shelter is through coastal forest

and the view from the shelter is of the mosaic of Afromontane forest and fynbos. The setting of the rock shelter is an opportunity to create awareness of natural history. It may be advisable to present the natural history information (Chapter 3) in a different format from the archaeological information to avoid visitor perception that people living close to nature are primitives.

2) The rock shelter was more than a protected place. It was a home where people lived and where they buried their dead. Inskeep described Matjes River rock shelter as a cemetery and it is probable the dead were buried there as a mark of ownership as much as respect. Owning a home gave rights to the resources in the surrounds. A visit to the rock shelter is entering another's domain. This is not as a right but by permission of the present custodians on behalf of the people who lived there in the past. In the traces of hearths and foodwaste displayed in peels taken from the 1994 excavation and in illustration of sleeping hollows, the concept of the site as another's home can be emphasised.

3) Radiocarbon age determinations put the first visitors arriving 11 000 years ago. This project has provided a firm chronology for the site. It is possible that the rate at which the deposit accumulation at different periods and occupation was episodic not only on an annular but also on a centennial scale. A concept of time will be important to visitors viewing the site.

4) The reason why people chose to live there is the Holocene sea level transgression brought the coast within range of collecting activities based on the shelter. This transgression can be linked to changes in the coastal ecology and is shown in the kinds of shellfish found in the deposits. The point can be made that understanding the ecological changes that have taken place in

the past is not an esoteric exercise but part of the knowledge necessary to manage the ecology of the coastal zone in the present and for the future.

5) The shellfish in the deposits are foodwaste but not the only items of diet. Fish, seals, marine birds, a variety of antelope and other game in addition to plant foods would have been eaten. Humified and carbonised layers are indicators of the plant food residues.

6) The sea grass, *Zostera capensis*, is preserved at the site. It carpeted a large surface of the shelter extending from the top of the Apex excavation to the entrance area. It may have been used to line burial shafts as at Oakhurst. It was used as bedding material in the shelter known as East Guanogat on Robberg Peninsula. The occurrence of *Z. capensis* and beads made of the shellfish *Nassa (Nassarius)* show the importance of the Keurbooms Estuary as a resource.

7) The people who lived at the site can be identified as Khoesan and this makes it appropriate to explain the Khoesan identity. Although the site includes numbers of burials is not recommended that drawings of human materials be shown. This will avoid offending the sensitivities of any visitor.

8) There is no rock art preserved on the walls of the shelter but one or more painted stones were recovered in the earlier excavations. It would be appropriate to draw attention to these and the role rock art would have played in the religious life of the inhabitants.

If these conclusions contribute to the overall objective of the programme of the rehabilitation of a prehistoric monument to the Khoesan who lived and died in this place then the effort involved will have been well rewarded.

APPENDIX 1

CLASSIFICATION SCHEME FOR STONE TOOLS

This scheme is based on that developed by J. Deacon (1982:513-579). It is a hierarchical one with major categories of waste, utilized and formal tools and within each category are classes and subclasses where appropriate. The subdivision is useful for distinguishing between successive stages of patterned behavior in artefact manufacture and is based on the reduction sequence from raw material to formal tool. The patterns seen may have meant little to the toolmakers themselves, but they highlight changes in habits and changes through time that have some relevance to the development and evolution of stone artefact manufacturing systems and technology in general. (Deacon 1982:115).

Manuports or unused lumps of raw material bought to a site. Unmodified and smoothed ochre are included in this category.

Waste or the unretouched by-products of stone artefact manufacture. Included in this category are pieces which may have been used, but which show no sign of damage visible to the naked eye.

Utilized pieces or artefacts with damage visible to the naked eye. Utilization damage is less sustained than deliberate retouch and the pieces in this category are not made to a repeated pattern.

Formal tools usually made on flakes in which deliberate retouch is used to shape the working edge and the tool to a repeated pattern.

