HUNTER-GATHERER-FISHERS OF THE FISH RIVER BASIN: A CONTRIBUTION TO THE HOLOCENE PREHISTORY OF THE EASTERN CAPE

by

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ABSTRACT

This thesis provides interpretations of the Holocene Later Stone Age of the eastern Cape which focus specifically upon hunter-gatherer strategies for managing and reducing risk over the last 5500 years. In this effort, social imperatives are given equal weight to environmental factors in assessing the Later Stone Age settlement of new areas. This approach focuses upon the changes actively instituted by hunter-gatherer-fishers in their social organisation. These changed from open network, inclusive social systems, to more closed networks, restricted settlement ranges and increasingly exclusive social behaviour wrought by competitive self interest.

The primary data base comes from the sites of Edgehill and Welgeluk, two riverine shelters dating to the last 5500 years. The analyses of these sites within a broader regional context show that changes in risk management can be recognised by a shift towards more intensive exploitation of freshwater mussels, fish, crab and tortoises, as well as the development of storage pits in order to prolong access to seasonally restricted oil rich seeds. This intensification is apparent from about 4000 BP. This subsistence focus upon an 'aseasonal' resource base infers an inseparable linkage between several factors. These are regional demographic saturation and a trend towards increased sedentism. Consequently, the traditional role of mobility as a strategy for managing risk becomes less effective. Concurrent with intensification and increasing competitive self-interest was a firmer identity between people and place. This identity is regionally signified through the manipulation of lithic raw materials and more locally through the practice of focused cave burial. The arrival of herders and mixed farmers produced a spectrum of interaction possibilities. Of importance is that hunter-gatherers remained active 'players' within this complex social landscape and did not simply passively change because of external forces.

A general conclusion from this study points out the inadequacy of the San ethnography for guiding the interpretations of the diachronic processes highlighted in this study. Ethnographic and archaeological analogs from studies of more complex hunter-gatherers are deemed equally appropriate for maximising the interpretative potentials of the eastern and southern Cape Holocene sequences.

JAGTER-VERSAMELAAR-VISSERS VAN DIE VISRIVIERKOM: 'N BYDRAE TOT DIE HOLOSEEN VOORGESKIEDENIS VAN DIE OOS-KAAP

deur SIMON LEE HALL

JANUARIE 1990

OPSOMMING

Hierdie tesis verskaf verklarings van die Holoseen Later Steentydperk in die Oos-kaap gedurende die laaste 5500 jaar. Daar word spesifiek gefokus op jagter-versamelaar strategië vir die beheer en vermindering van risiko. Noodsaaklike sosiale behoeftes en omgewingsfaktore word hier op gelyke voet gestel in 'n poging om die bewoning van nuwe gebiede in die Later Steentydperk na waarde se skat. Hierdie benadering fokus op die veranderinge wat aktiewelik deur jagter-versamelaar-vissers in hul sosiale organisasie geïnisieer is. Dit het verander van oop netwerke, ingegeslote sosiale stelsels, na meer geslote netwerke, beperkte vestigingsgebiede en toenemende eksklusiewe sosiale gedrag wat deur mededingende selfbelang teweeggebring is.

Die primêre databasis is verkry van die terreine by Edgehill en Welgeluk, twee rivieroewerskuilings wat uit die laaste 5500 jaar dateer. Die ontleding van hierdie vindplekke in 'n breër streekskonteks toon aan dat veranderinge in risikobeheer bespeur kan word deur 'n verskuiwing na meer intensiewe ontginning van varswatersmossels, vis, krappe en skilpaaie asook die ontwikkeling van bergingsputte om toegang tot seisoenale olieryke sade te verleng. Hierdie toename is duidelik vanaf ongeveer 4000 jaar gelede. Hierdie verskuiwing van die bestaansfokus na nie-seisoenale bronne dui op 'n onlosmaakbare skakel tussen verskeie faktore naamlik die demografiese versadiging van streke en 'n neiging tot verhoogde gesete bevolking. As gevolg daarvan het die tradisionele rol van mobiliteit as 'n strategie vir die beheer van risiko minder effektief geword. Gelyktydig met verhoogde kompeterende selfbelang het 'n sterker identiteit tussen mens en plek ontwikkel. Hierdie identiteit word op streeksbasis geopenbaar deur die manipulasie van litiese ru-materiale en plaaslik deur die praktyk van begrawings in grotte. Die aankoms van herders en gemengde boerdery het 'n spektrum van moontlikhede vir interaksie meegebring. Dit is belangrik dat die jagter-versamelaars aktiewe 'spelers' binne hierdie komplekse sosiale landskap gebly het en nie slegs passief onder druk van eksterne magte verander het nie.

'n Algemene gevolgtrekking van hierdie studie wys op die ontoereikendheid van die San etnografie om die vertolking van die diachroniese prosesse, wat in die studie beklemtoon word, te lei. Ooreenstemmende etnografiese en argeologiese studies van meer komplekse jagter-versamelaars word net so geskik geag om die verklarende potensiaal van die oos- en suid-Kaapse Holoseen opeenvolging maksimaal te benut.

DECLARATION

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

Signature

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Many people have helped me in the course of this project. Mr Cecil Nonqane must be singled out for his unflinching assistance and companionship in the field and in preparing material for analysis.

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TABLE OF CONTENTS

Page

LIST OF FIGURES

Figure **Page**

LIST OF TABLES

Table **Page**

CHAPTER ONE

INTRODUCTION

The main themes under investigation in this thesis concern regional Later Stone Age (LSA) settlement changes and subsistence intensification over the last 5500 years. The subjects of the examination are hunter-gatherer-fishers who lived along the inner margin of the eastern extension of the Cape Fold Belt. The data were obtained from the two sites of Edgehill and Welgeluk, which are both riverine rock shelters located on the banks of the Koonap River, a major tributary of the Great Fish River (Figs 1.1 & 1.2).

At one level the data from these sites inform upon hunter-gatherer-fisher (hereafter referred to as hunter-gatherer) economy within a riverine locale, an aspect which has received little archaeological attention in the southern African context (Deacon, H.J. 1972:38). At other levels the sites contribute to an understanding of a regional history during which the initiation of occupation at the sites and the specific economic trajectories evident in their sequences cannot be fully comprehended without comparative recourse to the wider regional archaeology previously undertaken. The existing data base in the eastern Cape is particularly extensive and permits such a regional approach (Deacon, J. 1972; Deacon, H.J. 1976; Robertshaw 1984; Leslie-Brooker 1987). I believe that the type of diachronic regional approach attempted here is possible because many of the synchronic 'slices' are already known, providing the basis for diachronic perspectives. It is on this work that the current study builds, both in contributions to the data base, as well as exploring the data within different theoretical fields. A main emphasis is Holocene demographic and social change examined against a backdrop of environmental change, an aspect which has been singled out previously as "...a topic worthy of study on its own..." (Deacon & Thackeray 1984).

This study is orientated just as much towards regional social process as it is to 'band'/land economics. Previous work has emphasised man/land relationships and this thesis attempts to add social relationships to these studies as well. Environment and environmental changes are still important variables in shaping the archaeological sequences, but are seen in terms of permission and constraint, presenting opportunities within which decisions are socially made.

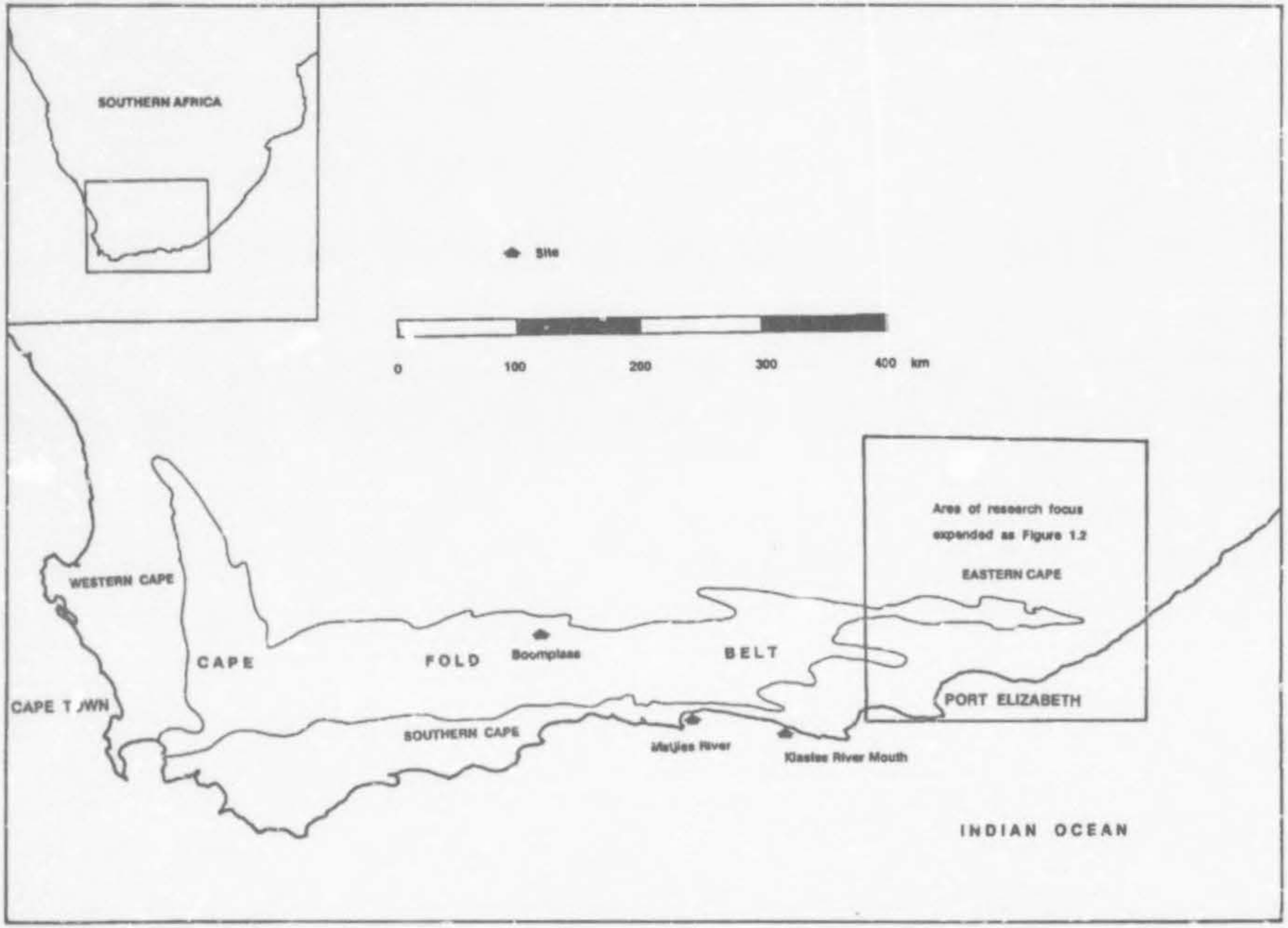


Figure 1.1. Orientation map of the research area in relation to the sub-continent and the southern and western Cape

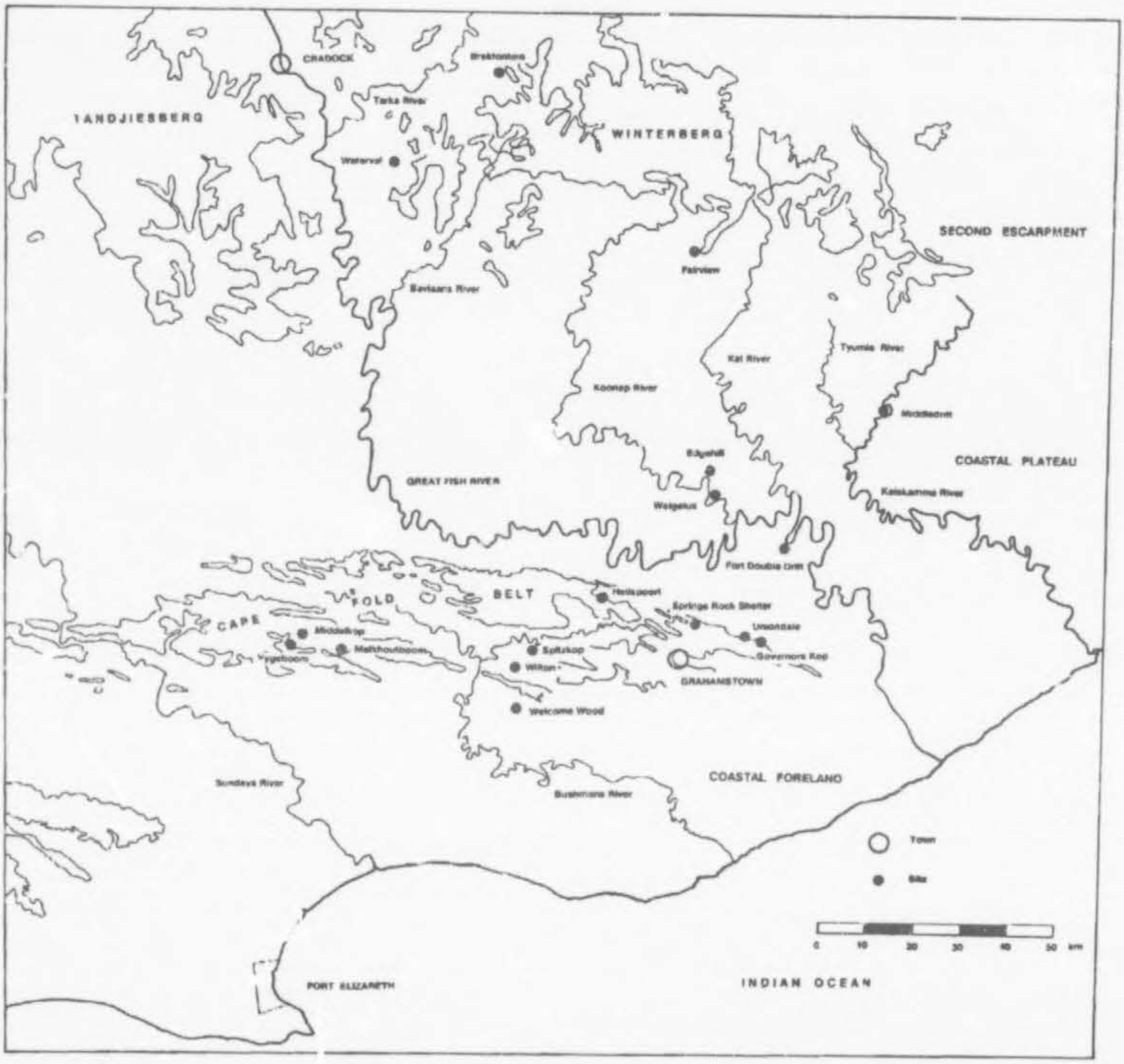


Figure 1.2. Detailed map of the research area

A key concept in the discussion of the LSA sequences in the eastern Cape is that of intensification. It is clear from the data to be presented, that a relatively low key but distinct trend towards increasing production and resource management is evident in the sequences from the mid-Holocene. Such trends in hunter-gatherer sequences elsewhere have initiated debates as to their causes and arguments range from population increase models, to those which see such trends resulting from an intensification of social relationships and alliance networks (Cohen 1977; Beaton 1983; Lourandos 1985). Integral to this debate is the ethnographic and archaeological study of the trajectory towards complex hunter-gatherers and the appearance of food production. The intensification process is seen by some (see Lourandos 1985) as representing a continuum of increasing cultural complexity from simple hunter-gatherers on the one hand, to food producers on the other, all of which are nodes on this continuum. Intensification is an archaeological signal of complexity and although the signals to be examined here are weak in comparison to those of complex hunter-gatherers elsewhere, the rationale behind the methodology employed here is that the process is seen as conceptually similar.

There is perhaps a danger in this perspective of imbuing LSA populations with a social and economic complexity which over-reaches the ability of the archaeological record to support such complexity. This has to be guarded against, but in the same light, the local San ethnography also needs to be used critically lest it completely subdues archaeological signals which could point towards different behavioural configurations that are at variance with ethnographic stereotypes. The theoretical and methodological approaches to San ethnography have tended to treat hunter-gatherers and the ethnographic present as an evolutionary stage, which is uncritically extended back in time. The past is seen as an image of the ethnographic present. This gives rise to weakly developed diachronic perspectives which mask archaeological variability.

In North America an increasing awareness by ethnographers of the need historically to contextualise the 'ethnographic present' brings archaeology, along with ethno-history, into the limelight as a source which can inform on the origins of the present and reduce the 'ethnographic tyranny' over the past (Wobst 1978; Trigger 1981). This attitude gives archaeologists the confidence to be less conservative about their data and its relationship to the 'ethnographic present'. While the archaeology obviously does not 'speak' by itself, it should not simply mimic the ethnography.

The San ethnography is clearly important in providing analogues for the deeper past, as has been so clearly demonstrated through its juxtaposition with appropriate theory for the elucidation of the principles behind LSA rock art as well as providing credible frameworks for the recognition of aggregation and dispersal sites (i.e. Lewis-Williams 1981; Wadley 1987). At the level of general principles the ethnography may be appropriate for analogical use for the deeper past but the detail and content of the LSA past must be viewed first in isolation. The resonance between ethnography and archaeology should be more balanced and not unidirectional. In fact, the archaeology may be more appropriate in defining the ethnographic present rather than the other way around. In Parkington's words, "Until we expect that things are different, we will always discover that they were the same" (Parkington 1984a:12).

The concern here with expanding the archaeological perspective to include social issues raises the question of appropriate theory. South African archaeologists have predominantly used the 'band' as the unit of analysis within frameworks which may be labelled as cultural ecological systems approaches. The emphasis on subsistence and settlement patterns, as determined by environment (see Deacon, H.J. 1976) neglects that bands interact with other bands within a structured set of social relationships. Decisions concerning settlement, for example, are informed just as much by social imperatives. Above all, researchers using social theory maintain that the economic and the social cannot in fact be separated.

The approach adopted here leans towards aspects of historical materialism in the belief that much more of the Holocene LSA record can be accessed with it and that it is particularly suited to the examination of a diachronic process, such as intensification. Moreover, it also accommodates parts of the archaeological record such as burial, previously considered epiphenomenal, by recognising that changes in the content and structure of one data category reflect changes in the socio-cultural whole. It is also well suited to the investigation of new social relationships between San, pastoralists and mixed farmers over the last 2000 years as well as changing relationships within hunter-gatherer society in response to these new economic and social incursions.

In Chapter Two the themes introduced here are expanded upon further. It provides the methodology through which the intensification process is archaeologically recognised and gives the theoretical orientation through which the process is explained. I develop a preliminary framework which explains the process as changing emphases in risk management strategies which mediate contradictions in social relationships between open and widespread networks on the one hand and increasing group self interest on the other.

Chapter Three describes the present and past environmental backgrounds and then makes a preliminary comparison between the timing of Holocene palaeoenvironmental changes and the LSA sequences in the eastern Cape as represented by the available radiocarbon dates. I suggest that there is a relationship between an early mid-Holocene climatic amelioration and territorial expansion but that a number of factors intervene to temper an overt determinism in this relationship. The sites and excavations are described at the end of Chapter Three.

Chapter Four gives the food waste data. The key theme in the discussion of the food waste is how intensification prolongs occupations within smaller areas and from single sites. The 'aseasonal' character of the subsistence base has obvious implications for changes in mobility patterns from which changes in risk management can be inferred.

The lithic and non-lithic artefacts are described in Chapter Five. These are examined predominantly with stylistic questions in mind and how stylistic changes signify demographic changes, the establishment of socio-spatial boundaries and social intensification and its relationship to the intensity of aggregation and dispersal patterns.

Chapter Six explores these themes further in relation to the practise of focused LSA cave burial. A simple relationship is established between focused ritual burial practice and relatively closed and exclusive hunter-gatherer behaviour.

Chapter Seven addresses the pottery sequences of the research area and interprets them in the light of ethnographic and historical observations of interaction between hunter-gatherers and food producers. The rock art record is also used to inform upon regional diachronic process and shifting emphases in hunter-gatherer economics and ideology.

The final Chapter returns to the relationship between the archaeology and the ethnography and a summary of the main points made in the thesis.

CHAPTER TWO

INTENSIFICATION : BACKGROUND AND THEORY

The recognition of intensification is a key theme for the pre-contact sequences (5500 to 2000 BP) at Edgehill and Welgeluk. This chapter presents and discusses a number of issues concerning intensification and its application to the current study. Firstly, intensification is defined and its archaeological recognition is discussed. Secondly, the notion of intensification is examined with reference to previous archaeological work in South Africa, and various theoretical frameworks used to explain intensification are briefly discussed. Thirdly, I critically discuss the method and theory of Kalahari San ethnography in order to examine its suitability for the elucidation of diachronic change, such as intensification. I also suggest that ethnographic frameworks used uncritically by LSA archaeologists will downplay variability. Lastly, having suggested an appropriate scale of ethnographic analogy, I articulate synchronic 'ethnographic present' principles of hunter-gatherer risk management with a diachronic model which stresses intensification as a signal of changing emphases in risk management strategies. I see the process resulting from the interplay between a number of factors which increasingly create incompatibility between generalised reciprocity and individual group interest.

INTENSIFICATION: DEFINITION AND RECOGNITION

The term and concept of intensification has become increasingly prevalent in the archaeological literature on hunter-gatherers. This is due to a concern with the pivotal relationship between complex hunter-gatherers and the appearance of food production. To this end, an entire volume has been compiled (Price & Brown 1985a) as well as a number of other papers (for example Bender 1978, 1981, 1985a, 1985b; Hayden 1981; Lourandos 1983, 1984, 1985; O'Brien 1987).

This interest in complex hunter-gatherers stems from an awareness that the appearance of food production was part of a process and should not be viewed in terms of an evolutionary stage-like transition or 'revolution'. Consequently, such studies stress that traditional hunter-gatherer models of homeostatic adaptation and stability be modified to include greater structural complexity and allow for more diachronic dynamism. It was within such societies that the process towards food production took place. Furthermore, in the light of this reassessment, the dichotomy between hunter-gatherers and farmers is seen as less absolute in the sense that simple hunter-gatherers and farmers are behavioural nodes on a clinal gradation of increasing extractive capability (Lourandos 1985:389). This diachronic perspective of hunter-gatherers and farmers as a continuum is reinforced through cross-cultural synchronic comparisons of hunter-gatherer variability in the 'ethnographic present'. Hunter-gatherers previously considered exceptions to the general forager model, such as North American west coast Indians (Suttles 1968), are now seen as geographic variants on this clinal continuum. One of the aims of this study is to emphasise the diachronic process of intensification in the late Holocene among LSA hunter-gatherers in the eastern Cape and to locate this process on the continuum of change. As will be discussed below, an archaeological assessment of intensification highlights marked differences between the archaeology and the ethnography and the relationship between the two needs to be addressed.

Intensification implies an increasing extractive ability which indicates either increasing productivity or increased production, or both. As Bender (1978:205) has pointed out, the distinction between the two terms can indicate different scales of process. Better productivity signals improvements in extractive efficiency, in which a group of hunter-gatherers may maintain production levels in the face of, for example, a decreasing foraging range. In such a situation better efficiency may produce a time saving which is not necessarily reinvested in producing more but perhaps in working less. Intensification, therefore, need not be synonymous with increased production. Increased productivity, as opposed to an absolute increase in production, has different implications for social and demographic change (Bender 1978:206). Increased production stems from an increase in demands, whereas increasing productivity may have nothing to do with such demands.

Two interlinked variables of increasing production in the archaeology of hunter-gatherers are population increase and increasing sedentism. While population increase in hunter-gatherer contexts can very often only be inferred, population pressure has often been cited as one of the 'demands' behind the intensification process (Cohen 1977). The place of population pressure in intensification will be discussed more fully below but the relationship between intensification and increasing sedentism is introduced here because it brings to the discussion considerations of the social order rather than simply the economic. Intensification implies that people are elaborating their subsistence strategies within increasingly smaller foraging ranges and consequently become economically tied to fewer points on the landscape for longer periods of time. This decreasing mobility, however, undercuts the economic risk-reducing rationale behind both individual and group movement which are also mechanisms for conflict dissolution (Lee 1979). Thus, the relationship between intensification and increasing sedentism creates new social problems which have to be accommodated. It is suggested that this is undertaken through a concomitant ritual intensification which among other things, ties people to places through ritual. In Bender's words;

> Perhaps residential permanence becomes a more viable option when it is preceded by or occurs with increased ritual permanence, when there is a ceremonial and social locus that invokes a delay on *socially* invested time, energy and thought -a place pivotal within the cognitive scheme of things, pivotal to activities that reflect both the reality of sociopolitical relations and the symbolic mediation, or masking, of those realities (Bender 1985:26; original emphasis).

Intensification, therefore, is not simply a process of increasing economic production. It is a socially constructed strategy which is underwritten in the ritual sphere. In fact, the two cannot be separated.

The importance of ritual place is by no means simply a theoretical construct in the LSA in South Africa. Janette Deacon introduces the concept of topophilia into her discussions concerning rock engraving clusters attributed to the southern /Xam. These clusters repeatedly served as bases for rainmaking ritual (Deacon, J. 1988a). I suggest below that, among other things, cave burials and their ritual elaboration in the eastern and southern Cape embody similar concepts which broadcast, through ritual, the economic and social identity of people with place. Intensification concerns both economic and social/ritual production.

Before considering some of the theoretical frameworks which have been used to explain intensification in South African LSA studies, I discuss the archaeological recognition of the process and isolate a number of indicators which are appropriate in the current study.

INDICATORS OF INTENSIFICATION

Cohen (1975, 1977, 1985) and Lourandos (1983, 1985) list a number of archaeological indicators for the recognition of intensification. While the indicators stressed by these two writers overlap considerably, their explanations differ markedly. Cohen stresses population growth and population pressure while Lourandos locates the intensification process within changing social relations of production, and rather than seeing population pressure as an independent variable, considers any observable population increase to be dependent upon changes in social relationships (Lourandos 1983:92). Much of what follows is taken from these two workers.

Absolute population increase has been posited as related in some way to intensification. The methods traditionally employed to calculate population levels and population increases have been developed in sedentary food producing contexts. These include, for example, the quantification of households or room numbers or counting the number of grindstones in each settlement. As such these methods are of little use for investigating similar aspects of non-sedentary hunter-gatherer groups and the sources of error compound to the point of irrelevance. The indicators for intensification and the implied population increases are consequently qualitative and relative, rather than quantitative and absolute.

These relative indicators involve demonstrable changes in settlement patterns, changes in the food resource mix and changes in artefact frequencies which can be tied to food procuring and food preparation activities. For these indicators to support and give confidence in the idea of intensification, in the sense of increased production, some indication of absolute increases in caloric production must be shown. Additionally, intensification must be shown to result from stress, i.e. demands, rather than as a response to new technology or new opportunities allowed by environmental changes. These indicators are not mutually exclusive and it is the general principles behind their use which are of concern here.

Increasing use of marginal habitats

If a trend towards settlement of areas which generally are less optimal for hunter-gatherers can be demonstrated, then intensification can be inferred. An obvious problem with this indicator is that marginal habitats may be increasingly used because they become less marginal through environmental changes rather than through an absolute necessity to expand into less favourable habitats. The degree to which marginal habitat expansion can be seen as intensification based upon absolute demands rather than environmental change is investigated in Chapter Three, but several factors are mentioned here which temper an apparent determinism between environmental change and territorial expansion.

Firstly, if new sites are consistently established in adjacent optimal habitats as well, the increasing use of marginal environments may be seen as the development of necessary strategies rather than simply a passive response to environmental release. Secondly, intensification can also be inferred if it can be demonstrated that expansion into marginal habitats is by a group whose incorporation of that marginal habitat is *an addition* to the optimal habitat in an increasingly complex seasonal transhumant pattern. This suggests that the optimal habitat can no longer, by itself, meet a group's subsistence requirements.

Increasing niche-width

Related to the first indicator is the recognition that new microhabitats are being exploited. While expansion into marginal habitats does imply this, intensification can be more positively identified if the niche-width also increases in optimal habitats as well, and these expansions are *additions* to rather than simply *replacements* for previously exploited niches. More specifically, intensification is apparent when economic activity increasingly focuses upon inter-tidal and riverine niches which are adjacent to or run through both optimal and less optimal environments.

Increasing use of high biomass, low trophic level resources

When smaller food parcels are increasingly exploited and have short reproductive cycles and high biomass, then intensification may be inferred. In addition, increasing exploitation of smaller food 'parcels' implies less search time, greater locational predictability and wider seasonal availability. These resources may be additions to larger and more prestigious animals but declines in the latter may indicate their reproductive inability to keep pace with intensification demands. This shift is precisely the same inferred by Hayden using the biological terms of r and K-selected species in his resource stress model (Hayden 1981:525). Implicit in this indicator is that people are sacrificing quality for quantity (Cohen 1977:80).

Where high biomass, low trophic level resources are added to the diet, controls must be used to measure the degree to which such trends could also be the result of environmental change. Furthermore, technological innovation may also be a contributing factor, although the exploitation of smaller food items does not require new technological inputs and in their absence a firmer case for intensification can be made. Another aspect of high biomass food exploitation is that such resources may require longer preparation times to render them palatable and this may reflect in frequency shifts in associated artefacts.

Increasing intensification of site usage

If there are any indicators in the structure of the site which suggest the range of activities carried out increase through time and become more varied, then intensification may be indicated. The key implication is that particular points on the landscape are becoming more heavily used as base camps for longer periods of time and the wider range of activities will be archaeologically reflected. Also implied here is an increasing emphasis on logistical, collector strategies rather than foraging strategies of multiple residential moves (Binford 1980). Supporting evidence could be storage facilities indicative of a greater investment in the site in terms of longer occupation episodes or repeated sequential site use in an annual cycle. As discussed above, burials and cemeteries may also indicate increasing ritual identity of people with place which, in turn, intensifies site usage in the ritual sphere as well.

In order for a strong case to be made for intensification and for a subsequent search for causality, many of these indicators should be archaeologically visible. The scale of their meaningful application is important. At the site level, local habitat variability may mask some of these indicators while enhancing others. The search for intensification and its explanation must lie, however, at the regional level and all the indicators should point in an aggregate-type way to the presence or absence of the process. Analysis of these indicators at the regional scale is of prime importance when seeking causal explanations. If these indicators are widely distributed spatially this itself may provide some control as to the mechanisms behind the process. The identification of these indicators may also be temporally uneven and this raises the question of different rates in the intensification process. The identification of intensification in the archaeological record is relatively straightforward but its explanation poses considerable problems. It is to theories of intensification used in South African studies that I now turn.

INTENSIFICATION: CAUSALITY AND EXPLANATION

The idea of intensification in South African LSA archaeology is by no means new. In the eastern Cape the subsistence adaptation of Wilton groups to plant food staples and small territorial browsers is seen as the behavioural correlates of relatively small groups, organised within small foraging ranges, the boundaries of which may have been quite firmly fixed (Deacon, H.J. 1976:163). The structure of behaviour in the Wilton is an explicit example of intensification when compared with the terminal Pleistocene adaptation, during which inferred lower population densities were organised in large groups. This geared subsistence activities towards the hunting of larger herd animals and consequently hunting ranges were less defined in a territorial sense. As H.J. Deacon states (1972:39):

> A noteworthy pattern revealed in the study of the ecology of the post-Pleistocene populations in South Africa is the apparent trend towards the use of a wider range of resources on an increasingly intensive scale.

In seeking an explanation for the Holocene LSA subsistence system in the eastern Cape as a local example of the world-wide broad spectrum resource trend, the biological idea of adaptation is used. The Wilton adaptation is one of close correspondence to post-Pleistocene environments, although overt determinism is tempered by cultural and demographic factors which are also important in the observed adaptation.

In the younger parts of the Holocene LSA sequences in the eastern Cape, new food residues such as *Cyperus usitatus* and *Unio caffer* appear, as well as storage facilities in the form of *Boophone* lined pits (Deacon, H.J. 1976:164). A tentative correlation between these new resources in the LSA and the appearance of pastoralism has been drawn (Deacon, J. 1969:120). Implicit in this correlation is that the stable adaptation of the eastern Cape Wilton groups was disrupted by the arrival of herders. The higher population, and the associated resource stress which ensued, required a broadening of the subsistence base.

As already mentioned, the Wilton in the eastern Cape is seen as a stable adaptation with a high degree of congruence with the environment. Within the ecological framework used in the explanation of the Melkhoutboom material, major changes in the sequence are seen as homeostatic adjustments, with the whole system readjusting back to a new stable state. For the terminal Pleistocene/Holocene industrial transitions from Robberg through Albany to the Wilton, environmental change is seen as an important variable, while the addition of new resources in the late Holocene is a response to the complications caused by the influx of pastoralists. Therefore, stimuli for change in both instances are located outside the system and (in the terminology of evolutionary biology) major changes take place in the form of punctuated equilibria and homeostatic adjustments. Within the ecological systems model presented by Deacon, smaller scale changes can be accommodated but these are seen as adjustments which maintain the overall adaptive principles of the homeostatic plateau and serve to maintain the functional integrity of the system (Deacon, H.J. 1980:88).

There has been a plethora of papers which critically examine ecologically based systems approaches for the interpretation of archaeological sequences (Burnham 1973; Bennett 1975; Faris 1975; Thomas 1981; Tilley 1981a, b; Bargatzky 1984; Hodder 1985, 1986) and more specifically in the South African context, Mazel (1987). I will not deal with these criticisms in any detail except to say that by their very nature, equilibrium centred frameworks downplay "nonhomeostatic changes, systems disruptions, and 'unbalanced' relations between people and their environments" (Vayda & McCay 1975:294). In this thesis a conceptual framework which emphasises change as continuous and persistent is used.

Parkington's (1980) conceptual framework sees that the change noted in the eastern Cape sequences of Melkhoutboom and Wilton was continuous and that the nature of patchy depositional sequences as well as the use of an adaptationist framework masks detail in them. Furthermore, he also argues that the amount of change seen in the sequences depends on the analytical scale. When the occurrence of, for example, small hafted tools is considered, a certain amount of stability is seen. However, when analysed at the level of frequencies, change is indicated. The same can be said for frequency changes in, or new additions to, the food resource mix. If the notion of these different analytical scales is kept in mind, I see no necessary contradiction in change within an adaptation. At a general level for example, the Wilton can be seen as an adaptation in which 'patch' foraging is an important principle but one that does not deny new types of patches being used or previously exploited ones being used more intensively. The principle is maintained but the detail changes (see Deacon, H.J. 1983).

In order to provide a mechanism which explains continuous change Parkington (1980:83) suggests:

> the increased interest in shellfish, plant foods, tortoises, dassies, browsing antelope and fresh water mussels in the Holocene may also represent the response of a growing population to a shrinking landscape.

Explanation for intensification rests upon an implausible mechanistic model which emphasises the increasing circumscription of an inherently growing population due to land loss from Holocene sea level rises and at the same time increased aridity in the interior. A combination of external environmental stimuli encourages population pressure, which in turn creates the demand for intensification.

The inspiration for this 'work harder' scenario was derived from Cohen (1977), who attributes the rise of agriculture as a response to inherent population growth and population pressure. Population pressure as a prime mover or independent variable for archaeological change has, like cultural ecology approaches, been extensively criticised (Hayden 1972; Bender 1975; Bronson 1975). Most writers emphasise that the enormous potential for prehistoric population increase during the Pleistocene contrasts markedly with the calculated growth rate of 0,01% per year (Hassan 1981:143). The difference is accounted for by control mechanisms such as limitations on fertility and fission (Howell 1979; Hassan 1981; Hammel & Howell 1987). Such factors are cited by Deacon (Deacon, H.J. 1980:88) in response to the population pressure model for Holocene intensification put forward by Parkington

(1980) On the basis of the !Kung, the physiological interplay between fat levels and fertility provides a potential mechanism for the homeostatic regulation of population, as do other cultural methods which suppress fertility or remove unwanted individuals. Consequently, inherent and continuous population growth cannot be taken as given. Furthermore, the flexibility of individual and group movement provides mechanisms which hunter-gatherers use to relocate away from areas of resource crisis. Therefore, an equally valid response by hunter-gatherers to a shrinking landscape would have been to reproduce less rather than to produce more and also to become locally extinct.

In terms of causality and intensification, Cowgill (1975a,b) has pointed out the fallacy of an uncritical association between the archaeological signals for increased production and population pressure by suggesting that population stress is too often conflated and confused with other demands which may have nothing to do with population pressure. Furthermore, he argues that the pace of population increase in the past has not been great enough to be a single determining factor in generating cultural change (Cowgill 1975a:128). Hassan (1981:162-3) lists a number of other criticisms of the prime mover population pressure model, the most important of which is that population increase is tied inextricably to social and economic factors and cannot be seen as a totally independent variable.

Intensification is one possible response to population and resource imbalance, but equally, intensification may be a response to demands other than population pressure. Population decline and fission are also valid alternatives and these alternatives should not be seen as mutually exclusive and competing theories. Response to disequilibrium is situational and context bound. I suggest that the tempo and scale of intensification evident in the LSA eastern Cape record is, in turn, an important guideline which helps choose the relative importance and determinancy of factors such as environmental change and population pressure. A direct correlation between environment and intensification is too simplistic. A more suitable structuring of the variables is required to get the best explanation of the data. A better correlative use of intensification involves hunter-gatherer strategies for risk reduction which are embedded in social relations both between and within groups.

Explanations of intensification have previously tended to be based on theoretical frameworks which stress the determinancy of single, external, prime mover factors or sophisticated systems-based models in which "everything affects everything else" (Harris 1977:401). Many see such functionalist approaches as reductionist, tautologous and teleological. The goal of a system is equilibrium and stability, both within the whole system as well as between its component parts and critics find difficulty in accommodating change in such models (Hodder 1982). Alternatively, optimal foraging theory provides an attractive body of biologically derived principles for the investigation of intensification. The framework investigates food choices, optimal group sizes and site location and 'patch' use (Keane 1983:138). The use of optimal foraging theory has also been criticised because of problems in matching calorifically derived optimal efficiency with social 'efficiency' or equality. What is energetically optimal is not necessarily socially optimal and equating the two tends to "trivialise social relationships" (Keane 1983:145). Furthermore, Chapter Five discusses stylistic markers, the use of which appears to break all rules concerning rational and optimal economic behaviour (see also Wiessner 1984:193).

Historical materialist approaches (Lewis-Williams 1981; Campbell 1987; Wadley 1987; Mazel 1989) stress that ecologically derived systems theory tends to focus only upon the forces of production and in so doing, there is much in the LSA record which remains unexplained. This explanatory lacuna is filled by approaching social formations in their entirety which requires drawing out the more elusive social relations of production as well. Most historical materialist studies seek to locate change within the social formation as a result of contradiction and incompatibility within the social relations of production, or between these and the forces of production. The environment constrains or permits social formation but does not dictate its exact form.

The most recent work on intensification in South Africa has been undertaken within a historical materialist framework (Mazel 1989). Mazel explains intensification in the Thukela Basin as a product of gender conflict, during which women came to produce more and controlled the products of their labour, thereby attaining equality in hunter-gatherer society. Equally, however, it could be inferred that women produced more because they were increasingly exploited. The apparent egalitarianism of hunter-gatherer social relations makes the archaeological recognition of tension within them difficult. It is because of this that I take a more general view which highlights changes in social emphases as resulting from tension between them and the material base.

ARCHAEOLOGY AND ETHNOGRAPHY: A BASIS FOR COOPERATION

Parkington (1984a) suggests that the emphasis on gathering rather than hunting during the last 2000 years in the western Cape can be attributed, in part, to the appearance of pastoralists. Settlement patterns, site distributions and site size are quite different in the pre-contact period. On the basis of this he draws attention to the fact that the historically observed "Soaqua" pattern cannot be uncritically extended beyond the historical context within which it arose: "The time depth of many of the technological and social devices observed historically needs critical attention" (Parkington 1984a:170). Historical records and ethnographies of hunter-gatherers must be used critically, "as a challenge, not a model, of the past" (op. cit.:172). Parkington's concern recognises the specific context bound nature of particular prehistoric trajectories and the need to assess each on its own merit. It is in this light that this research on the eastern Cape LSA record is approached and a discussion of the appropriateness of the ethnography for analogues is pursued. Among other things, this is necessary in order to support inferences concerning the complexity of hunter-gatherers in the eastern and southern Cape, relative to that seen in the ethnographic present.

In the preface to *Man the Hunter*, Lee and Devore state that the excavation of early living floors focused attention on the ethnographic record thereby generating a "reliance on hunter-gatherer data for *reconstruction*..." and that the symposium sought to encourage more ethnographic study "...while there were still *viable groups* to study" (Lee & Devore 1968:vii; my emphasis).