MANUPORTS

This category includes unused cobbles or lumps of rock bought to a site as raw materials. These raw materials include quartz, silcrete, chalcedony and micaceous sandstone. The class "other" consists largely of shale. The class "ochre" is divided between unmodified and smoothed pieces.

WASTE

Cores are pieces with three or more negative flake scars and are irregular in origin. With this class are included core by-products - core reduced pieces and core rejuvenation flakes. The Albany industry is a informal industry and it was decided to include these by-products in the class cores to reduce noise that might have been generated.

Chunks are pieces with one or two negative flake scars. Included in this class are pieces which are definitely of artefactual origin, but cannot be placed in any other class.

Chips are pieces with a maximum dimension of less than 10 mm.

Irregular flakes are a class of unretouched flakes with no utilization visible to the naked eye. This class was divided into broken, complete and overhit flakes.

UTILIZED PIECES

Damaged utilized flakes are flakes or flake fragments with an edge sharp enough to have served as a cutting tool on which there is visible damage in the form of a series of small flakes removed along the cutting edge, usually on the dorsal surface. Utilization damage is usually restricted to a small portion of the edge in the form of three or more flake scars.

Notched utilized flakes show no retouch to shape the working edge, but have sustained damage to the edge which has resulted in a small notch or notches being formed. To qualify as a notch, there should be at least two flake scars that have formed a distinct concavity along the working edge through pressure on a small section of this edge.

Pièces esquillées show secondary crushing along the curved, chisel-like striking platform. This crushing appears to be the result of the core reduced piece having been used in a chisel-like action, but it is also possible that this damage may result from attempts to remove from further flakes from the piece. Pièces esquillées are usually 20-25 mm long and 15-20 mm wide with a quadrilateral plan form. The utilized edge is straight in plan form, but when viewed from above it is gently curved.

Upper and lower grindstones are included in this category.

RETOUCHED PIECES

Scrapers are usually made on flakes. They are characterized by two main features: a flat ventral surface that is unretouched and a convex working edge that has been deliberately shaped by secondary retouch. Utilization results in smaller flakes being removed from the working edge and this will steepen the angle between the ventral surface and the working edge which can range from 30 to over 90 degrees.

Two sub-classes of scrapers have been recognized on the basis of size. Large scrapers, also referred to as typical Albany scrapers, have a maximum dimension of greater than 20 mm. Small scrapers, also referred to as typical Wilton scrapers, have a maximum dimension of less than 20 mm.

Adzes have one or more straight or slightly convex working edges which have been shaped by one set of flake scars and also show secondary step-flaking resulting from use at a steep angle and in a chopping motion.

APPENDIX 2

ARTEFACT FREQUENCIES BY MEMBER, 1994 EXCAVATION

Table 13: Bucket counts and frequencies of artefacts per unit volume (7,5 l) of deposit

Member	**EE**	**TSM-W**	**TSM-L**	**LSL-U**	**LSL-L**	**LSL-C**
NUMBER OF BUCKETS EXCAVATED	75.5	100.5	170	247.7	46.5	11
Total artefacts per bucket	4.1	18.4	11	13	4.1	3.4
Untrimmed flakes per bucket	3.9	14.7	9.7	12.3	3.9	3.4
Utilized pieces per bucket	0.05	1.5	0.5	0.3	0	0
Formal tools per bucket	0.01	0.1	0	0.8	0	0

Table 14: Frequencies and percentage frequencies in classes of the Waste category and in raw material