These two statements underpin an evolutionary and, in the case of Lee, an explicitly uniformitarian approach to the potential uses in which the ethnographic present can shed light upon the archaeological past (Lee 1979). However, several authors within the same volume queried the appropriateness of uncritical analogical borrowing from hunter-gatherer ethnography. They point out how the environmental and social contexts of the ethnographic hunter-gatherers are in most cases very different from those studied archaeologically to the point where extrapolation back in time is dangerous (Deetz 1968). Wholesale ethnographic analogy is felt to silence aspects of the archaeological record which fall outside the variabilty of the ethnography (Freeman 1968) and in so doing, the "present and the past become reduced to an assumed sameness" (Hodder 1986:145).

The use of a uniformitarian approach to ethnographic analogy in archaeology is described as a "tyranny" by Wobst (1978). In archaeology, the variability in past human behaviour cannot be accounted for in terms of general processes or laws. In the southern African context the uniformitarian approach has been criticised for presenting the past as stable and timeless (Schrire 1980; Wilmsen 1983), where hunter-gatherers become locked in "frozen tableaux" (Schrire 1984:2).

In many instances uniformitarian principles were implicitly embedded in the anthropological mind before field work began. This stemmed from the rescue character of the ethnographic research designs which sought to salvage the residual behaviour in hunter-gatherer societies and made them appear distinct from their food producer neighbours. While all ethnographers acknowledged cultural encroachment on traditional hunter-gatherer lifeways, they stressed the isolation of their particular study groups and hence their suitability as representatives of the deeper past (Lee 1979). This focus highlighted 'untainted' hunter-gatherer isolates, but the very nature of such studies focused the research away from the larger scale interactions and processes which were contributing to the erosion of the hunter-gatherer lifestyle in the first place (Wobst 1978). There were hunter-gatherers observed in the process of increasing their interaction with local food producers but these were also placed within the evolutionary mould as examples of transition. Such transitions provided an ideal opportunity for observing hunter-gatherers on the "...threshold of the Neolithic" (Lee 1972a:342; 1972b).

The search for pristine hunter-gatherers obviously led ethnographers into marginal environments where hunter-gatherers had survived by virtue of the fact that such environments apparently could not sustain extensive farming communities. Consequently, the analogical use of the economic and social systems observed in such environments is questioned given that most archaeological work is based in much more benign and productive habitats. The problems of extrapolating hunter-gatherer behaviour in quite different environmental contexts is compounded when the deeper archaeological past in the region of the ethnographic study is taken into account in terms of producing the patterns observed in the ethnographic present (Woodburn 1980; Schrire 1984). For example, more recent archaeological work in the Kalahari has determined that there is very little of that landscape which has not been settled by agro-pastoralists (Denbow 1984, 1986; Denbow & Wilmsen 1986). Most hunter-gatherer sites within the last 1500 years have some artefacts derived from agro-pastoralists thereby indicating contact and interaction.

As an example, the active and forceful way in which the !Kung controlled the Tsumeb copper mines and interacted with the Ovambo in the recent historic period (Gordon 1985:26) suggests that hunter-gatherers had a long standing and detailed knowledge of larger scale agro-pastoralist economies (Gordon 1984). When all these factors are taken into account the recent and current transitions of hunter-gatherers into larger scale economic systems may be nothing new to hunter-gatherers themselves. It is the short diachronic ethnographic scale, and the assumptions of the anthropologists involved which create the impression of an entirely new trajectory (Schrire 1980:16). In this light the perceived pre-contact ethnographies of hunter-gatherers are held up as typical of this lifestyle and consequently the analogues from them are used for interpreting the deeper past.

The truth is that in many ways we do not know what factors have been important in shaping ethnographic hunter-gatherer social and economic systems. What we see as distinctive may be a product of living in harsh environments, a product of a long and complex history of social and economic interactions with near-by food producers, or are the features we see in extant hunter-gatherers "...some subliminal consensus in finding similar solutions to similar problems" (Schrire 1984:18; see also Woodburn 1980).

Any deeper investigation of what constitutes a typical hunter-gatherer society reveals that there is in fact far more variability and complexity in some hunter-gatherer systems than the ethnographically derived stereotypes allow. Native North Americans on the west coast achieved high population densities, were for the most part sedentary and lived in settled villages permitted through the extensive storage of staple foods (Suttles 1968). Such an 'extreme' in the hunter-gatherer mode of existence belies easy generalisations about a single category of hunter-gatherers. More recent interest with complex hunter-gatherers (Price & Brown 1985a) and their relationship in trajectories towards agriculture, indicates that complex hunter-gatherers in the ethnography can no longer be held up as exceptions (Testart 1982:523). In order to account for hunter-gatherer social and economic variabilty in the ethnographic present, several researchers have classified hunter-gatherers into two general types. In contrast to the 'band' and subsistence orientated hunter-gatherer type of Lee (1979), these typologies focus more upon the social relations of production (Woodburn 1980, 1983; Testart 1982; Barnard 1983; Myers 1988). More specifically, the general classificatory feature revolves around the degree of immediacy, or lack of it, in access to and the distribution of economic production. The terms 'immediate' and 'delayed return systems' are used to describe this polarity. As the name implies, a central feature of delayed return hunter-gatherers is the storage of surplus for future use.

What is of interest in this classification is that very few hunter-gatherer groups operate in an immediate return and strictly egalitarian way. Those groups which are examples of immediate return hunter-gatherers such as the !Kung, Mbuti pygmies, and the Hadza, are so circumscribed by atypical conditions that their utility as baselines for comparison and analogy are seriously questioned (Ingold 1983:554).

If this is so, do we turn elsewhere for more credible alternatives, and how should we use the San ethnography? Deetz (1968:281), in a penetrating discussion on the use of ethnographic analogy in Man the Hunter, points out that grouping all hunter-gatherers together throws up some "...strange bedfellows". In his view, the Australian Aborigines, the Gê from Brazil and aboriginal Californians are groups more representative of pre-Neolithic society, given that they were subject to little-to-no food producer contact. He suggests that such moiety organised societies were much more widespread in the past. As such, they may provide more appropriate analogs for pre-Neolithic societies. These hunter-gatherers are more complex than the model of hunter-gatherer life represented by the circumscribed and "...encysted Bushmen" (Deetz 1968:283-4). I suggest that these groups which Deetz refers to should be kept in mind as reminders of interpretive possibilities in the South African pre-contact archaeological record. This is done in a general way, utilising the distinctions drawn between 'immediate' and 'delayed' hunter-gatherer systems.

I believe there are distinct behavioural differences in the hunter-gatherer archaeology of the eastern and southern Cape that are clearly at odds with the ethnography. In essence, the archaeology suggests that hunter-gatherer societies in these areas were leaning towards more complex delayed return systems and a subtle reading of the ethnography and historical sources hints at this possibility. This requires that assumed relationships between the archaeological record and the San ethnography be carefully examined. From the Bleek records it is clear that four categories of medicine men were recognised among the southern San, whereas for the Kalahari groups no distinctions are made. All the functions are embodied in one individual (Lewis-Williams 1984:226-7). At face value this implies that ritual function among the southern San was allocated among different individuals in a more complex manner.

Territoriality is another conflicting point. Cashdan (1983) discuses different degrees of territorial behaviour among San groups in which the !Ko, occupants of the most arid and variable environment, exhibit greater degrees of territoriality than other groups, with most social relationships existing within a band nexus rather than between. Janette Deacon (1986:152-3) in her analysis of historical and archaeological sources relating to the northern Cape /Xam Bushmen, emphasises their relatively small and well defined territories which were tied to seasonal rather than spatial resource fluctuations. She has also isolated the concept of "...human attachment to familiar places" (Deacon, J. 1988a:138). Ritual and legendary power of place seems to have determined the location of painted and rock engraving sites, a concept which does not appear to be well developed in the ethnography.

The ritual elaboration of death and burial at specific places also appears to be a repeated feature of the Cape LSA (Hall & Binneman 1987), whereas the ethnography shows that there is little to no elaboration of death among hunter-gatherers and certainly no identity between the living and place of burial (Woodburn 1983; Wiessner 1983a). While the variability within the ethnography and the historical sources could be a product of varying degrees and different types of interaction with food producers, I suggest that there are grounds for investigating the possibility of more complex hunter-gatherer systems in the eastern and southern Cape.

I now turn to the construction of a skeletal model which explains intensification as a result of changing costs in risk management strategies which uses as a baseline, ethnographic principles of risk management.

RISK MANAGEMENT: A MODEL

Resource intensification embodies the related processes of increasing sedentism and demographic shifts, both relative and absolute. The actual process runs counter to general models of hunter-gatherer residential mobility and flexibility in group composition, which are strategies "...which disengage people from property, (and) inhibit not only political change but any form of intensification of the economy" (Woodburn 1983:447). Egalitarian hunter-gatherers are conservative, and egalitarianism is not a neutral or passive quality that is inherent in the hunter-gatherer lifestyle or a product of habitat. The egalitarianism of simple hunter-gatherers is perpetually reinforced and actively asserted. Any deviation in this threatens traditional risk-reducing strategies. Intensification is one signal of change in this system of management.

If intensification indicates a shift in how risk is managed, the fact that hunter-gatherers chose 'to vote with their feet', indicates that such decisions are not made in the context of attaining a preferred or more advantageous state. Intensification, therefore, is not goal orientated and is not simply an outgrowth of access to better technological innovations. The resistance of the !Kung to planting crops is not one of ignorance or simply that there are still plenty of mongongo nuts, but that risk-management strategies of generalised reciprocity embedded within social relationships make the accumulation and maintainance of an agricultural surplus a difficult task to accomplish. The contradiction between personal accumulation and general reciprocity is unmanageable. !Kung who raise animals and plant crops cannot overinvest in them because of the above and neither can they be tied down permanently to one place. Acquired domestic animals are therefore "...not much more than a single additional element in a broadly based subsistence mix" (Yellen 1984:64). The know-how may be present but the social commitment is not (Bender 1978:204).

Explanation of moderate change in the archaeological record is a difficult task given the ethnographic evidence cited above of resistance to strong external forces. Even so, and in contrast, the process of what Hitchcock refers to as secondary sedentism (Hitchcock 1982; Hitchcock & Ebert 1984) is relatively rapid compared to that in primary contexts. The different rates between contact sedentism and pre-contact sedentism are the basis of criticism against the use of contact sedentism for analogical use in trajectories towards food production (Harris 1977:410; Bender 1978:208). I suggest that examination of some of the general principles in contact sedentism transitions do have some utility in modelling the process in the archaeological record.

Subsistence risk is something which hunter-gatherers seek to avoid at all costs and risk is managed through a number of mutually reinforcing strategies. San bands are flexible and fluid in membership and location. This is a structured strategy allowed through the combination of widespread kinship ties and high mobility (Lee 1979; Wiessner 1982). Individuals have freedom of residential choice and in decisions concerning the food quest. Consequently, people are not immutably bound and dependent upon others for their livelihood. All individuals have access to the means of production, both in the form of technology and information and, in the same way, there are rules which allow differential production to be redistributed throughout a group (Lee 1979; Woodburn 1983). A high degree of flexibility in the !Kung San is evident which allows responses to both positive and negative situations and this dismantles any elaboration towards 'complex' behaviour (*sensu* Woodburn 1982).

Flexibility in !Kung bands is not a random process but is structured around a system of social relationships embodied within the system of *hxaro*. *Hxaro* is a process in which individuals establish a number of exchange partners who are selected from within and without the band so that resource risk is pooled. These mutual obligations consequently permit access to widespread territories (*n!ores*) (Wiessner 1982). *Hxaro* partnerships are initiated and maintained through the balanced exchange of gifts within which social obligations are stored. These obligations can be activated if access to a partner's *n!ore* is required. As Wiessner suggests, these *hxaro* ties manage the variance in resource fluctuations in an environment where prediction of such fluctuations is difficult. Individual or group mobility provides the mechanism for relocating away from a 'bad patch' and *hxaro* ties provide the 'passport' which gives access to one that is better.

Mobility and risk pooling strategies such as *hxaro* are geared at one level towards reducing subsistence stress. Woodburn points out, however, that such open channel strategies serve not only in the day to day economic sphere but also in underlining the basis of egalitarian social relations (Woodburn 1983:438). Risk reducing strategies are levelling mechanisms through which social and material inequalities are continuously dismantled. Mobility and flexibility "...disengage people from property, from the potentiality in property rights for creating dependency" (Woodburn 1983:445). Information about resource locations and the movement of other people on the landscape is crucial knowledge as well, and open channels of communication ensure that information bottlenecks do not occur (Moore 1983; Root 1983).

Risk management strategies such as *hxaro*, mobility and fluid group membership are generally ongoing processes but the management of social relationships does intensify during an aggregation phase. The Kalahari San aggregate into larger social groups at times of the year during which interaction with a wide range of kin and *hxaro* partners intensifies in a formal, public phase of a group's annual cycle (Lee 1979; Wadley 1987). At such times, marriage partners are found, social relationships are established and renegotiated and ritual intensity increases, restating the basis of San social obligations. Environmental considerations are not dominant in determining an aggregation and dispersal cycle and the timing is not wholly dependent upon seasonal fluctuations. Some San aggregate during the winter and disperse during the summer while other groups will do the reverse (Barnard 1979). Fission and fusion operate just as much on the basis of social imperatives. The potential for fission after aggregation is necessary because of the San's institutional inability to maintain social cohesion among large groups of people indefinitely. Aggregation provides a locus at which risk management and social storage can be pooled, and fission and mobility provide the safety valves through which unmanageable social tensions can be dissipated.

The ethnographic principles for risk management outlined briefly above provide the comparative baseline against which the process of intensification is explained in this study. The social management of risk also has great utility for examining the last two thousand years of the eastern Cape archaeological record during which time hunter-gatherers had to share the landscape with food producers as well. Mobility, aggregation, dispersal and ritual intensification are all processes which can be identified archaeologically. It is on the basis of changes in these aspects of the archaeological record that intensification is explainable as one of changing cost-benefit ratios of risk management. This skeletal model is 'fleshed out' in application to the data. This approach draws heavily upon the demographic inferences of Binford (1980, 1983), general statements of risk management by Brown

(1985), and aspects of sedentism discussed by Harris (1977) and Hitchcock (1982). It also draws upon the work of Wiessner (1977, 1982) and Bender (1978, 1985a,b) and that of Gilman (1984) in respect to symbolic aspects.

Fundamental to this model is a basic contradiction between a social and economic need to maintain widespread and open alliances on the one hand and the protection of group self interest on the other. Alliance, flexible group membership, mobility and *hxaro*-type ties are all risk management strategies which work optimally when the congruence between resources, group numbers and group mobility is not threatened. Through time, the benefits of 'traditional' risk management strategies decrease as the weight of these factors changes and congruence between group numbers, their spacing and resources begins to break down. Trends towards increasing landscape saturation, both in terms of people and groups, decreases mobility and consequently traditional risk reducing strategy becomes less viable. An increasing number of groups is inseparably linked to a coinciding process of increasing 'patch' definition and use and this in turn increases the potential for conflict and competition. Competition threatens mobility and alliance and in response traditional risk management strategies operate on a more intense level. As the risk management strategies and the social relationships they embody come into increasing contradiction with the economic base, ritual is increasingly employed, not because cooperation or alliance is necessarily required, or even desirable but because the basis of cooperation has become problematical (Laughlin & d'Aquili 1979; Gilman 1984). The ability of groups to maintain widespread mobility and open exchange systems becomes increasingly difficult and consequently there is a change in traditional risk management strategies.

Eventually, the balance in risk management is tipped increasingly towards maintaining self interest rather than widespread and open networks. The cost of increasing social and economic selectivity is a reduction in potential relocation areas and risk management increasingly concentrates on meeting those losses through intensification. In Yellen and Harpending's (1972) terms hunter-gatherer systems change from open anucleated ones towards increasingly nucleated systems. Unlike Lourandos and Bender (Lourandos 1983; Bender 1985a, b), I do not see intensification generating more widespread and intensive alliance networks. Rather, intensification implies a contraction of alliance systems and increased territorial definition. Intensification provides evidence of a reorientated risk management strategy which seeks to emphasise both productivity and production as a response to population saturation, group circumscription, reduced mobility, competition and heightened identity between a group and a specific set of places on the landscape. The process is a trajectory towards increasingly exclusive social systems, and away from general reciprocity. Effective and known social distance decreases and the general trajectory leans towards one of differentiation, closure, exclusion and heterogeneity.

Throughout this Chapter the themes emphasised have been drawn largely from research which deals with complex hunter-gatherers and their diachronic relationship with the development of food production. Use of this work can be criticised on the basis that such research is irrelevant to the study of simple hunter-gatherers in our past. I maintain that such criticism recalls too strongly ethnographic stereotypes, which in turn deny archaeology its strongest advantage: that of studying diachronic process. Although it is pointlessly speculative, the idea of clinal gradation allows a response to those who point out that food production did not develop internally in the sub-continent, but that if uninterrupted and with more time, it would have (Hayden 1981).

CHAPTER THREE

ENVIRONMENTAL AND ARCHAEOLOGICAL BACKGROUND

ENVIRONMENTAL BACKGROUND

The region in which both Edgehill and Welgeluk are situated is geologically, climatically and vegetationally a transitional zone (Cowling 1987). The transitional nature of the area, particularly in regard to its climate and vegetation, gives rise to heterogeneous habitats of varying potentials for human occupation and differing economic lifeways. For example, the increasing summer rainfall east of the [illegible]es historically limited Xhosa mixed farmers to those areas with a summer rainfall season sufficient for growing maize, sorghum and millets. At the same time the rugged nature of the Winterberg to the north with only summer upland grazing, was less useful for both pastoralists and mixed farmers (Hall, S. 1986). It is probable that the Cape Fold Belt (CFB) in pre-pastoralist times was a more optimal habitat for hunter-gatherers than the more marginal habitats to the north in the Fish River Valley. The relatively steep ecological gradients between these regions created 'environmental frontiers' for hunter-gatherers. The more recent historical frontier zone concept can be extended into the pre-colonial past with ecological gradients and climatic transitions in this instance creating environmental frontiers.

Present and past environments are discussed here in some detail with two aims in mind. Attention is given to Holocene palaeoenvironmental reconstruction in order to investigate the relationship between environment and changes in the regional distribution of LSA populations. Environmental potentials for hunter-gatherer, pastoralist and mixed farmers also need to be highlighted in a general way because these provide the backdrop against which interactions between them took place. 'Backdrop' is a key word, because it is believed that environment will constrain but not direct human affairs. While this Chapter provides the basis for a comparison between environment and settlement, it is argued that theoretically any correlations between the two reflect the social enculturation of a landscape and not the other way round. In Ellen's (1979:8) words:

> There are repeated reminders that we should never underestimate the ingenious and pre-eminent role of social (including historical) factors as causal agents, and that the social and environmental variables interact in subtle and complex ways, which are just not apparent from simple correlative studies.

Without highlighting those environmental variables thought to be of relevance in the past, however, I believe that any archaeological attempts to paint a more complex past are impossible.

THE 'PRESENT' ENVIRONMENT

Geology

Both sites are riverine shelters cut by the differential erosion of the Koonap River on soft mudstones and shales of the Adelaide subgroup of the Beaufort Group (Geological Series 1976) (Figs 3.1 & 3.2). These undercuts are usually capped by more resistant sandstone sills which are geologically shortlived and unstable. As a consequence, in comparison to the CFB, habitable shelters in the lower Fish River Basin are sparse. A common feature of Karoo rocks is their widespread invasion by Karoo dolerites. These dolerite intrusions are less susceptible to weathering than the surrounding mother-rock and are therefore a significant factor in determining topography as well as controlling the movement of underground water (Haughton 1969). The altitude and ruggedness of the Winterberg to the north of the sites is a result of large scale doleritic intrusions there. These dolerites do not penetrate the Cape System to the south, the area around Edgehill and Welgeluk marking their southernmost extent (Visser 1986) (Fig. 3.2). The contact and thermal metamorphism which resulted between the dolerites and the surrounding Karoo formations produced a hard and relatively fine grained hornfels suitable for flaking and formal tool manufacture. While there are dolerite dykes close to Edgehill, the remnants of unflaked cortex on LSA adzes suggests that all hornfels tools were derived from reducing river pebbles collected from the Koonap River gravels. From both sites, LSA people had immediate access to hornfels.