CLASS	RAW MATERIAL		EE	TSM-W	TSM-L	LSL-U	LSL-L	LSL-C
UNTRIMMED FLAKES	Quartzite	f	257	1341	1630	3042	183	38
		%	*87.1*	*90.6*	*98.4*	*99.7*	*100*	*100*
	Quartz	f	26	8	12	1	0	0
		%	*8.8*	*0.5*	*0.7*	*0.03*	*0*	*0*
	Chalcedony	f	12	131	14	6	0	0
		%	*4*	*8.8*	*0.8*	*0.1*	*0*	*0*
	Total	f	295	1480	1656	3049	183	38
% of total waste			*95.7*	*87.8*	*92.3*	*96.6*	*95.8*	*100*
CHIPS	Quartzite	f	0	31	14	54	1	0
		%	*0*	*75.6*	*93.3*	*98.1*	*100*	*0*
	Quartz	f	0	6	1	0	0	0
		%	*0*	*14.6*	*6.6*	*0*	*0*	*0*
	Chalcedony	f	0	4	0	1	0	0
		%	*0*	*9.7*	*0*	*1.8*	*0*	*0*
	Total	f	0	41	15	55	1	0
% of total waste			*0*	*2.4*	*0.8*	*1.7*	*0.5*	*0*
CHUNKS	Quartzite	f	7	114	90	42	7	0
		%	*53.8*	*73*	*84.1*	*95.4*	*100*	*0*
	Quartz	f	0	4	5	0	0	0
		%	*0*	*2.5*	*4.6*	*0*	*0*	*0*
	Chalcedony	f	6	38	12	2	0	0
		%	*46.1*	*24.3*	*11.2*	*4.5*	*0*	*0*
	Total	f	13	156	107	44	7	0
% of total waste			*4.2*	*9.2*	*5.9*	*1.3*	*3.6*	*0*
CORES	Quartzite	f	0	5	8	6	0	0
		%	*0*	*62.5*	*66.6*	*100*	*0*	*0*
	Chalcedony	f	0	3	4	0	0	0
		%	*0*	*37.5*	*33.3*	*0*	*0*	*0*
	Total	f	0	8	12	6	0	0
% of total waste			*0*	*0.4*	*0.6*	*0.1*	*0*	*0*
REDIRECTING FLAKES	Quartzite	f	0	0	1	0	0	0
CORE REDUCED **PIECES**	Quartzite	f	0	0	2	0	0	0
	Total	f	0	0	3	0	0	0
% of total waste			*0*	*0*	*0.1*	*0*	*0*	*0*
TOTAL WASTE	Quartzite	f	264	1491	1745	3144	191	38
		%	*85.7*	*88.4*	*97.3*	*99.6*	*100*	*100*
	Quartz	f	26	18	18	1	0	0
		%	*8.4*	*1*	*1*	*0.03*	*0*	*0*
	Chalcedony	f	18	176	30	9	0	0
		%	*5.8*	*10.4*	*1.6*	*0.2*	*0*	*0*
	Total	f	308	1685	1793	3154	191	38
as % of GRAND TOTAL			***98.4***	***90.7***	***95.2***	***97.5***	***100***	***100***

Table 15: Frequencies and percentage frequencies in classes of the Utilized category and in raw material

CLASS	RAW		EE	TSM-W	TSM-L	LSL-U	LSL-L	LSL-C
UTILIZED FLAKES	Quartzite	f	3	75	75	73	0	0
		%	*75*	*48.3*	*86.2*	*100*	*0*	*0*
	Quartz	f	0	2	0	0	0	0
		%	*0*	*1.2*	*0*	*0*	*0*	*0*
	Chalcedony	f	1	80	12	0	0	0
		%	*25*	*50.9*	*13.7*	*0*	*0*	*0*
	Total	f	4	157	87	73	0	0
% of total			*100*	*98.1*	*97.7*	*94.8*	*0*	*0*
Edge damage	Quartzite	f	1	35	33	24	0	0
		%	*100*	*36*	*80.4*	*100*	*0*	*0*
	Quartz	f	0	1	0	0	0	0
		%	*0*	*1*	*0*	*0*	*0*	*0*
	Chalcedony	f	0	63	8	0	0	0
		%	*0*	*63.6*	*19.5*	*0*	*0*	*0*
	Total	f	1	99	41	24	0	0
Steep damage	Quartzite	f	0	40	32	40	0	0
		%	*0*	*68.1*	*91.4*	*100*	*0*	*0*
	Quartz	f	0	1	0	0	0	0
		%	*0*	*1.7*	*0*	*0*	*0*	*0*
	Chalcedony	f	1	17	3	0	0	0
		%	*100*	*29.3*	*8.5*	*0*	*0*	*0*
	Total	f	1	58	35	40	0	0
Notched edge	Quartzite	f	2	0	10	9	0	0
		%	*100.0*	*0.0*	*90.9*	*100*	*0*	*0*
	Quartz	f	0	0	0	0	0	0
		%	*0*	*0*	*0*	*0*	*0*	*0*
	Chalcedony	f	0	0	1	0	0	0
		%	*0*	*0*	*9*	*0*	*0*	*0*
	Total	f	2	0	11	9	0	0
PIECES ESQUILLEES	Chalcedony	f	0	2	1	0	0	0
	Quartz	f	0	1	0	0	0	0
	Total	f	0	3	1	0	0	0
HEAVY EDGE FLAKED	Quartzite	f	0	0	0	1	0	0
GRINDSTONES	Quartzite	f	0	0	0	1	0	0
ANVILS	Quartzite	f	0	0	1	2	0	0
	Total	f	0	3	2	4	0	0
% of total			*0*	*1.8*	*2.2*	*5.1*	*0*	*0*
TOTAL UTILIZED	Quartzite	f	3	75	76	77	0	0
		%	*75.0*	*47.7*	*85.3*	*100*	*0*	*0*
	Quartz	f	0	3	0	0	0	0
		%	*0*	*1.8*	*0*	*0*	*0*	*0*
	Chalcedony	f	1	82	13	0	0	0
		%	*25*	*51.2*	*14.6*	*0*	*0*	*0*
	Total	f	4	160	89	77	0	0
as % of GRAND TOTAL			***1.2***	***8.4***	***4.7***	***2.3***	***0***	***0***

Table 16: Frequencies and percentage frequencies in classes of the Untrimmed flakes and in raw material

RAW MATERIAL			EE	TSM-W	TSM-L	LSL-U	LSL-L	LSL-C
Quartzite	Broken	f	75	281	399	702	35	9
		%	*29.1*	*20.1*	*24.1*	*23.1*	*19.1*	*23.6*
	Complete	f	21	442	245	291	18	4
		%	*8.1*	*31.6*	*14.8*	*9.6*	*9.8*	*10.5*
	Overhit	f	161	672	978	2036	130	25
		%	*62.6*	*48.1*	*59.0*	*67.2*	*71.0*	*65.7*
	Total	f	257	1395	1655	3029	183	38
Quartz	Broken	f	7	0	2	1	0	0
		%	*28.0*	*0*	*16.6*	*100.0*	*0.0*	*0*
	Complete	f	6	7	5	0	0	0
		%	*24.0*	*87.5*	*41.6*	*0.0*	*0.0*	*0*
	Overhit	f	12	1	5	0	0	0
		%	*48.0*	*12.5*	*41.6*	*0.0*	*0.0*	*0*
	Total	f	25	8	12	1	0	0
Chalcedony	Broken	f	4	35	3	4	0	0
		%	*33.3*	*26.9*	*17.6*	*66.6*	*0.0*	*0*
	Complete	f	2	76	7	1	0	0
		%	*16.6*	*58.4*	*41.1*	*16.6*	*0.0*	*0*
	Overhit	f	6	20	7	1	0	0
		%	*50.0*	*15.3*	*41.1*	*16.6*	*0.0*	*0*
	Total	f	12	130	17	6	0	0

Table 17: Frequencies and percentage frequencies of the amount of cortex in Untrimmed flakes