Approximately 40 km to the south of the sites lie the rocks of the Cape System comprising Witteberg quartzites, Table Mountain sandstones and Bokkeveld shales (Badenhorst 1970) (Fig. 3.2). In the vicinity of Grahamstown a peneplained surface some 15 km long from

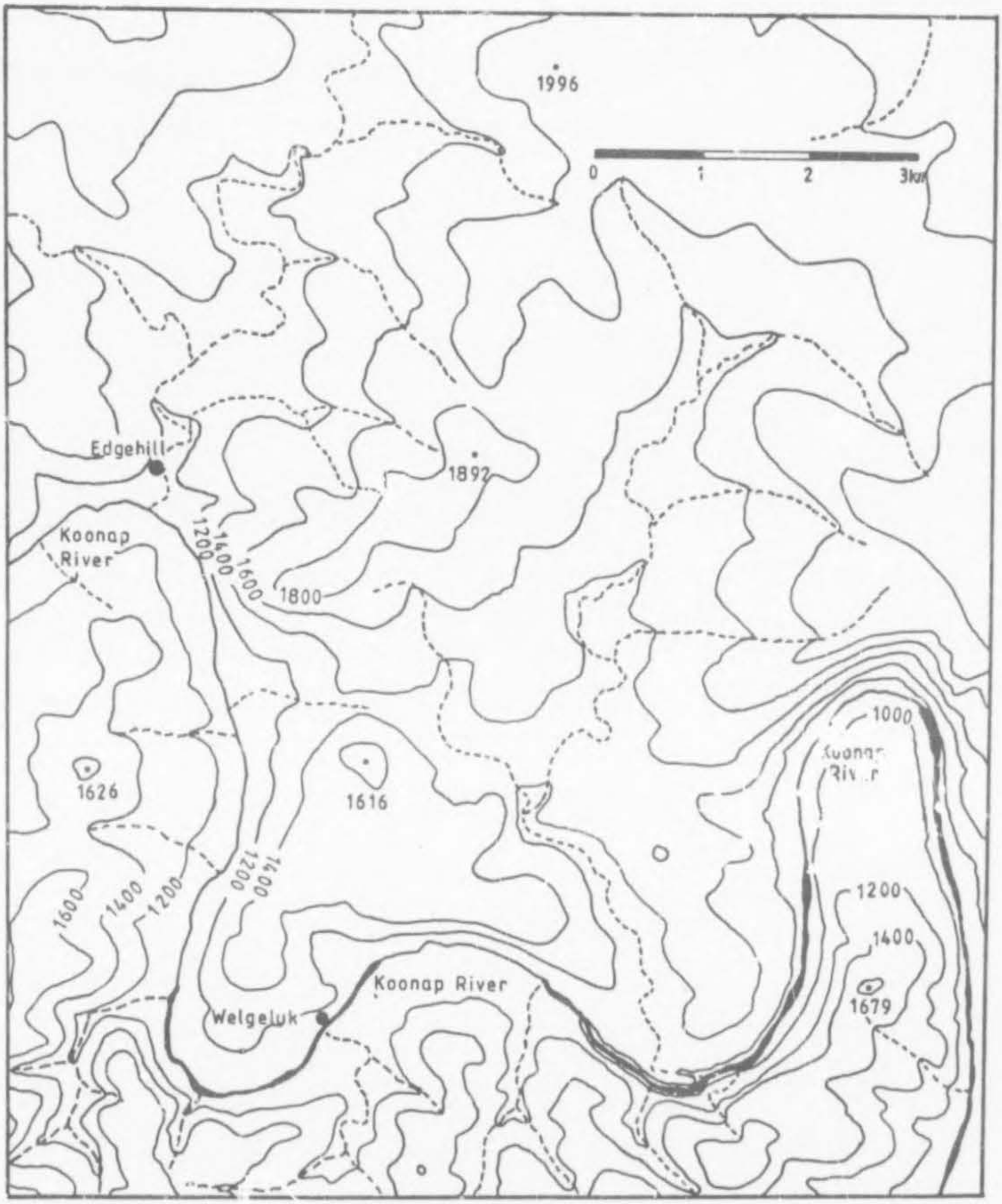


Figure 3.1. The immediate surrounds of Edgehill and Welgeluk (contour intervals in feet)

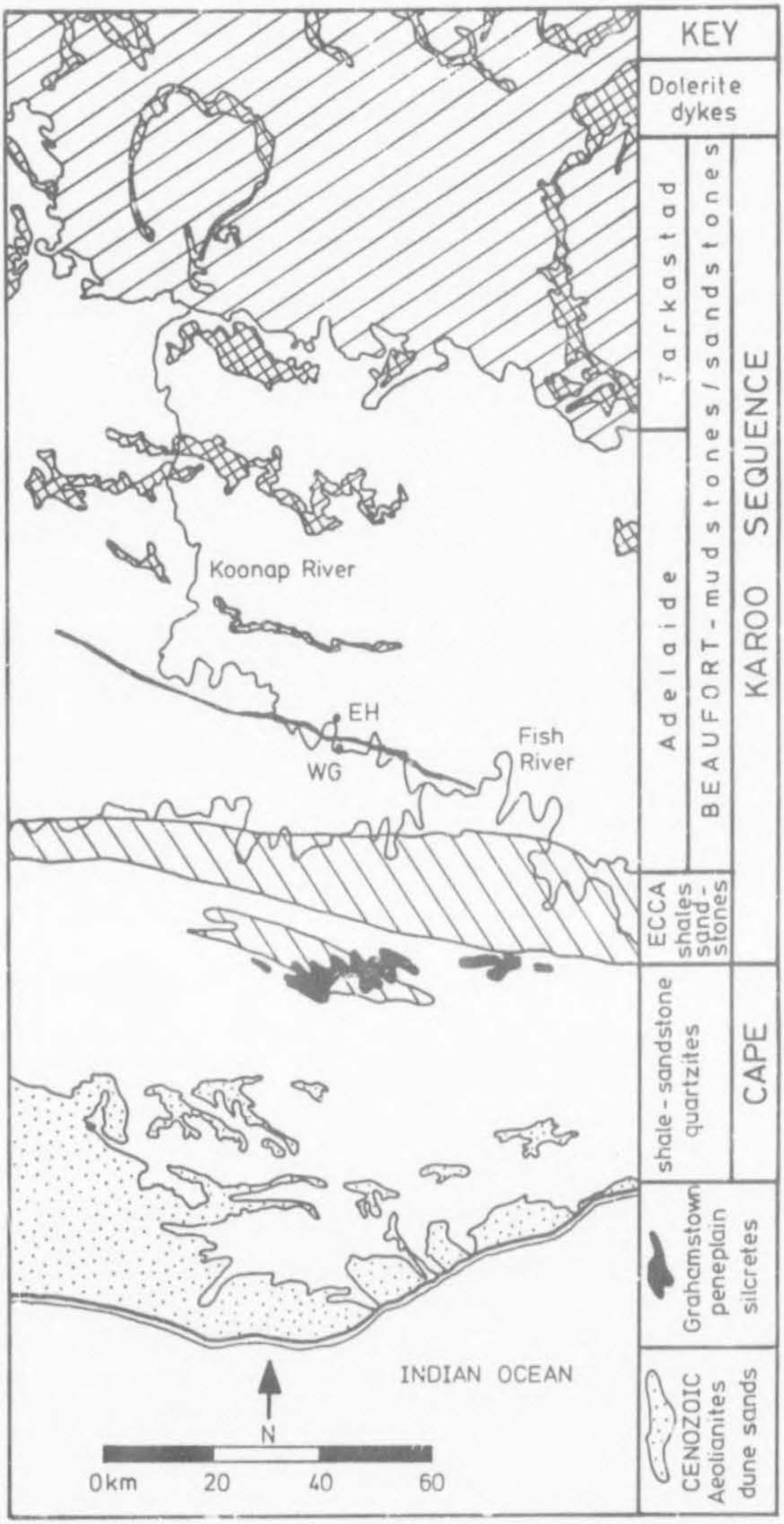


Figure 3.2. The geology ot the research area

west to east is capped by a relict veneer of silcrete (Mountain 1980). These *in situ* silcrete deposits are important for LSA stone tool manufacture at both Edgehill and Welgeluk (Fig. 3.2).

Four physiographic regions have been defined in the region, two of which are important as background for the LSA. These regions run from north to the south:

1. The Second Escarpment.
2. The Coastal Plateau.
3. The Cape Fold Belt (CFB).
4. The Coastal Belt.

The Second Escarpment or Tandjiesberg-Winterberg orographic line (Rennie 1945) forms the most prominent feature in the region and is thought to mark a former position of the Great Escarpment (King 1951). The main highlands comprise the Tandjiesberg and Bankberg to the west and the Winterberg, Elandsberg and Amatola ranges to the East. This region forms a relatively unbroken hill and mountain belt bet[illegible] 50 and 80 km wide, half of which lies over 1500 m above sea level (Badenhors[illegible]cept for the breach made by the Great Fish River flowing through from the north, [illegible]ement into and through this highland, especially for stock owners, would have been difficult. Major Karoo dolerite intrusions provide the backbone for all the high peaks and ridges. The Second Escarpment is the main catchment for the southerly flowing tributaries of the Great Fish River, such as the Baviaans, Koonap and Kat Rivers which drain these highlands.

The lower altitude plateau-lands to the south of the Second Escarpment are called the Coastal Plateau and dip relatively gently to the south from an altitude of 600 m above sea level to 60 to 90 m at the coast (Badenhorst 1970). In the west the coastal plateau leads out into the Great Karoo and in the east it reaches down to the coast at the Great Fish River mouth. Although in comparison to the Second Escarpment the Coastal Plateau is relatively flat, it is characterised by deeply incised river valleys which give rise to ravine-like topography, sometimes to a depth of 300 m. Both Edgehill and Welgeluk occur within such valleys.

Running across the Coastal Plateau is the eastern extension of the CFB which fades in the east at the point where it is cut by the Fish River (Badenhorst 1970). The moister and cooler conditions allowed by this higher ground introduce into the eastern Cape a distinctly southern Cape character, particularly in terms of the vegetation. It is within the folds of this higher ground that many rock shelters have formed, most of which hold traces of LSA occupation. This contrasts with the low density of rock shelters on the Coastal Plateau north of the CFB attributable to the structural instability of the Karoo rocks.

Soils

Soils on the Coastal Plateau are described as desert soils and are derived from Karoo rocks (Badenhorst 1970). Mechanical processes are the major soil forming factors and chemical decomposition is minimal due to high evaporation rates. Soils are generally shallow and weakly structured and under poor land management are prone to extensive erosion (Ellis & Lambrechts 1986). The A horizons of these soils are relatively nutrient rich and while the carrying capacity is generally low the vegetation provides extensive grazing which for the most part comprises sweetveld. Along the river flood plains, narrow strips of organically richer sandy alluvia occur.

On the higher ground of the Second Escarpment the soils are immature, skeletal, and nutrient poor as a result of the leaching effects of higher rainfall. These podzoloic soils are reddish brown near dolerite intrusions. Soils of the CFB and Coastal Foreland comprise brown sandy loams and are relatively fertile, although those formed from Witteberg quartzite are infertile and grazing is seasonally limited to summer (Martin & Noel 1960).

Weather

The climate is complex because of the region's transitional position in relation to the circulation patterns contributing to summer and winter rainfall (Tyson 1986). Coupled with the topography, this gives rise to steep climatic and ecological gradients (Cowling 1987). According to the Köppen classification the climate can be described as warm and temperate. In the vicinity of the sites the current annual rainfall averages about 450 mm (Badenhorst 1970) (Table 3.1). This contrasts with the 650 to 700 mm for the CFB to the south. The higher ground of the CFB exacerbates the low rainfall of the Fish River Valley by casting a rain shadow over it. The effectiveness of this rainfall is also much reduced by high evaporation rates. Although rain can fall at any time of the year, the distribution shows a marked bimodal curve with peaks in spring and a larger peak in autumn. Consequently winters are relatively dry (Fig. 3.3).

To the north, rainfall on the Second Escarpment can be in excess of 1000 mm per year but decreases to the west. This rain falls for the most part in summer, between October and March (Venter et al. 1986) (Fig. 3.3). To the east, rain falls almost entirely during the summer months. This is a significant factor in determining the historical distribution of

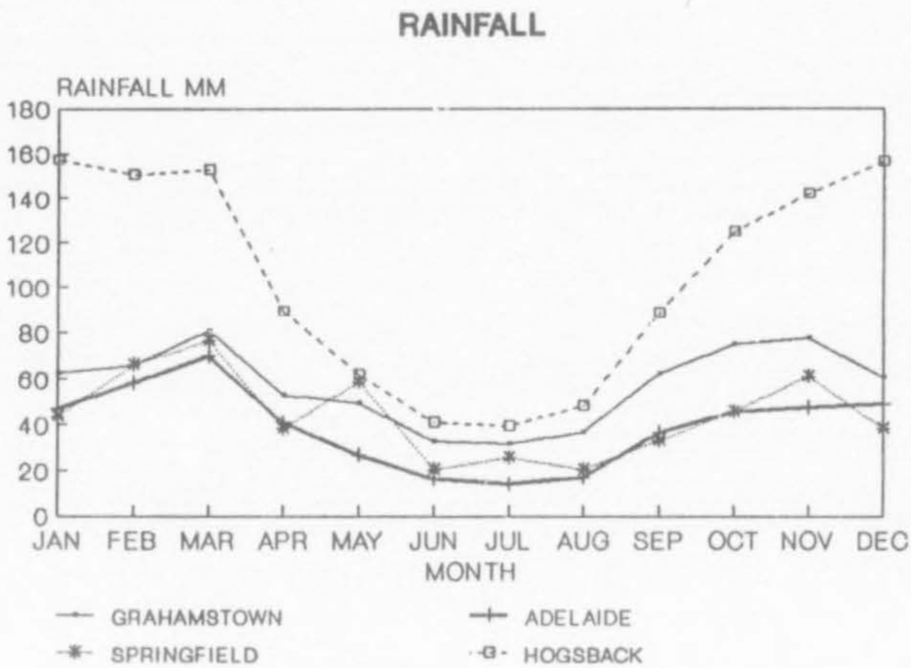


Figure 3.3. The distribution of mean annual rainfall from four eastern Cape stations

Xhosa mixed farmers as their crops were dependent upon summer rainfall. Although thunderstorms on the Coastal Plateau and Second Escarpment are common in summer between October and March, most of the rainfall, especially in the latter area, occurs as orographic precipitation (Badenhorst 1970). Snow can fall on the Winterberg at any time of the year but is more common between June and September. No snow falls in the vicinity of Edgehill and Welgeluk (Springfield Farm weather records:1924 to 1950).

River flow

The main catchment of the Koonap River is located within the predominantly summer rainfall uplands to the north and consequently peak flow occurs from November through to March (Fig. 3.4). Between May and August there is a 65% probability that the river will stop flowing and contract into a series of disconnected pools (River Flow Data 1978). However, during the severe drought of the early 1980s, water was always available at points along the river course. For LSA hunter-gatherers it can be speculated that the combination of rainfall, riverflow, and temperature tied winter settlement to the major river valleys because surface water would have been hard to come by away from them. The same restraint may also have applied to pastoralist transhumant patterns.

Vegetation

The eastern and south-eastern Cape has a complex vegetational mosaic because of the convergence of four major phytochoria. These are the Karoo-Namib, Afromontane, Tongoland-Pondoland and the Sudano-Zambezian (Werger 1978; Gibbs-Russel & Robinson 1981; Cowling 1987; Hoffman & Everard 1987) (Fig. 3.5).

Both Edgehill and Welgeluk lie within the upper reaches of Acocks' vegetation type 'Fish River Scrub' (Acocks 1975), or the low succulent scrub of Martin and Noel (1960). More recently, Cowling (1983) has reclassified this vegetation type into Subtropical Transitional Thicket, of which there are two sub-types. The Fish River Scrub is referred to as Kaffrarian Succulent Thicket, which is a dry type found in hot valley floors where rainfall varies between 350 and 500mm per year (Acocks 1975). This type is transitional with distinct Karoo-Namib links as well as Afromontane affinities (Cowling 1984). It is extremely dense, thorny and succulent and reaches a maximum height of about 3 m. This vegetation has low resilience and, once disturbed, recovery is slow (Hoffman & Everard 1987).

Species diversity and plant productivity in this Subtropical Thicket is relatively high. Euphorbia and aloe species are prominent as well as *Portulacaria afra* (spekboom). Other