RAW MATERIAL		EE	TSM-W	TSM-L	LSL-U	LSL-L	LSL-C
Quartzite	no cortex f	191	843	886	1610	105	26
	%	*74*	*60.4*	*54.6*	*53.1*	*57.3*	*68.4*
	platform cortex f	47	427	558	1308	76	11
	%	*18*	*30.6*	*34.4*	*43.1*	*41.5*	*28.9*
	dorsal cortex f	1	17	16	8	0	0
	%	*0.3*	*1.2*	*0.9*	*0.2*	*0*	*0*
	side cortex f	10	72	85	69	2	1
	%	*3.8*	*5.1*	*5.2*	*2.2*	*1*	*2.6*
	entire dorsal	8	36	77	34	0	0
	%	*3.1*	*2.5*	*4.7*	*1.1*	*0*	*0*
	Total f	257	1395	1622	3029	183	38
Quartz	no cortex f	25	7	11	1	0	0
	%	*100*	*87.5*	*91.6*	*100*	*0*	*0*
	platform cortex f	0	1	1	0	0	0
	%	*0*	*12.5*	*8.3*	*0*	*0*	*0*
	dorsal cortex f	0	0	0	0	0	0
	%	*0*	*0*	*0*	*0*	*0*	*0*
	side cortex f	0	0	0	0	0	0
	%	*0*	*0*	*0*	*0*	*0*	*0*
	entire dorsal	0	0	0	0	0	0
	%	*0*	*0*	*0*	*0*	*0*	*0*
	Total f	26	8	12	1	0	0
Chalcedony	no cortex f	12	89	14	6	0	0
	%	*100*	*68.4*	*82.3*	*100*	*0*	*0*
	platform cortex f	0	20	1	0	0	0
	%	*0*	*15.3*	*5.8*	*0*	*0*	*0*
	dorsal cortex f	0	2	0	0	0	0
	%	*0*	*1.5*	*0*	*0*	*0*	*0*
	side cortex f	0	7	1	0	0	0
	%	*0*	*5.3*	*5.8*	*0*	*0*	*0*
	entire dorsal	0	12	1	0	0	0
	%	*0*	*9.2*	*5.8*	*0*	*0*	*0*
	Total f	12	130	17	6	0	0

Table 18: Frequencies and percentage frequencies in classes of the Formal category and in raw material

CLASS	RAW MATERIAL		EE	TSM-W	TSM-L	LSL-U	LSL-L	LSL-C
SCRAPERS	Quartzite	f	0	1	0	2	0	0
		%	*0*	*9*	*0*	*100*	*0*	*0*
	Quartz	f	1	3	0	0	0	0
		%	*50*	*27.2*	*0*	*0*	*0*	*0*
	Silcrete	f	0	1	0	0	0	0
		%	*0*	*9*	*0*	*0*	*0*	*0*
	Chalcedony	f	1	6	0	0	0	0
		%	*50*	*54.5*	*0*	*0*	*0*	*0*
	Total	f	2	11	0	2	0	0
% of formal tools			*100*	*91.6*	*0*	*100*	*0*	*0*
ADZES	Chalcedony	f	0	1	0	0	0	0
	Total	f	0	1	0	0	0	0
% of formal tools			*0*	*8.3*	*0*	*0*	*0*	*0*
TOTAL FORMAL TOOLS	Quartzite	f	0	1	0	2	0	0
		%	*0*	*14.2*	*0*	*100*	*0*	*0*
	Quartz	f	1	3	0	0	0	0
		%	*50*	*28.5*	*0*	*0*	*0*	*0*
	Silcrete	f	0	1	0	0	0	0
		%	*0*	*7.1*	*0*	*0*	*0*	*0*
	Chalcedony	f	1	7	0	0	0	0
		%	*50*	*50*	*0*	*0*	*0*	*0*
	Total	f	2	12	0	2	0	0
as % of GRAND TOTAL			***0.3***	***0.8***	***0***	***0.06***	***0***	***0***

Table 19: Frequencies of ostrich eggshell, bone tools. marine and estuarine shell