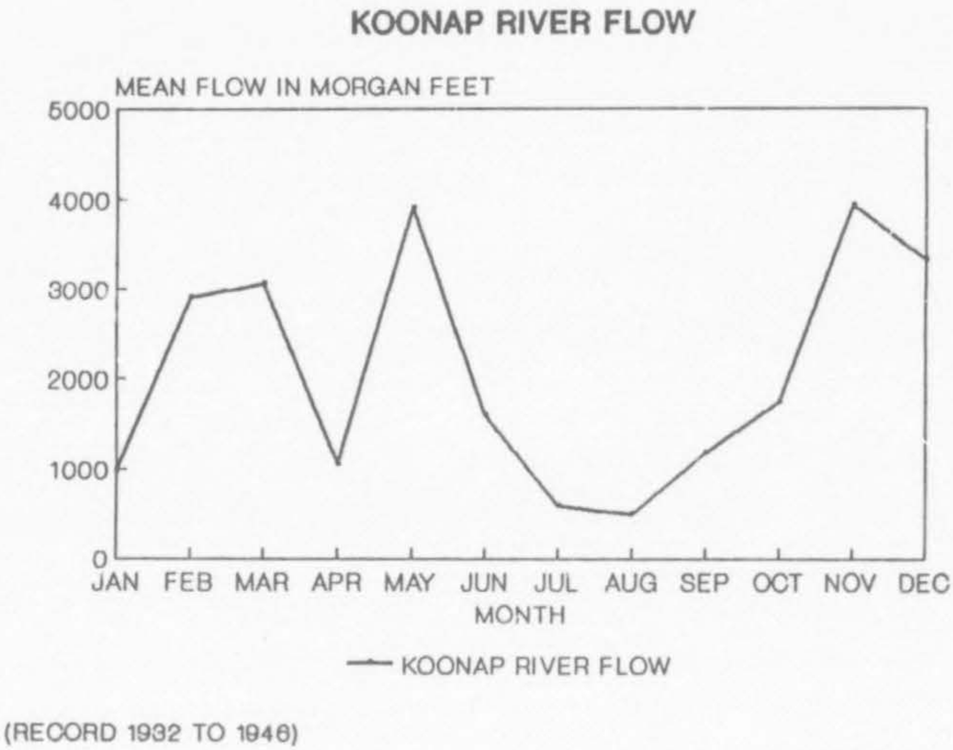


Figure 3.4. The mean flow rate of the Koonap River over an annual cycle

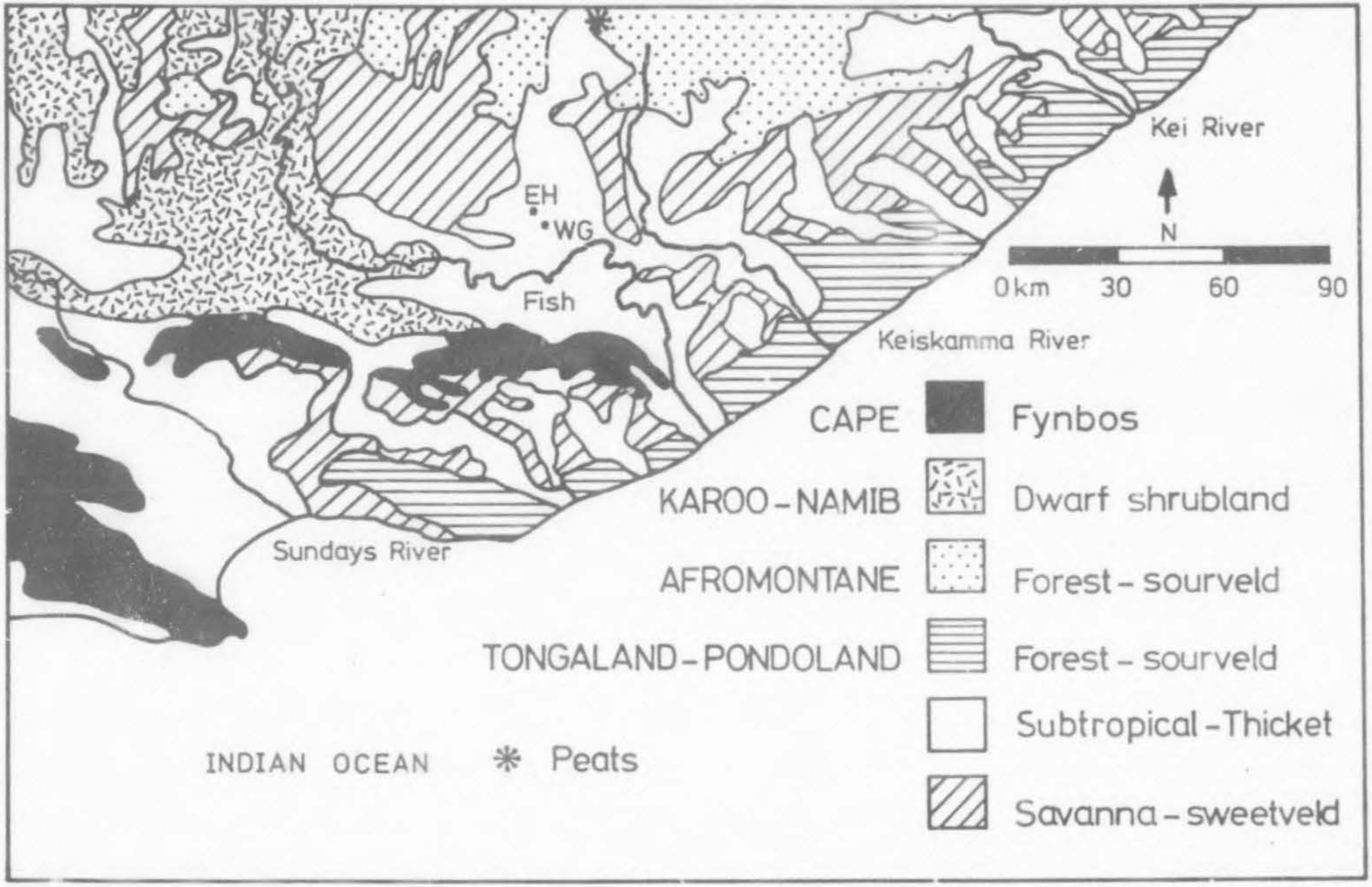


Figure 3.5. The major vegetation types of the research area

common tree and shrub species are *Grewia robusta*, *Rhoicissus digitata*, *Azima tetracantha*, *Pappea capensis*, *Ehrita rigida*, *Rhus* spp., *Euclea undulata*, *Schotia* spp., *Acacia karroo* and *Diospyros scabrida*. In the undergrowth *Acanthaceae* spp., *Crassula* spp., *Asparagus stipulaceus*, and *Senecio* spp. are commonly found. In contrast to the dense stands of *Watsonia* species in the fynbos of the CFB, plants with underground storage organs are solitary and no similar plant rich 'patches' are found in the Subtropical Thicket. All the Iridaceae are solitary, with limited seasonal above ground visibility. Many trees and shrubs produce summer and autumn seeds and fruit but productivity is variable. For example, the 1988/89 *Pappea capensis* crop was remarkably abundant, whereas the previous ten years produced negligible yields. The factors which trigger superabundant fruiting are not well understood and it is not simply a question of good rainfall. Consequently, while the timing of seed and fruit availability is predictable, the yield is not.

Immediately to the north and north-west of the sites increasing altitude and rainfall give rise to a savanna bushclump and grassveld mosaic referred to by Acocks as Eastern Province Grassveld (Acocks 1975) (Fig. 3.5). Cowling (1983:403) labels this sub-type Kaffrarian Thicket, which has strong Afromontane affinities. The soils below these bushclumps are minerally and organically enriched as well as being much moister relative to the surrounding grassland soils (Palmer et al. 1988). However, the grassveld component is extremely nutritious and dense and provides one of the richest grazing areas in the south-eastern Cape (Trollope 1974). The nutritive value of the grassveld is maintained throughout the year even after the summer growing season has ended (the popular term is sweetveld). The principal species is *Themeda triandra*. The grazing potential of Eastern Province Grassveld is the basis for the meaning of the Khoi word 'Koonap' or 'Caapna', which roughly translates as "fine fields" (Skead pers. comm.). The bush clumps which dot this grassveld are dominated by *Acacia karroo*, *Cussonia spicata*, *Scutia myrtina* and *Schotia afra*.

The highlands of the Winterberg to the north comprise Afromontane Forest, sour grassveld and fynbos patches on stony outcrops and grassy hilltops (Acocks 1975; Cowling 1987). The high rainfall of these uplands (Fig. 3.3) produces leached and nutrient poor soils. This contributes to proportionately greater flower and seed production which rapidly depletes the grass of much of its protein (Childs 1971). Furthermore, the earlier and harsher onset of frosts rapidly lignifies any remaining leaf nutrients. Consequently, even though the Winterberg sourveld has a high carrying capacity, its use in any traditional free range grazing system would have been restricted to the summer growing season. Regardless of the bulk of graze available, stock animals rapidly lose condition if they are not shifted to sweeter pastures later in summer (Hall, S. 1986). The availability of the most important pasture grass, *Themeda triandra*, is even more seasonally restricted to early summer, after which it is replaced and overshadowed by coarser species. Other grass species are *Heteropogon contortus* and *Tristachya leucothrix*. This sourveld region generally lies above the 1220 m contour.

Afromontane Forest patches occupy the cooler and wetter kloofs and gullys, particularly on the south facing slopes of the Winterberg and Amatola ranges (Fig. 3.5). Dominant trees are *Podocarpus falcatus* and *P. latifolius*, with *Canthium cliatum* and *Trichocladus ellipticus* prominent in the undergrowth.

The higher and wetter CFB to the south of Edgehill and Welgeluk supports fynbos, with *Protea*, *Erica* and Restionaceae taxa prominent, intermingled with subtropical grasses (Cowling 1987). This vegetation also has a large number of geophyte species which provided a staple dietary component for LSA populations in the area (Deacon, H. J. 1976). These species, especially *Watsonia* sp., do not occur in the drier areas around Edgehill and Welgeluk, but other plants with large underground storage tubers, such as *Dioscorea* sp. are found.

Fauna

The Subtropical Thicket in the vicinity of Edgehill and Welgeluk supported a large mammal fauna which was composed mainly of browsers. Early traveller accounts indicate the range of species in the area (Sparrman 1786; Paterson 1789; Barrow 1806; Thompson 1827; Black 1901; Lichtenstein 1928; Lister 1949; Thunberg 1986). Most commonly these were species they hunted, such as the Cape buffalo (*Syncerus caffer*), elephant (*Loxodonta africana*), hippo (*Hippopotamus amphibius*) and the black rhino (*Diceros bicornis*). The Koonap River had a large population of hippo, and the pool immediately below Welgeluk was well known for this (Els pers. comm.). Sparrman, resident in the Agter Bruintjies Hoogte from December 1775 to January 1776, was visited by several Xhosa from the "Konap-rivier" who, when they heard of his desire to shoot hippo, assured him that there were many to be found in the Koonap (Sparrman 1786:197,220). Eland (*Taurotragus oryx*) were also commonly observed in these early accounts.

It is considered significant that little mention is made of the larger browsers such as bushbuck (*Tragelaphus scriptus*) and kudu (*T. strepsiceros*) by the early travellers (Burdett 1987). Although their retiring habits make them difficult to observe, Allen-Rowlandson believes that the present high numbers of kudu are attributable to a recent reduction in predators and do not reflect their true status in the south-eastern Cape, which is at the limit of their range

(Allen-Rowlandson 1980). Smaller territorial browsers of this area are the blue and grey duiker, and steenbok and grysbok (*Cephalophus monticola*, *Sylvicapra grimmia* and *Raphicerus* spp. respectively).

In the more open savanna habitats to the north and west of the sites the large mammal fauna had a predominantly grazer component. Large herds of springbok (*Antidorcas marsupialis*) were seen as were red hartebeest (*Alcelaphus caama*) and quagga (*Equus quagga*) (Lichtenstein 1928). Ostrich were also commonly seen in the more open western areas.

Small ground game was available in the form of three tortoise species, *Geochelone pardalus*, *Chersine angulata* and *Homopus areolatus* (which are particularly abundant in this habitat) (Greig & Burdett 1976), as well as the ubiquitous dassie (*Procavia capensis*).

Four species of fish occurred historically in the Koonap River, the most common of which is the mud-mullet or 'moggel' (*Labeo umbratus*). This species has a high biomass in eastern Cape rivers and spawns in considerable numbers during the first extensive flushing of the rivers by the summer rains (Gaigher et al. 1975). The other three species are the eel (*Anguilla mossambica*), a smaller kurper type fish (*Sandelia bainsii*) and the freshwater mullet (*Myxus capensis*) which no longer occurs in the Koonap River. Other important riverine resources include the freshwater mussel (*Unio caffer*) and turtle (*Pelomedusa subrufa*).

THE PAST ENVIRONMENT

The search for and synthesis of palaeoenvironmental indicators in the eastern Cape is at a preliminary stage but there are several studies on natural sedimentary sequences as well as cultural sequences which contribute to a general understanding of late Quaternary environments. Synthesis of these data emphasises the Holocene, which is of more relevance to the time depth of the Edgehill and Welgeluk sequences.

The scale of palaeoenvironmental change within the Holocene, relative to change between glacial and interglacial times, is much smaller. In absolute terms, temperature fluctuated no more than 1°C around the present day mean (Deacon & Lancaster 1988:158). The lower amplitude climatic changes during the Holocene raise the question as to what extent they influenced environmental productivity and regional LSA population levels previously noted (Deacon, J. 1974, 1988b; Deacon, H.J. 1976; Deacon & Thackeray 1984; Hall, S. 1988a). Low archaeological visibility in the early to mid-Holocene LSA has been attributed to somewhat harsher environments. The contrast is between relatively 'continuous' Holocene sequences in the winter and all year round rainfall regions of the southern and eastern Cape versus hiatuses at inland plateau sites. Distinct chronological lags between the basal chronologies at Edgehill and Welgeluk compared to significantly longer sequences in the CFB to the south require that local palaeoenvironmental data be sought in order to investigate the scale of any possible relationship between these sequences and Holocene environmental change. It is assumed that rock shelter basal radiocarbon dates reflect more widespread relative or absolute population shifts and population buildup (Deacon, J. 1974; Deacon & Thackeray 1984).

Local studies which contribute to palaeoclimatic and paleoenvironmental reconstructions against which the Holocene cultural record can be compared are limited. The preliminary work on the fossil pollen bearing deposits on the Winterberg Plateau of the Second Escarpment are therefore important and are dealt with in more detail (Meadows et al. 1987; Meadows & Meadows 1988).

Winterberg peats

The Winterberg pollen bearing vleis or peats occur some 50 km to the north of Edgehill and Welgeluk and provide the nearest culturally independent palaeoenvironmental data (Fig. 3.5). Both sites lie at a height of 1400 m above sea level and are a short distance from the south facing Elandsberg scarp edge and therefore fall within the pollen catchments of Afromontane Forest, sour grassveld and fynbos patches on nearby dolerite outcrops.

Dunedin vlei has been cored to a maximum depth of 3,0 m, while Salisbury has a shallower sequence (1,75 m). Both vleis have been dated and indicate that sedimentation began at approximately the same time in both vleis (Dunedin: 12 500 ± 160 BP, Pta-4207; Salisbury: 11 800 ± 160 BP, Pta-4318) (Fig. 3.5). It is thought that the onset of sedimentation reflects moister and warmer conditions in the terminal Pleistocene (Meadows 1988). A rich organic band in both vleis has been dated to 8000 years ago implying a further increase in moisture. The interpretation of increasing moisture at about 8000 BP is corroborated by pollen profiles from both sites (Meadows et al. 1987; Meadows & Meadows 1988). The pollen diagram for Dunedin shows four zones (Fig. 3.6). In the lowest zone (3,00-2,60 m), there is a high proportion of grass species, low percentages of *Cyperaceae* but significant amounts of renosterbos (*Elytropappus*). This mix suggests drier conditions than at present with a vegetation more analogous to the present day Karoo uplands further to the west. *Elytropappus*, for example, does not grow on the Winterberg at the present time. No Afromontane Forest species were present in this zone.

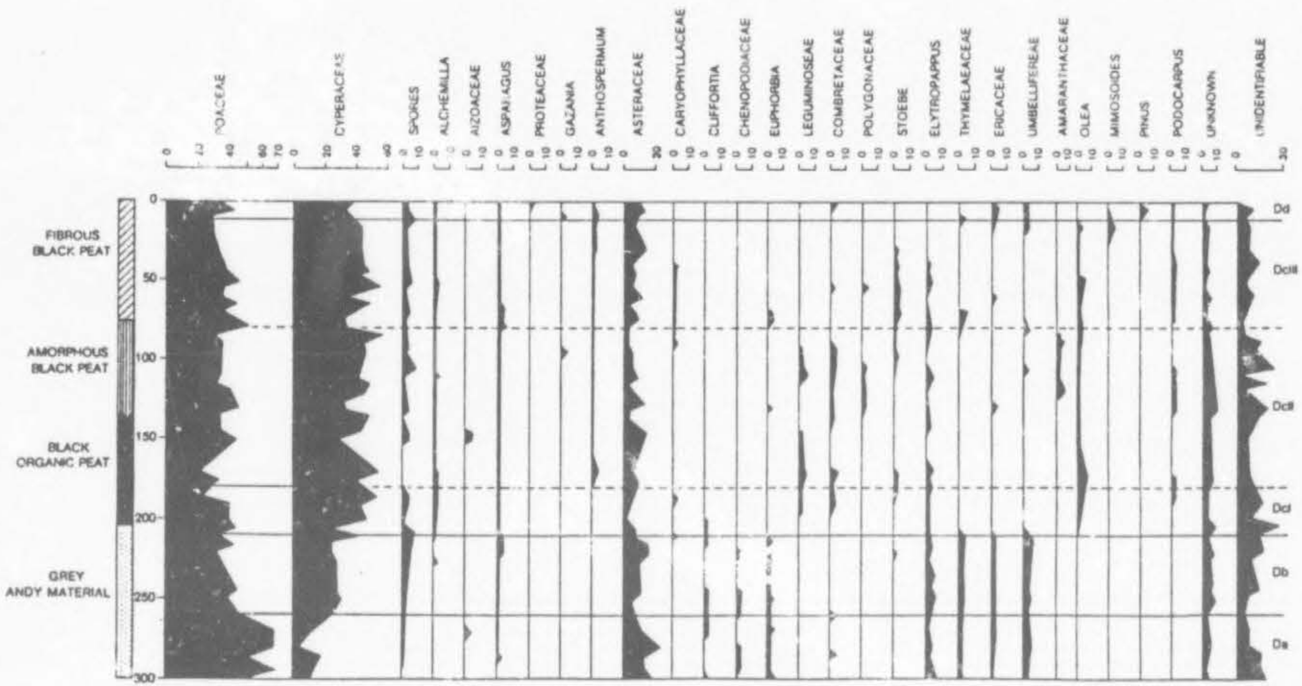


Figure 3.6. The pollen diagram from Dunedin peat, Elandsberg (taken from Meadows & Meadows 1988)

From about 2,60 to 2,10 m at Dunedin, there is an increase in *Cyperaceae* with a concommittent fall off in grass pollen which indicates increasingly moister conditions. However, Karroid species persist and the spectra still suggest drier conditions than those in the present. Forest species for the most part are absent but *Olea* sp. does occur in the equivalent zone at Salisbury vlei.

The next zone is defined by the relatively abrupt appearance of montane forest pollen (*Podocarpus* and *Olea* contribute 15% of the total) and a fall off in karroid species. Overall grass and sedge pollen still dominate. The beginning of this zone is dated to 7880 ± 200 BP (Wits-1434)(Meadows 1988) and is interpreted as indicating still moister and warmer conditions which encouraged Afromontane Forest expansion. Meadows et al. (1987) suggest that the moisture increase stems from stronger summer rainfall. *Elytropappus* declines even further in this zone. The pollen spectra from the upper 0,1 m at both sites date to the historic period as indicated by the presence of *Pinus* pollen and a return of Karroid elements. Together these indicate colonial farming as well as veld mismanagement.

The Elandsberg pollen sequences suggest a general trend from the terminal Pleistocene towards increasing rainfall through the Holocene. The early part of the sequence (12 500 to 8000 BP) indicates drier and, in this case, possibly cooler conditions relative to the the upper part of the sequence. The most marked stratigraphic and pollen change occurs at about 8000 BP which suggests significantly moister and perhaps warmer conditions.

Meadows (1988) has collated all southern African radiocarbon dates on organic peat deposits and made a frequency plot of their temporal distribution. It is assumed that peat initiation and subsequent growth rates are responses to climatic changes, especially moisture. As such, the analysis of radiocarbon-dated peat stratigraphy indicates generally moister or drier periods. Meadow's (1988:466) plot indicates two periods of peat initiation or acceleration in peat formation. The first, represented by the basal dates at Dunedin and Salisbury, occurs in the terminal Pleistocene. The second moister phase is indicated from the mid-later Holocene from circa 5000 BP. Another Elandsberg vlei (Ellerslie) gives a basal date of 4200 ± 60 BP (Pta-4335) and an organic soil on the northern Compassberg slopes provides a reading of 3590 ± 70 BP (Pta-4342) (Meadows 1988:467). Meadows also notes that in the summer rainfall areas there are few dated peat deposits between about 10 000 and 6000 years BP.

Other local studies

A qualitative model of the vegetation history of the eastern Cape midlands by Palmer (1988) notes that in the Subtropical Thicket the number of endemics is low indicating a relatively shallow time depth for this type. He suggests that the mesic conditions between 14 000 and 12 000 BP encouraged widespread Subtropical Thicket expansion. It is possible, however, that the bush clumps of the savanna-like Eastern Province Thornveld to the north of Edgehill, are relicts of a previously more widespread Subtropical Thicket. These clumps and the trees they contain could well be of some antiquity. Recruitment of genera such as *Pappea*, *Boschia* and *Euclea* can only take place if at all, within the nutrient and moisture enriched soils which they cover (Palmer pers. comm.; Palmer et al. 1988). The speculation is that early Holocene conditions may have thinned out parts of the Subtropical Thicket established in the terminal Pleistocene. While the extent of the thicket is little changed from this time, it is possible that drier early and mid-Holocene climates encouraged more Karoo-Namib elements while moister conditions from the mid-Holocene encouraged Afromontane species.

Possible indicators from the archaeological sites themselves, particularly Edgehill, may be interpreted in a palaeo-environmental framework (Hall, S. 1988a). This is tenuous because of the difficulty in separating cultural selectivity from the unbiased sampling by hunter-gatherers of environmental changes. The evidence at hand is derived from size changes in the freshwater mud-mullet (*Labeo umbratus*). Figure 3.7 shows the remains of *L. umbratus* which have been measured across the basioccipital facet. This measurement was to help assess whether the LSA exploitation of the riverine icthyofauna negatively impacted recruitment and mean fish size. The measurements extrapolated to standard lengths and fish mass show that there is a significant increase in these measurements through time contrary to the expectation that increasing exploitation of this resource farmed down populations (Fig. 3.7). In units 7 and 8 at Edgehill (ca 5500 to 5000 BP) the mass of *L. umbratus* being returned to the site ranges between 40 and 105 g. Above unit 7 the upper size range increases to about 400 g.

Differential preservation may be ruled out as the cause. It seems unlikely that basioccipitals with facets only 1 to 1,5 mm larger would survive less frequently in slightly older deposits. No direct evidence of fishing technology has been recovered from the excavations and the size increase may be a result of improving LSA fishing techniques. However, if historical observations of basket and mat fishing, stone or reed fish traps (Thompson 1827), or stone

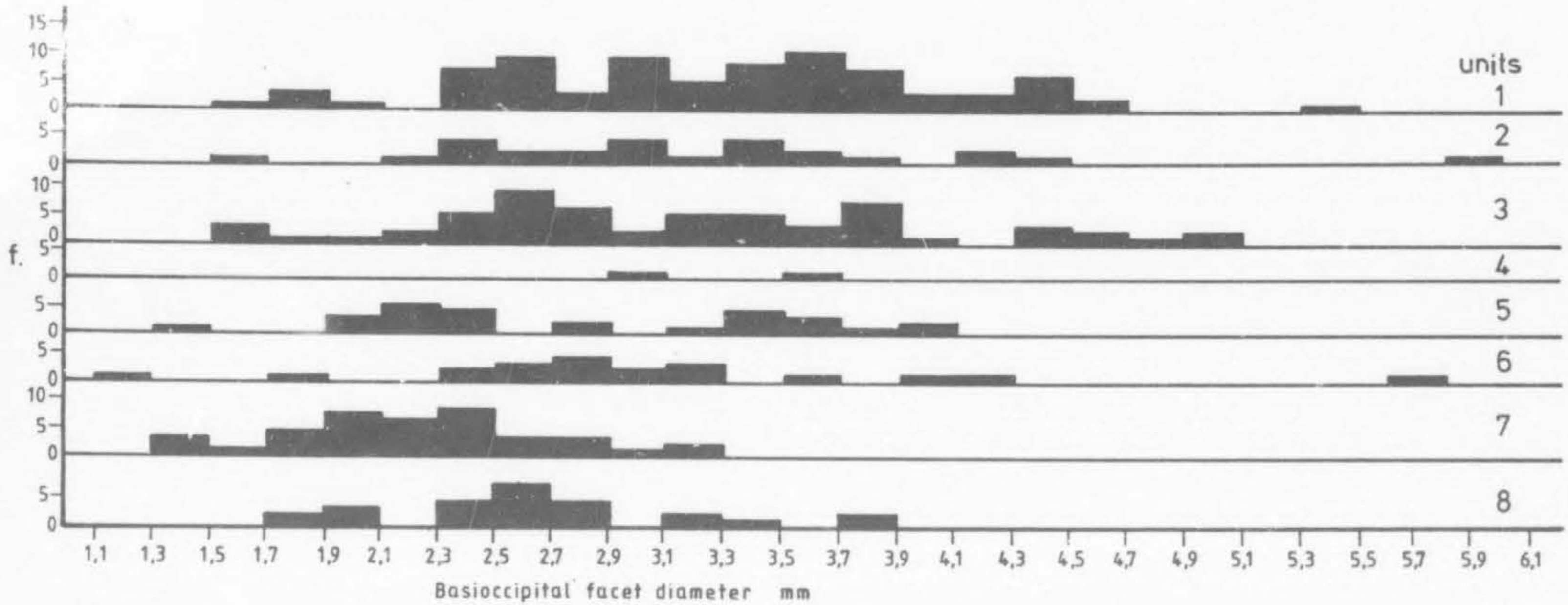


Figure 3.7. Edgehill: distribution of basioccipital facet widths of L. umbratus

stunning during spawning (pers. observation) have any archaeological time depth, it is unlikely that they will discriminate against different size classes.

The interpretation favoured for these data is that increasing fish size above unit 7 at Edgehill signals an improvement in the quality of the riverine habitat (Hall, S. 1988a). Sexually mature fish at below average size can indicate impeded river conditions during which a reduction in flow and water volume decreases nutritional loads and gives rise to 'aquarium' like conditions, both of which contribute to stunted fish growth (Cambray pers. comm.). Reduced and more intermittent river flow also restricts migration, recruitment and spawning opportunities. If this assessment is correct it indicates that after 5000 BP, discharge from the summer rainfall catchments on the Second Escarpment increased, with flow patterns adjusting to levels similar to today's.

The validity of the *L. umbratus* size increase as a palaeo-environmental indicator is strengthened by a pilot study on Edgehill charcoal samples. Analysis shows low tree species diversity in the basal layers comprising *Rhus* spp. as well as *Euclea/Diospyros* spp. (Tusenius pers. comm.) (Table 3.2). Diversity increases through time, to include four as yet unidentified types and the late appearance of *Acacia karroo*. Under present day conditions most hard woods cluster along the riverine fringe where drift wood stacks also occur. If LSA wood collecting also focused on these the charcoal evidence may reflect similar hydrological improvements in the riverine condition at the same time as the fish size changes.

Moving further afield, pollen samples from the Aliwal North springs have been analysed (Coetzee 1967). Pollen is only preserved in those parts of the cores dating between 12 600 and 9650 BP. These indicate fairly rapid vegetational switches between pure grassveld and Karroid vegetation. Inferred climatic changes are cooler and humid for grassland vegetation and warm and dry for Karroid vegetation, but the trend into the Holocene is towards warmer and drier conditions. The initiation of peat formation at Aliwal North at about 12 600 BP is similar to the start of sedimentation in the Elandsberg vleis and, as Meadows (1988) points out, may be a significant correlation. The interpretation for warmer and drier conditions in the Aliwal North sequence is also similar to those from the Elandsberg but the authors differ as to the relative temperatures which accompany those early Holocene dry conditions.

Another study by Tusenius (1985, 1986) on fossil charcoals from archaeological sites in the north-eastern Cape, excavated by Opperman (1987), provides further palaeoenvironmental evidence which has been interpreted in a similar way to the studies already discussed. At the LSA site of Ravenscraig in the Drakensberg escarpment *Euryops* charcoal makes up a significant percentage of identified charcoals in the sequence between about 10 000 and 3000 years BP (Tusenius 1986:94) indicating a relatively dry and warmer period. In the oldest layer 5 and the youngest layer 1 (10 200 BP and 460 BP respectively) *Leucosidea* rises in frequency while *Euryops* drops implying relatively moister and cooler conditions at these times. The same interpretation applies to the charcoal from Colwinton and Bonawe.

While the picture of a relatively warmer and drier period in the early to mid-Holocene is clearly indicated there are marked depositional hiatuses in the cultural sequences from these sites. The timing of these breaks is fuzzy given that there are significant parts of the deposits which have not been dated (Opperman 1987; Hall, S. 1988b). The palaeoenvironmental data are therefore tied to cultural sequences. One cannot be sure if the cultural gaps are directly correlated with the warmer and drier episodes and if not, the more precise timing of these palaeoenvironmental changes remains obscure.

In the southern Cape a study on pollen cored from the Norga peat provides a sequence of palaeoenvironmental changes over the last 4000 years (Scholtz 1986). The basal Zone A, estimated to date between 4000 and 2600 BP, provides evidence for forest expansion and implies a wetter local environment. This may correlate with higher frequencies of arboreal pollen observed by Martin (1968) from the Groenvlei lake sediments, although this interpretation is complicated by the possibility of dune movements inhibiting the contribution of heath species to the pollen rain (Deacon, J. 1984). Pollen from Zone B at Norga (2600 to 1400 BP) suggests a deterioration in the environment and the expansion of sub-karoid vegetation and forest retreat. Zone C (1400 BP to the present) sees a re-expansion of forest species.

Other evidence for palaeoenvironmental change in the Holocene from the southern Cape comes from a suite of studies based around the excavations at Boomplaas Cave in the Cango Valley (Deacon, H.J. et al. 1984; Deacon & Thackeray 1984). Analysis of micromammal remains (Avery, D. 1982, 1983), charcoals (Deacon et al. 1983), and large mammals (Klein 1978, 1980, 1983) all suggest a maximum warm period around 6000 BP with conditions thereafter ameliorating to those similar to the present.

Palaeoenvironmental summary

16 000 to 12 000 years BP. A period of relatively higher moisture than at present, during which the general distribution of the Subtropical Thicket seen today became established with perhaps a high percentage of Pondoland-Tongaland species. Although sedimentation

in Winterberg impeded drainage basins begins, reflecting greater runoff, the highland vegetation is Karroid, with much reduced Afromontane Forest.

<u>12 000 to 8000 years BP.</u> This is a period of increasing aridity relative to previous conditions and to those of today. There is perhaps a slight contraction of Subtropical Thicket from the higher areas of the Coastal Plateau and a shift towards more Karoo-Namib species in the thicket of the valley floors. It is probable that the catchments of the Koonap and Fish Rivers and the lower reaches of these systems experienced a significant fall in mean water levels and that flow was sporadic. Several lines of evidence, particularly Scholtz (1986), point to decreased summer rains with long hot summers. Model simulations retrodict that at 9000 BP, southern Africa was cooler and drier than at present with less intense summer rains (COHMAP members 1988:1049).

<u>8000 to 5000 years BP.</u> During this period upland vegetation patterns shifted more towards present day configurations particularly with the appearance of Afromontane species indicative of moister conditions although conditions remained drier relative to the present. Perhaps stronger summer rainfall occurred as well.

<u>5000 BP to the present.</u> Moisture and temperature fluctuations at this time appear to be mostly within present day ranges (Deacon & Lancaster 1988:160). Vegetation and hydrological patterns in the region of the sites also adjust to present day ranges with a consequent increase in mean flow levels of the Koonap River and the appearance of more Afromontane species in the Subtropical Thicket.

THE EXCAVATIONS AT EDGEHILL

SETTING

Excavations at Edgehill and Welgeluk were undertaken between 1981 and 1985. All excavations were on a small scale. No work has been previously undertaken at any of the sites.

Edgehill is located some 600 m from the Koonap River on the western side of Rietfonteinspruit, a small tributary of the Koonap River. It is east facing (Fig. 5.1; S 32°5'19", E 26°30'55"). Rietfonteinspruit is a permanent spring which rises 3 km above the site and has never in living memory stopped flowing (Barnard pers. comm.). The topography immediately around the site is composed of a gentle rolling landscape to the north, covered by the savanna-like Eastern Province Thornveld. To the south, the topography is more rugged and Subtropical Thicket dominates the vegetation. The site lies on a vegetational transition zone.

The shelter is below a small cliff in which softer mudstone bands have been cut back below a more resistant Adelaide sandstone sill. The shelter is divided into two chambers separated by a block pedestal. It is only in the northern chamber that deposit has been preserved (Fig. 3.8). The excavation was located towards the northern end of this chamber in order to avoid disturbance in the form of porcupine burrows. Examination of these burrows showed that the contact between the deposit and the back wall is on the same level as a bedding plane and that the deposit in which the excavation was placed chokes up another considerable chamber to the west. Selection of the area to excavate was, however, a compromise because some of the drainage of the slope above the shelter is chanelled down past the northern edge of the shelter. Consequently, the deposit has been cut back through the action of this small runnel. It is thought that this saturates the deposit periodically.

STRATIGRAPHY

The square with the grid reference M8 was excavated as a test pit, with N7 and N8 following (Fig. 3.8). Square M7 was excavated to a depth of 0,30 m in order to provide a step for the deeper excavations. The deposit is about 1,70 m deep and can be divided into two main sections. This division is made on the basis of variable stratigraphic resolution. The upper 1,0 m consists of a grey to red-grey ashy soil which is stratigraphically structureless (Fig. 3.9). This upper deposit was excavated in 0,05 m spit levels. The stratigraphy improved in the lower deposits down to bedrock and for the most part could be excavated by natural layers. These consisted of light grey to white crusts, some of which are extremely dense and hard, alternating with softer dark red and ashy grey soils from which the bulk of the organic remains were recovered.

Tool and faunal sample sizes from each spit and layer were too small for meaningful comparison and consequently have been lumped into eight larger units on the basis of stratigraphy, changes in artefact frequencies through time and changes in raw material and faunal categories. These aggregated levels and layers have been termed units. From the base upwards these are as follows:

Unit 8. A series of three stratigraphic layers designated FE, GRN and TLL. These are red soils and FE is distinctive because of a high degree of iron staining. These layers were lumped because of the dominance of hornfels and sandstone over silcrete in the lithic artefact assemblage. There is also a complete absence of backed bladelets. Beads made from the small estuarine shell *Nassarius kraussianus* are present. Charcoal from TLL gave a radiocarbon date of 5500 ± 70 BP (Pta-3581) (Table 3.3). Volume of unit: 32 buckets (bkts).

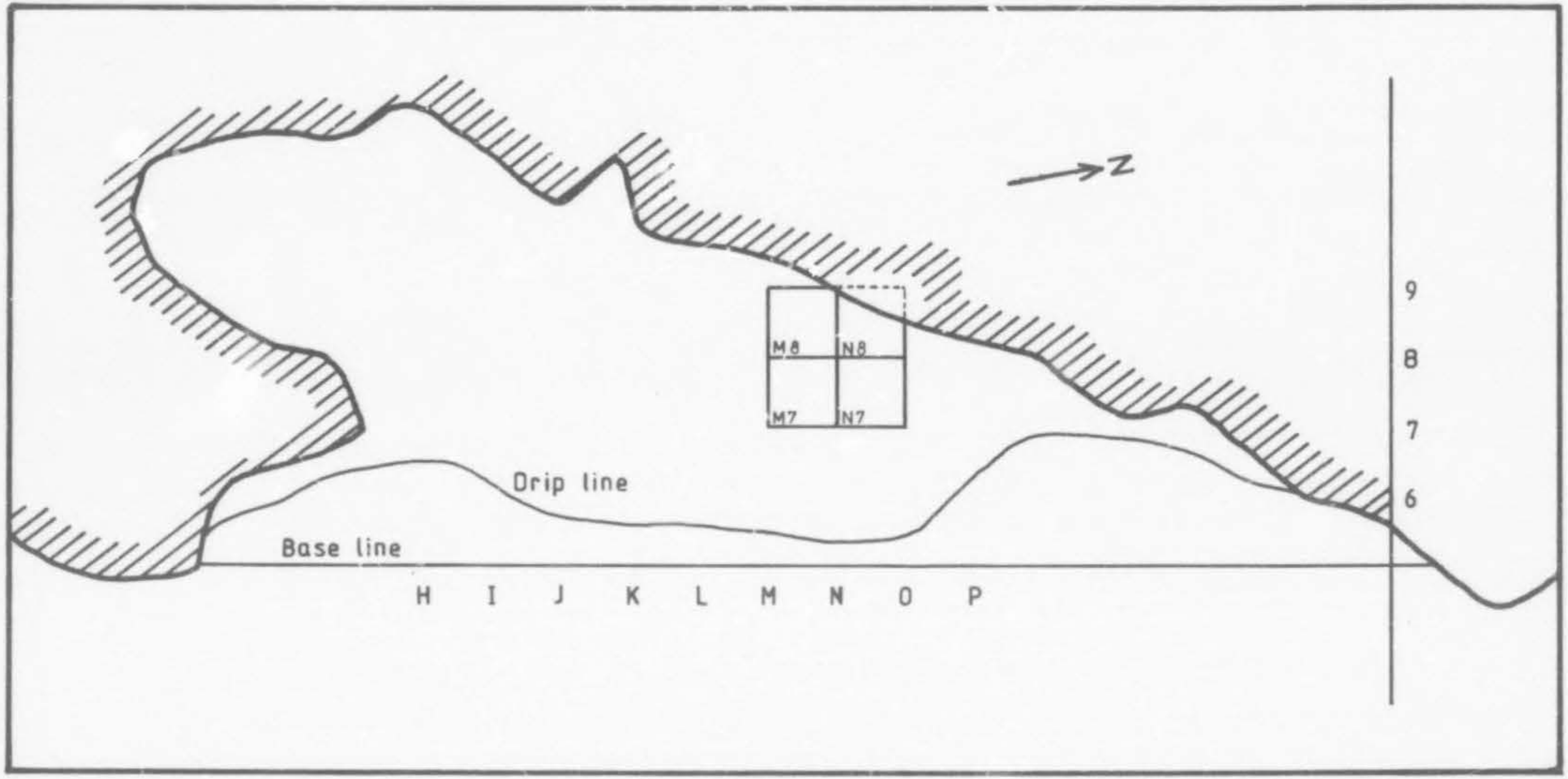


Figure 3.8. Edgehill: shelter plan and location of excavations

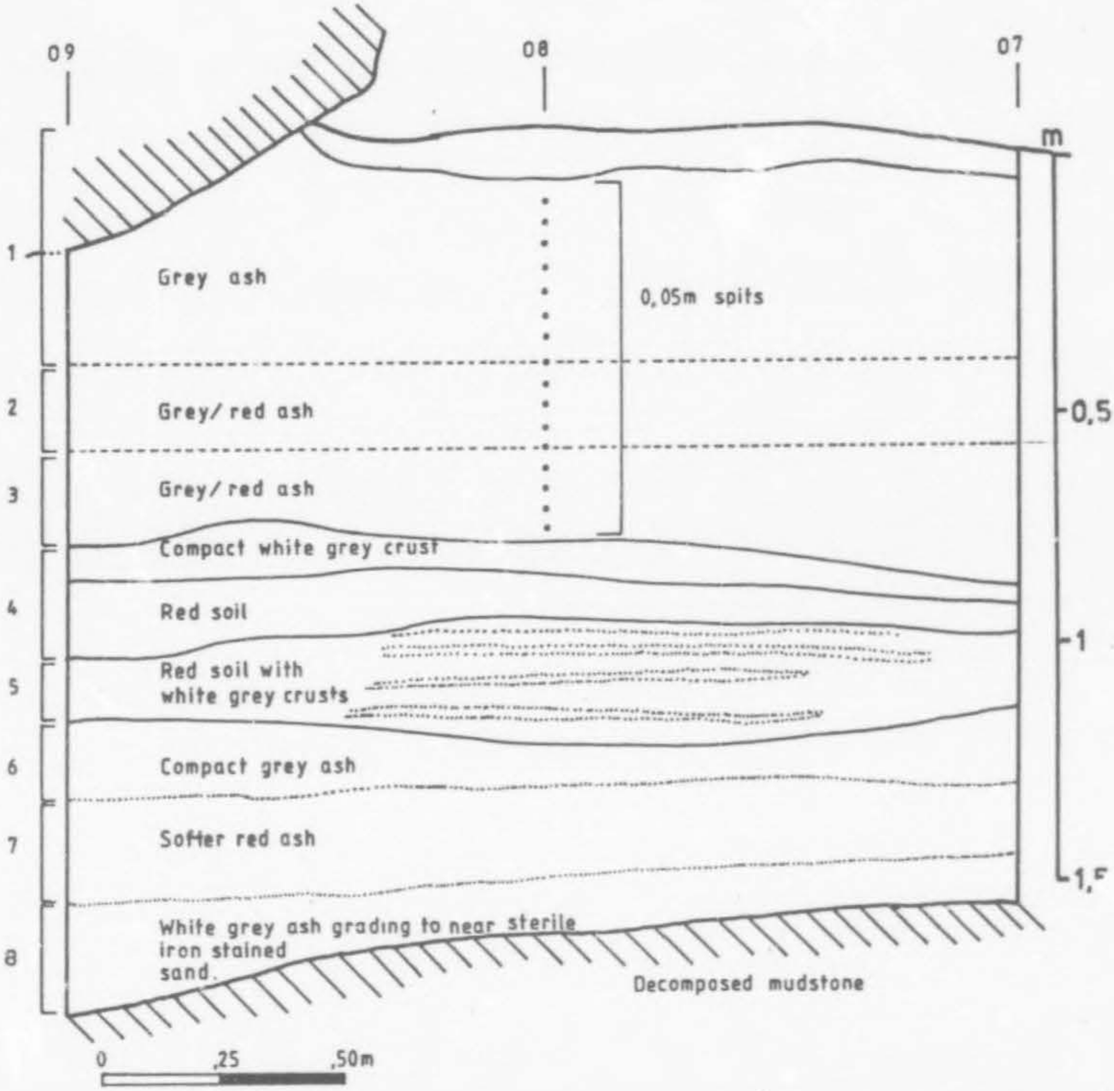


Figure 3.9. Edgehill: section drawing of excavations

Unit 7. This unit is a combination of softer and more ashy deposits composed of three layers called GNM, PX and BOGE. Hornfels tools still predominate and *Nassarius kraussianus* beads are present. A date of 5430 ± 70 BP was obtained from BOGE (Pta-3571). Volume of unit: 77,5 bkts.

Unit 6. The deposits in this unit come from three layers called OGE2, OGE and DWF. The separation of unit 6 from unit 7 was made on the basis of a shift in stone tool raw material from hornfels to silcrete. Unit 6 is further distinguished by a sharp increase in the frequency of backed bladelets as well as the first appearance of adzes. *Nassarius kraussianus* beads are absent in unit 6. Volume of unit: 68 bkts.

Unit 5. This unit is the most distinctive stratigraphically. It is composed of a series of hard white crusts, separated by softer and darker stringers. These hard white crusts are interpreted as combusted plant rich units similar to those encountered in the excavations at Melkhoutboom (Deacon, H.J. 1976). The layers in unit 5 have been labelled JT1 to JT4, BRJT, MJT and SW. *Nassarius kraussianus* beads are absent. The density of cultural material is relatively low with most of the organic remains coming from the darker stringer deposits. Volume of unit: 39 bkts.