CLASS	TYPE		EE	TSM-W	TSM-L	LSL-U	LSL-L	LSL-C
OES	OES beads	f	0	1	3	27	0	0
	Unfinished OES beads	f	0	0	0	0	1	0
	Total	f	0	1	3	27	1	0
WORKED BONE	Bone points	f	0	1	0	3	0	0
	Fish gorges	f	0	0	1	1	0	0
	Total	f	0	1	1	4	0	0
WORKED MARINE AND ESTUARINE SHELL	*'Nassa'* beads	f	0	0	3	158	0	0
	Perforated *Ostrea*	f	0	0	0	1	0	0
	Donax serra left	f	0	1	10	0	0	0
	Donax serra right	f	0	0	7	5	0	0
	Total	f	0	1	20	164	0	0
UNWORKED ESTUARINE SHELL	*Nassa (Nassarius)*	f	2	0	0	435	0	0
	Total	f	2	0	0	435	0	0

APPENDIX 3

METRICAL DATA FOR DETERMINING SHELLFISH SIZE

Various taphonomic factors are responsible for the fragmentation of the shellfish remains. The main reason is the fragile nature of the shells. The breaking open of the shells to extract the meat and trampling that occurred during occupation and deposition mean that few shells are complete enough to take length measurements.

Hall (1980:280) proposed a method for obtaining metrical data from the fragmentary shellfish remains. The method depends on establishing the relationship between the length of the pedal retractor muscle scar and the length of the complete specimen in the case of *Perna perna*. As mussel shells in archaeological assemblages tend to be broken at a point approximately one third of the length measured from the umba the method is appropriate. This approach has been used to obtain estimates of the whole shell lengths for *P. perna* and *Donax serra* in samples from different stratigraphic members in Matjes River rock shelter sequence.

PERNA PERNA

The size index was based on the distance between the umba and the posterior end of the scar of the anterior pedal retractor muscle. The structure of the *P. perna* valve and the positions of measurement taken in the analysis are shown in Figure 1.

A sample of 20 *P. perna* was measured to obtain measurements of overall length and the distance from the anterior pedal retractor muscle scar and the umba. These data were plotted as a scatter diagram (Figure 2) and a line of best fit line obtained by simple regression. There is some variability in the relationship between the two measurements but a clear trend is evident. It was a simple procedure to read off the length estimates for *P. perna* shell fragments in the Matjes River rock shelter samples.