Unit 4. This unit comprises two stratigraphic layers labelled ABMNE and MNE. MNE marks the end of the lower stratigraphically resolvable deposits and comes closest to a marker horizon because it is found over most of the excavation. MNE is a hard white crust while ABMNE is a softer red-grey underburn. MNE and ABMNE are combined because they share relatively high artefact densities and low amounts of faunal remains. *N. kraussianus* beads are absent. A date of 4320 ± 60 BP was obtained from charcoal from ABMNE (Pta-3574) (Table 3.3). Volume of unit: 32,5 bkts.

Unit 3. This block of deposits is made up of four 0,05 m spit levels designated R9 to R6 after the reddish tinge of the deposit. *N. kraussianus* beads appear in unit 3 and the frequency of the freshwater mussel, *Unio caffer*, begins to rise. Volume of unit: 49 bkts.

Unit 2. The top of unit 2 is distinguished by a change in the deposit colour to that of a predominantly grey ash. The division between unit 2 and 3 is completely arbitrary. Unit 2 comprises five 0,05 spit levels, R1 to R5. Volume of unit: 43 bkts.

Unit 1. This unit is composed of seven 0,05 spit levels called GA1 to GA7. Apart from the colour change in the deposits, the unit is also characterised by the presence of pottery and high frequencies of *U. caffer*. Surface dust has been included in unit 1. A radiocarbon date taken from near the base of unit 1 gave a reading of 1830 ± 60 BP (Pta-3564) (Table 3.3). Volume of unit: 140 bkts.

DATING

While Edgehill has four dates, they only at best give a general chronological picture of LSA occupation at the site. However, on the basis of these dates it is reasonable to assume that there are no major breaks in the sequence. When equivalent or even shallower sedimentary sequences with older radiocarbon dates from the CFB are considered, the occupation at Edgehill appears to be relatively continuous and intense.

All four radiocarbon dates were run on charcoal recovered from the sieve. Although the dates provide an internally consistent series, there are significant parts of the upper sequence which are not dated. The oldest reading comes from layer TLL because no suitable charcoal samples were recovered from the two older basal layers GRN and FE (Table 3.3; Fig. 3.9). The date provides only an approximation of the initial timing of LSA occupation. If, however, one accepts the small radiocarbon time difference between unit 7 and unit 8 then it is possible that the first occupations in FE were not much older than the TLL date. A date of not more than 6000 years BP for the first occupations is a reasonable estimate. Whatever the age of the initial occupations, the densities of artefacts in GRN and FE are relatively low when compared to the layers above, suggesting that occupation was sporadic.

A vertical distance of 0,5 m between the unit 7 and unit 4 dates gives an approximate rate of accumulation of 22 years per 0,01 m. The depositional rate between the unit 4 date and that of unit 1, 35 years per 0,01 m, indicates that occupation is more intense in the lower occupations. Given the inadequacy of the radiocarbon coverage it is best not to attach too much significance to these figures.

The youngest date from unit 1 does present some problems. The reading is taken from near the base as defined by the presence of pottery but the frequency of sherds is very low. Given the quite substantial disturbance to the deposits evident through current porcupine action and the complete absence of any stratigraphic structure, it indicates that these upper deposits are only stratigraphically intact in a general way. The date as an indicator of the presence of pastoralists in the area cannot be discarded, however. It is still within the time range for the appearance of pastoralism in the Cape, even if it is a little earlier than previous pottery dates in the eastern Cape (Deacon, H.J. 1976; Derricourt 1977). Furthermore, it is backed up by secure dates of a similar age on the first pottery layers at Welgeluk Shelter.

FEATURES

The factors which masked the stratigraphy in the upper deposits at Edgehill (GA & R) also obscured many features which most probably represent hearths. These are distinguished only through slightly paler and more finely textured patches of deposit but the precise boundaries were impossible to determine. Over small areas freshwater mussel valves clearly lay on the same walking surface but could not be traced to any great extent. These do indicate, however, that there is no major dip in the deposit over the area excavated.

The blandness of the upper deposits also masked a pit which was only identified after the top half had already been excavated. This was recognised on the basis of a significant 'tubular' concentration of artefacts, freshwater mussel shells and anomalously well preserved bone in a discrete area in N8 between GA5 (base of unit 1) and R5 (top of unit 3)(Fig. 3.10). The bulk of material in the pit consisted of ochre stained and abraded slabs and upper grindstones. While there were no obvious changes in the colour or texture of the deposit in the vicinity of this material, the concentration represents an apparently rapid discard event into an empty pit. Several of the large slabs were dipping at 45°, indicating dumping into a confined space. The associated bone was well preserved and a complete pelvis and scapula appear to come from the same Bovid I sized individual. Freshwater mussel was common in the pit but not frequently found outside it, indicating that the dump had come from the upper unit in which the mussel frequency is high. The pit is not directly dated. No pottery was found in the pit contents and the level of the pit mouth cannot be precisely determined. A minimum age of 2000 years BP is suggested. While the empty pit was used as a dump, the original function may have been a storage facility for oil rich seeds, such as *Pappea capensis*.

THE EXCAVATIONS AT WELGELUK

SETTING

Welgeluk Shelter is located on the northern bank of the Koonap River some 7 km downstream from Edgehill (Fig. 3.1)(S 32°59'05", E 26°31'56"). The shelter faces south-east and lies about 10 m above the river bed which at this point is a boulder and pebble rapid.

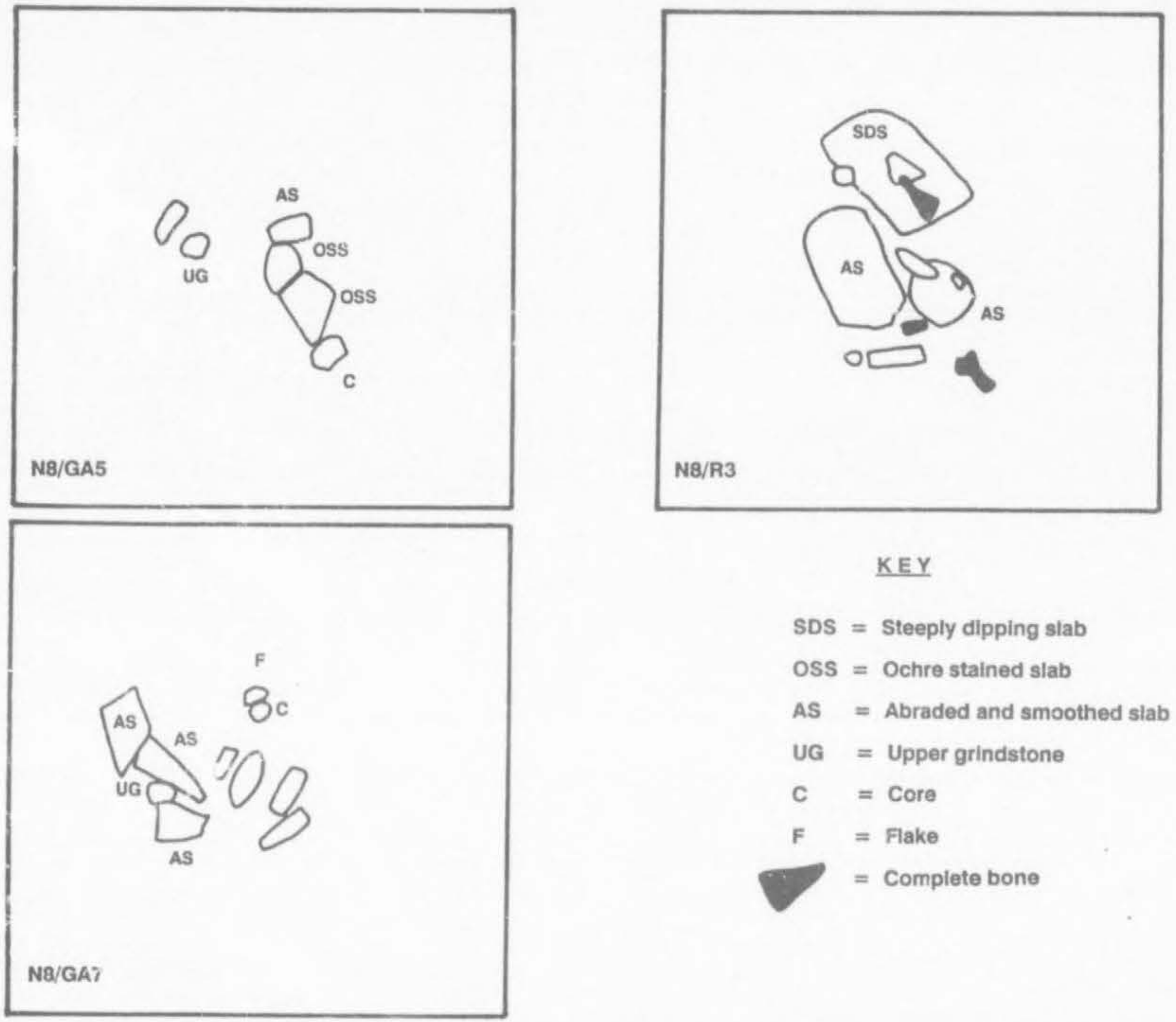


Figure 3.10. Edgehill: plots of pit contents

Immediately downstream from the rapid there is a long pool. Historically this is known to have been a popular hippo haunt and local lore also specifically emphasises an abundant eel population (Els pers. comm.). The site is ideally situated in relation to diverse riverine habitats as well as dense Subtropical Thicket kloofs and grassier hilltops nearby.

Like Edgehill, Welgeluk has formed through the differential erosion of softer shale and mudstone bands below a more resistant sandstone sill. The shelter lies at the base of a small cliff on an inside river bend. Flood waters do not apparently reach the shelter (Els pers. comm.). When the river floods the water pushes out onto the opposite flood plain and the shelter is not threatened. The front of the shelter is partly screened by vegetation, particularly *Acacia karoo*, which forms a significant part of the current riverine fringe.

Welgeluk Shelter is long and narrow (Fig. 3.11) with deposit over most of its surface. There are, however, large roof blocks on and just below the surface in the north-eastern half of the shelter. The excavation was positioned in the southern part of the shelter in order to avoid these.

The excavation was small, comprising three square metres, one of which was obstructed at a depth of about 0,70 m by a continuation of the roof blocks which dip below the present surface to the south (Fig. 3.11). These could not be removed. The sequence reached a maximum depth of 2,20 m, and is capped by a 0,10 to 0,15 m thick highly compacted historic dung crust. This sealed the deposit and allowed little assessment of the contents from surface inspection alone. One small disturbance towards the front of the shelter revealed some stratigraphy and plant material. The presence of the latter particularly encouraged the initial testing of the site because plant material was entirely absent at Edgehill.

STRATIGRAPHY

Compared to the deposits at Edgehill, those at Welgeluk are stratigraphically clear and complex and excavation for the most part proceeded using natural colour and textural changes (Fig. 3.12). In total, 128 separate horizons were isolated, some of which were extremely small. No discretely excavated horizon, however, contained sufficient archaeological material for meaningful comparison between horizons. As was done at Edgehill, these were lumped into larger blocks (units) for analysis. In some instances divisions were made arbitrarily. Four units have been defined, of which units 1 and 4 have been subdivided into A and B. From the base upwards these units are as follows:

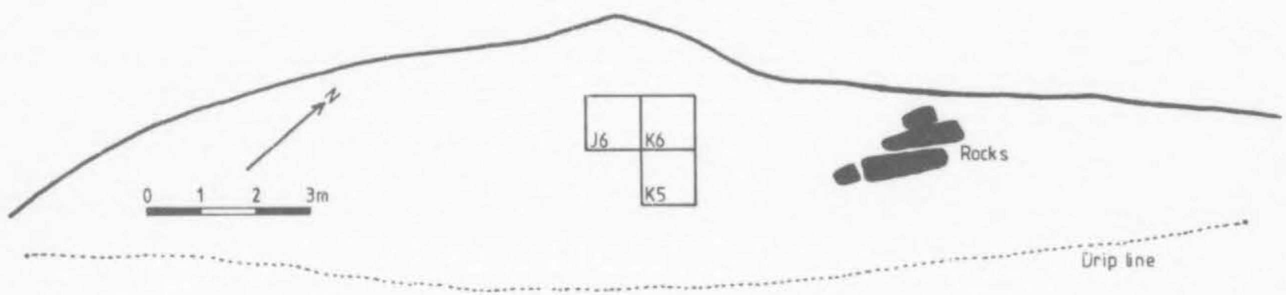


Figure 3.11. Welgeluk: shelter plan and location of excavations

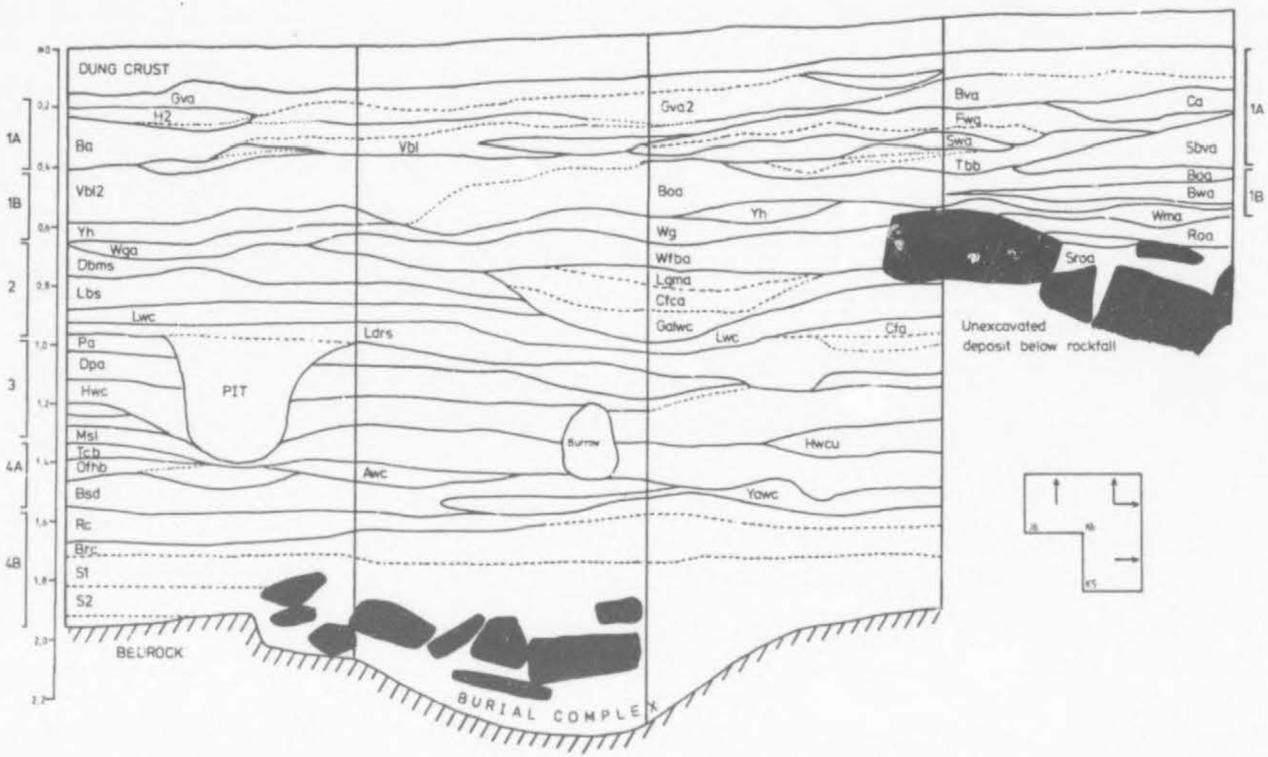


Figure 3.12. Welgeluk: section drawing of excavation

Unit 4B. The first depositional event at Welgeluk was the burial of a minimum of six individuals under a cairn constructed of river slabs with the whole complex lying directly on bedrock (Fig. 3.12). (The burial complex is dealt with in Chapter Six and Appendix I.) The deposits overlying and adjacent to the burial complex are red/brown soils, in which the stratigraphic resolution is poor relative to that in the deposits above. Twenty units were nevertheless isolated. The basal 0,20 m in 4B is an undifferentiated red soil and was removed by two 0,05 m artificial spits. The top of 4B was defined as a thick spall unit (Fig. 3.12:RC). This was present over the whole area excavated, but was less dense to the north and east. The extent of RC is such that it can be considered a marker horizon, most other layers having little lateral extent.

Not much significance can be attached to RC. Spall horizons have been found at Uniondale (Leslie-Brooker 1987:68), Melkhoutboom (Deacon, H.J. 1976:24-5), and at Wilton (Deacon, J. 1972), but the RC horizon on both radiocarbon dates and artefact typology is much younger than the CFB site spall horizons, which all appear to be of similar age. Over-interpretation of RC as a mechanical response to general climatic change or as representative of an occupational hiatus is tempered by a roof fall at the northern end of the shelter which occurred while excavation was in progress. The impact from this roof collapse spread shattered debris over a considerable area. Of possible significance is that this roof fall occurred during a short but intense wet spell in the middle of the drought and may have been prompted by the mechanical action of a rapid moisture increase. The RC spall horizon could have resulted from a similar process.

One radiocarbon date was processed for unit 4B (Table 3.3). The date was run on charcoal from SPIT 1 (Fig. 3.12), approximately 0,10 m above bedrock. No suitable samples were found below. The date of 4560 ± 70 BP (Pta-3947) therefore, does not date the first use of the site (burial complex) but is considered to be fairly close. The rib cages from two of the burials were submitted to the CSIR but the collagen levels were insufficient to provide a reading (Vogel pers. comm.). The chronological separation, if any, between the burial complex and the first build up of deposits is not known. Comparison of the basal sequence at Edgehill with Welgeluk suggests that the initiation of occupation at Welgeluk is no older than the 5500 ± 70 BP (Pta-3581) basal date from Edgehill. This is because the formal tool component in these units at Edgehill is dominated by hornfels but replaced by silcretes at about 5000 years BP. The first occupation at Welgeluk occurred after this raw material flip and consequently the basal date at Welgeluk is probably no older than about 5000 BP. A total of 109 buckets were removed as unit 4B.

Unit 4A. These sediments are similar to those in 4B but are interspersed with fairly massive and compacted whitish-grey crusts (Fig. 3.12:AWC, YAWC). These are interpreted as combusted plant rich horizons. It is improbable that such large ash bodies resulted from the redistribution of hearth ash, as hearths are relatively small features. They also contain little organic material. No radiocarbon dates were processed from 4A. The unit is an amalgam of nine excavated units, excavated in 40,5 buckets.

Unit 3. The distinction between units 4A and 3 was made on the basis of a near sterile, coarse sand layer labelled MSL (Fig. 3.12). MSL is on average 0,10 m thick and is a clear marker horizon over the whole area excavated. The distinctivness of MSL was confirmed by sedimentological analysis (Candler 1983) (Table 3.4). This showed that MSL contained the highest sand content of all horizons sampled (78,3%), and was also relatively well sorted.

The unit above MSL, (HWC), is dated to 3300 ± 60 BP (Pta-3936) (Fig. 3.12; Table 3.3). The time difference between the unit 4B date and the unit 3 date is in the order of 1200 years. When the intervening undated deposits are considered, it is clear that MSL does not represent a long period of non-occupation. The sedimentological analysis suggests that MSL may have formed through a relatively rapid wash of sediment into the shelter but not from flooding by the river. During heavy rain, fault lines in the back wall became hydrologically active and MSL may have resulted from such a concentrated discharge. The hard crusts noted above in 4A persist in 3 (HWC, HWCU) and some of them are extremely thick and massive (PA) but softer, less compacted ash bodies are also present (Fig. 3.12:DPA). Unit 3 is made up of 17 excavated layers taken out in 99,5 buckets of deposit.

Unit 2. The distinction between units 3 and 2 was arbitrary and based on a surface corresponding to the mouth of the pit, DWATF (Fig. 3.12). Examination of the section shows that from unit 2 the individual layers tend to be thinner and less laterally extensive. This may be because the stratigraphic resolution is not masked as much as in the deposits below. It should also be kept in mind, however, that this reflects changes in the way the shelter was used. Only one crust was identified (LWC) and the deposits were generally softer grey ashes and humified red to browm soils (ROA, SROA) in which the frequency of freshwater mussel and freshwater fish were particularly abundant (GALWC, CFCA, LGMA). One radiocarbon date was processed on charcoal from GALWC which gave a reading of 2510 ± 60 BP (Pta-3948) (Table 3.3). Twenty six units make up unit 2 which was removed in 108 buckets.