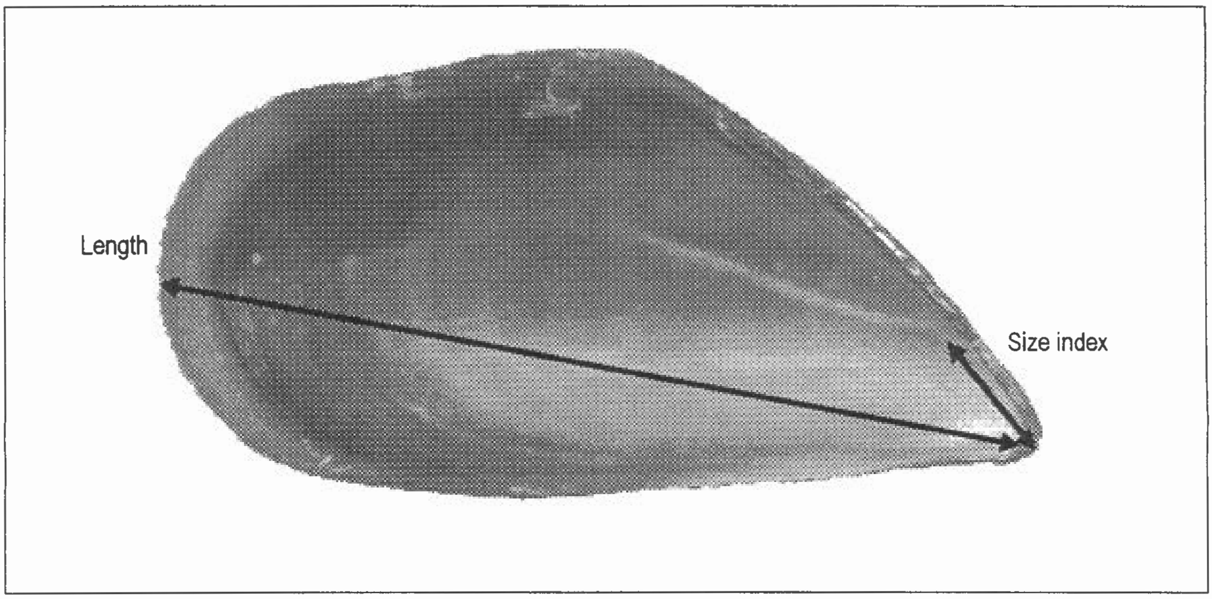

Figure 19: *Perna perna* shell showing the measurements taken.

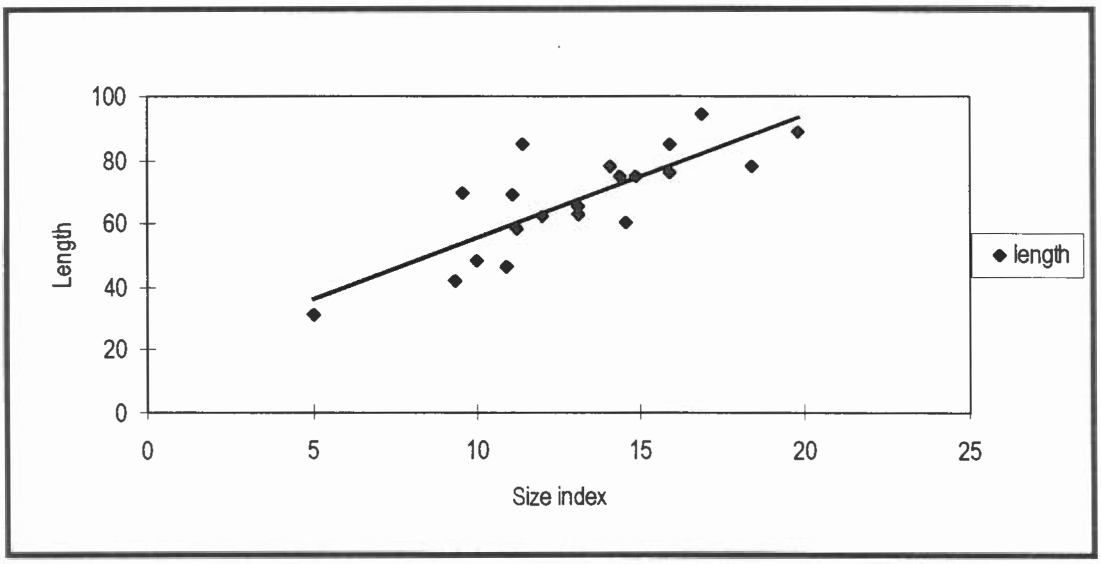

Figure 20: Scatter diagram of length of *Perna perna* shells

DONAX SERRA

For this species the length of the umba was chosen for measurement. The structure of a *D. serra* valve and the measurements taken in the analysis are shown in Figure .

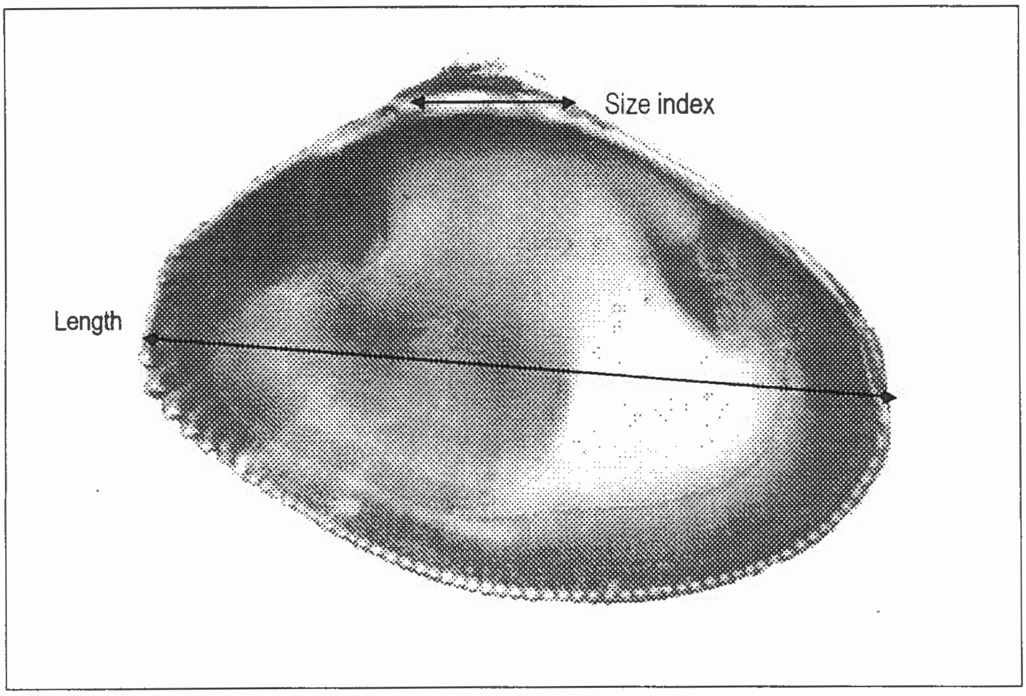

Figure 21: *Donax serra* shell showing the measurements taken.

Twenty *D. serra* shells were measured to investigate the relationship between overall length and the length of the umba. The data were plotted as a scatter diagram (Figure) and a line of best fit obtained by simple regression. The scatter of points is less than in the case of *P. perna* and the relationship appears to be robust. It was again a simple procedure to estimate the lengths of the shells of *D. serra* represented by fragments in the Matjes River rock shelter samples.

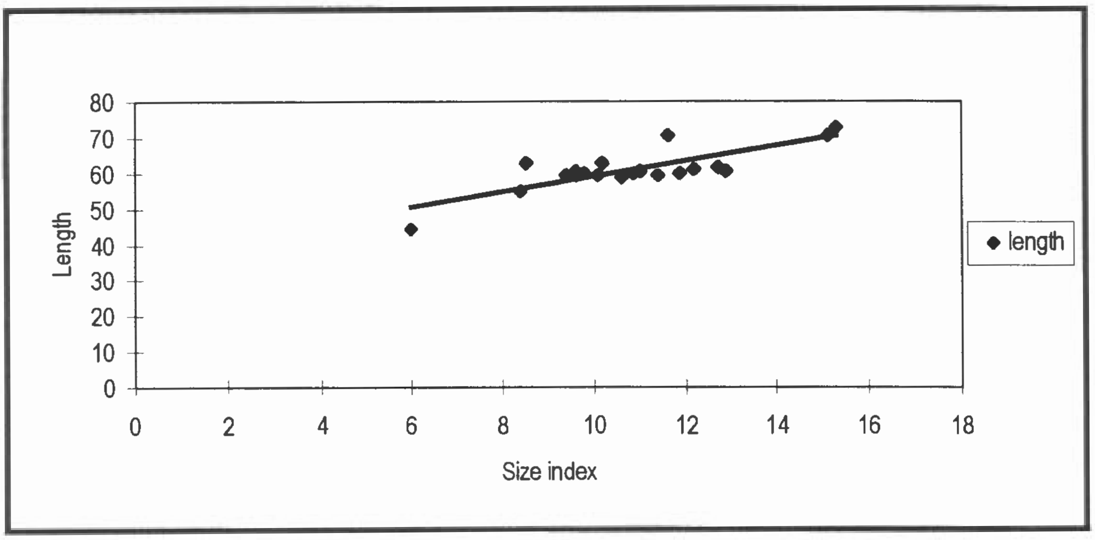

Figure 22: Scatter diagram of *Donax serra* lengths

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