Unit 1B. The base of 1B is defined on the appearance of pottery in the sequence in unit WFBA (Fig. 3.12). A radiocarbon date on charcoal from WFBA gave a reading of 1980 ± 50 BP (Pta-3984) and a further date from a dense hearth core (CH) of 1360 ± 50 BP (Pta-3960) was also obtained (Table 3.3). The date for pottery may appear a little old but is not rejected because of a similarly early date for pottery from Edgehill (1830 ± 60 BP: Pta-3564). The deposits of 1B are distinguished by their brown organic nature and a marked increase in the preservation of plant material over the deposits below. This is shown by Candler's sedimentological analysis (Candler 1983; Table 3.4). Straddling units 2 and 1B in square K5 (Fig. 3.12) are several large roof blocks which could not be removed and, consequently, excavation below them was not continued. These blocks mark a major roof collapse in the shelter and the large blocks visible on the surface some 4 m to the north belong to the same collapse (Fig. 3.11). Unit 1B comprised 23 units taken out in 112,5 buckets.

Unit 1A. A change in the type of pottery has been taken as the criterion for splitting 1A from 1B. Pottery in 1B is relatively thin walled and well made and decorated with horizontal and diagonal incision on the necks. Pottery in 1A is generally coarsely made, poorly fired and decorated with incisions (nicks) across the lip of the rim. The first appearance of the rim nicked pottery in SBVA has been dated to 510 ± 50 BP (Pta-3934) (Fig. 3.12). The deposits in 1A are similar to 1B but are organically richer than those below (GVA, BVA, SBVA)(Table 3.4). Interfingering with these units are small white ashes and dense charcoal cores (H2, SWA) which mark hearths.

The uppermost horizon in 1A (GVA) contains seeds identified as the exotic cactus *Opuntia ficus-indica* which became established in the eastern Cape from 1750 AD onwards (Stirton 1978). Unit 1A is made up of 33 layers, taken out in 163,5 buckets.

The whole surface of the shelter is covered by a dense and compacted dung crust 0,10 to 0,15 m in thickness. This crust accumulated from the late nineteenth century from European farmers using the shelter as a stock kraal (Els pers. comm.).

Discussion

The Welgeluk deposits are typical of LSA shelter fills in the eastern Cape in which the well stratified units indicate that human occupation was the dominant agency of accumulation. The sediment analysis by Candler (1983) shows essentially silty sands with a high organic content (Table 3.4). It has been noted that the upper 1,0 m of the sequence is stratigraphically complex, with smaller units than in the deposits below. This may be a product of stratigraphic preservation related to different rates of accumulation and the length of time before preceding units were covered. The ashes, hearths and charcoal bands in the upper deposits relate to discrete occupations, while the large ash bands lower down may be equivalent to the ash bodies found at Melkhoutboom (Deacon, H.J. 1976) and are interpreted as the combustion of plant rich horizons. Such combustion may have masked the stratigraphic detail which is visible in the upper deposits and the fact that none were encountered in the upper units 1A and 1B may simply be a product of sampling. It must also be kept in mind that these differences may reflect changes in the frequency, length and nature of occupations between the pre- and post-pottery levels.

If the interpretation of the massive lower ash bodies as combusted plant rich horizons is correct, then the marked increase in the preservation of plant remains in 1B and 1A is clearly a product of better preservation. The introduction of plant material into the site has been relatively consistent throughout the occupation. Rates of accumulation are always difficult to calculate and assess given that with increasing depth a decrease in organic content (Candler 1983) (Table 3.4) gives rise to more compacted and thinner deposits which can skew the calculated rate. Rough estimates have been calculated by dividing the difference in radiocarbon time by the vertical depth separating the localities of each radiocarbon sample (Table 3.5). The quantification of accumulation rates is rather meaningless but the relative differences show that depositional rates are fairly even throughout, except for the later part of the pottery unit 1B which then returns to the previous rate in the final pottery unit 1A. Along with other lines of evidence this may have some use in assessing the nature of occupation during the initial contact situation between hunter-gatherers and pastoralists.

FEATURES

Burials

The burial complex is described and discussed fully in Chapter Six and Appendix I.

Pits

One pit was identified straddling squares J6, K6 and the un-excavated J7 to the west (Figs 3.12 & 3.13). The mouth of the pit was easily distinguished through the contrast between the massive hard white ash (PA) (the surface from which the pit was dug) and the pit fill itself (DWATF). This was soft, dark brown in colour and damp. The recovery of a complete tortoise carapace (*Chersine angulata*) from just below the pit mouth shows that the pit filled rapidly. The mouth of the pit is ellipsoid in shape and measures 0,80 m across and is 0,30 m

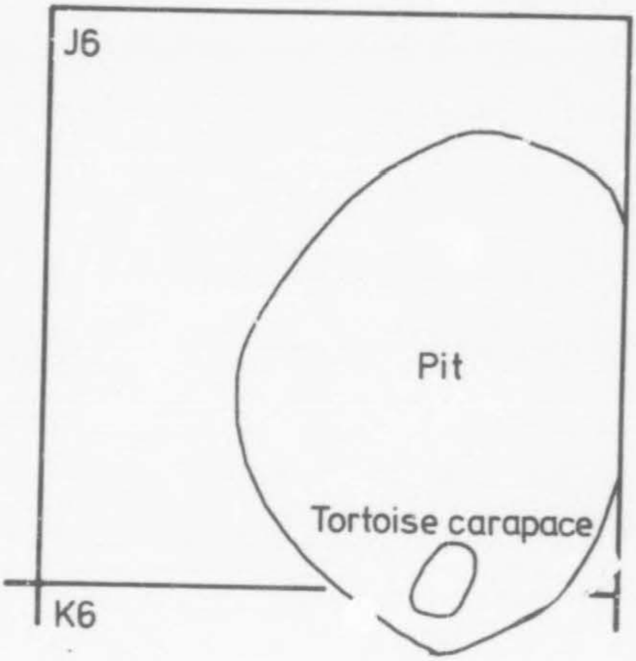


Figure 3.13. Welgeluk: plan of pit

deep. The surface from which the pit was dug is bracketed by two radiocarbon dates (3300 and 2510 BP)(Table 3.3). This places the feature unequivocally before any contact with pastoralists or mixed farmers, as represented by the upper pottery units. The function can only be speculated upon but it is reasonable to suggest that it was for seed storage and is therefore identical to pits located by Deacon (Deacon, H.J. 1976:32-5) at Melkhoutboom. At Melkhoutboom, the superior organic preservation indicated that these pits were lined with grass and used to store oil rich seeds such as *Pappea capensis*, *Calodendrum capense* and *Podocarpus falcatus*, remains of which were also found in the upper units at Welgeluk.

Hearths

These features, as mentioned above, appear more prevalent in the upper deposits. They are small, ash patches with dense charcoal cores and pinkish underburns, the whole hearth being no more than 0,30 m in diameter (Fig. 3.14). No hearths were marked in any way with stones. An informal arrangement of rocks was found on the surface of GVA in unit 1A (Fig. 3.15). These rocks were pecked, edge damaged, slightly abraded and ochre stained indicating functional use as anvils and grinding surfaces.

CORRELATION WITH EDGEHILL

On the present evidence the radiocarbon difference between the basal occupations at Edgehill and Welgeluk is in the order of 1000 years. This chronological difference is also indicated through the absence of the older hornfels dominated deposits at Welgeluk as well as the absence of the segment rich mid-Holocene horizons, which are also found at Edgehill but not at Welgeluk. Unit 4B at Welgeluk therefore corresponds chronologically with units 4 and 5 at Edgehill. Initially it was felt that not much significance could be attached to the time separation between the basal occupations at Edgehill and Welgeluk. However, on detailed analysis of the contents it is felt that the differential timing reflects the changing needs of the local LSA population and the way in which the local landscape was culturally developed. It is felt that there is nothing random or opportunistic in the choice to start using the shelters at different times.

Units 2 and 3 at Edgehill are not dated, but possibly overlap with Welgeluk unit 2. It is possible that the upper pottery units at Edgehill have been disturbed but the similarity in dates for the first appearance of pottery in both sequences indicates that as an indication of the first pastoralists in this part of the eastern Cape, they are reliable. Both sites combine to provide a relatively continous sequence of LSA occupation over the last 5500 years.

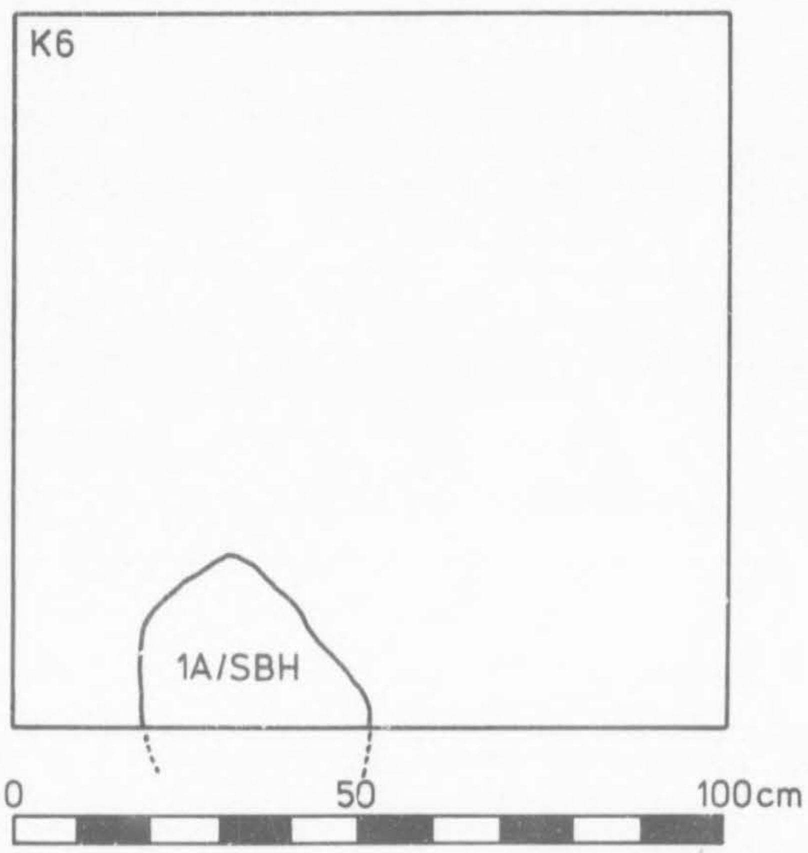


Figure 3.14. Welgeluk: plan of hearth in 1A/SBH

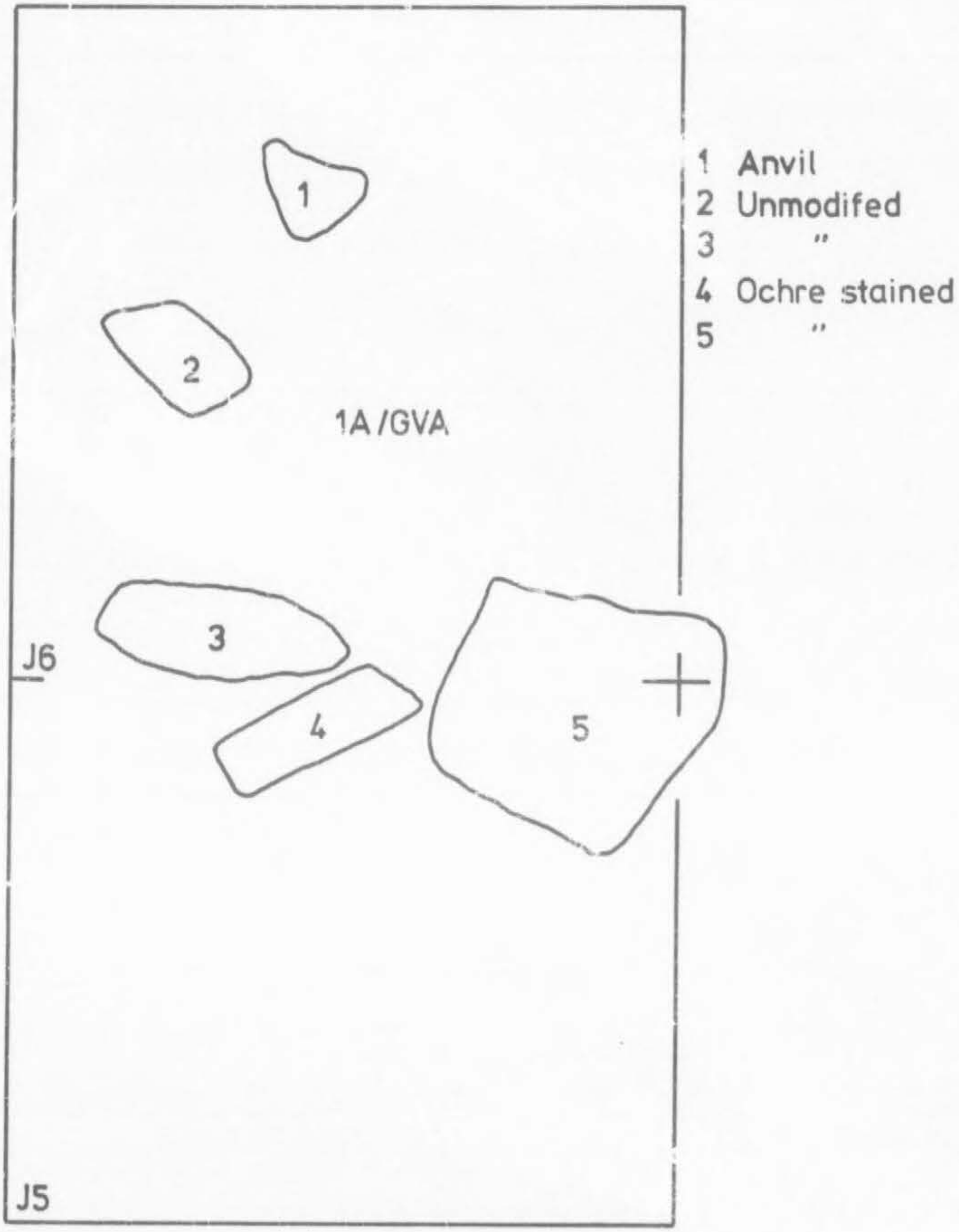


Figure 3.15. Welgeluk: Plot of rocks in 1A/GVA

Edgehill is somewhat older than Welgeluk but the upper pottery units at Welgeluk are considerable and provide detail on this part of the sequence which is absent at Edgehill.

Both Edgehill and Welgeluk were occupied well after the initial LSA settlement of sites in the eastern extension of the CFB. An assessment of this regional temporal difference is now given.

HOLOCENE REGIONAL SETTLEMENT AND PALAEOENVIRONMENTS COMPARED

A general model of Stone Age population flux and environmental productivity has been proposed by Deacon and Thackeray (1984). Simply stated, interglacial habitats are more productive than glacial habitats and this, in turn, affects prehistoric population levels, and consequently archaeological visibility. The authors note "...two phases of exponential population growth after 15 000 BP, the earlier one, terminating at some 10-9000 BP and the second initiated about 4000 BP" (op cit.:383). These trends are inferred from the analysis of available archaeological radiocarbon dates and are built upon a similar earlier analysis which demonstrates the same pattern (Deacon, J. 1974). When the dated occurrences are sub-grouped by the general biome within which they occur, the temporal and spatial distribution of the dates shows that LSA deposits in the southern, south-eastern and in the eastern extension of the CFB are found throughout the terminal Pleistocene and Holocene. In the more marginal inland Karoo and grassland biomes, clear depositional hiatuses occur between 9000 and 4500 years BP (Deacon, J. 1974).

This early Holocene LSA hiatus has been correlated with palaeoenvironmental evidence for drier and cooler/warmer? conditions at that time and the effect these had on environmental productivity and early Holocene LSA population levels. These harsher conditions, however, had less impact on LSA populations in the CFB of the southern and Eastern Cape. Meadows (1988:470) has drawn attention to the similarity between the distribution of archaeological radiocarbon dates and those from peat deposits. He concludes that moister climates encouraged greater archaeological visibility even within the relatively low key environmental fluctuations during the Holocene and that the two are highly correlated.

Figure 3.16 presents the chronological profiles for dated archaeological occurrences in the eastern extension of the CFB and the Subtropical Thicket and Karoo-Namib habitats to the north. It is clear that on the present sample of dates there is a marked lag in the timing of LSA occupation of the two areas (Hall, S. 1988a). Sporadic LSA residues appear at about

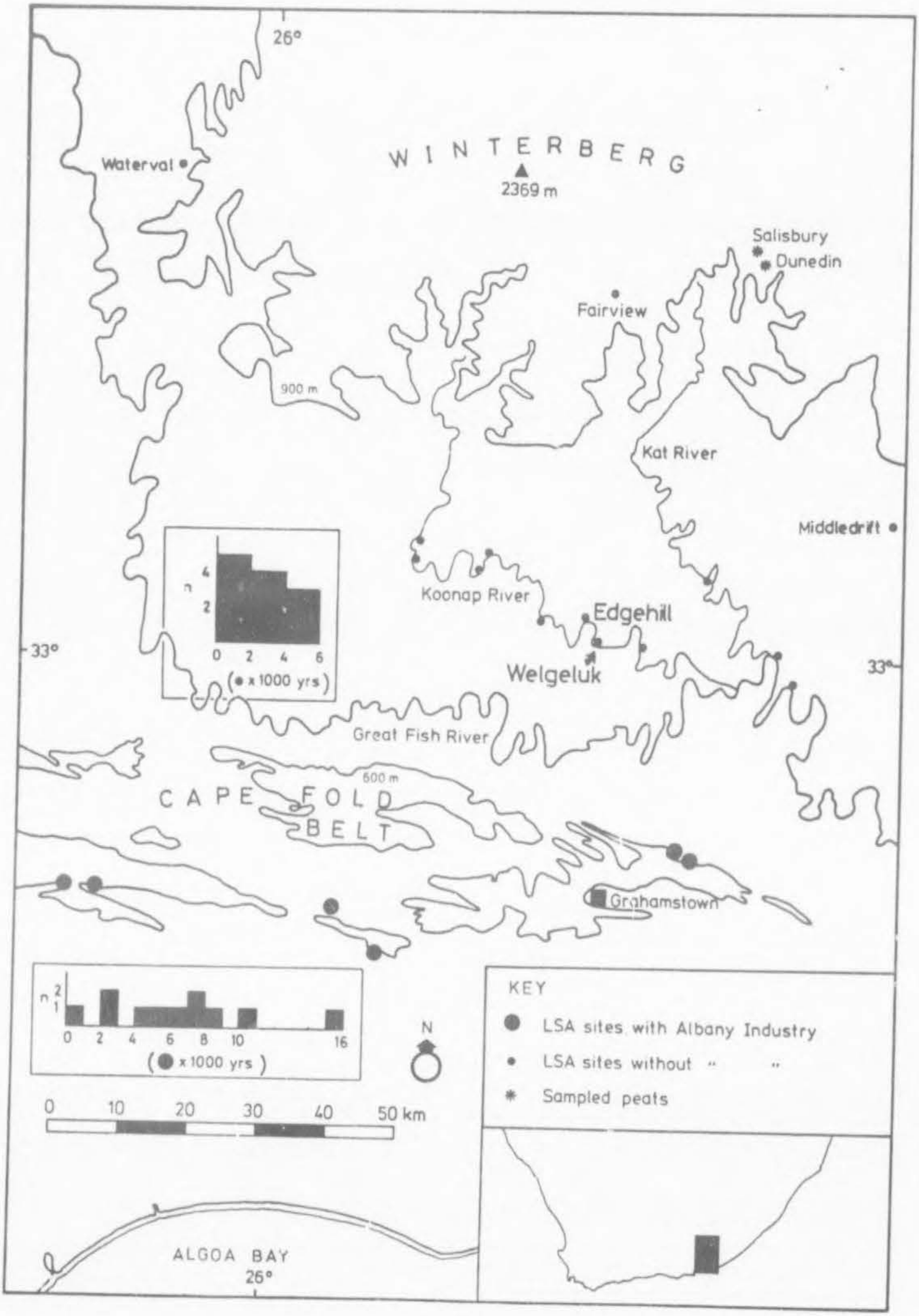


Figure 3.16. The distribution of radiocarbon dates in the eastern extension of the Cape Fold Belt and lower Fish River Basin

15 000 BP in the CFB (Deacon, H.J. 1976) and the Terminal Pleistocene/early Holocene Albany Industry has been recorded at Wilton (Deacon, J. 1972) and at Uniondale (Leslie-Brooker 1987). Terminal Pleistocene and early Holocene industries were also recorded by Hewitt at two of his excavations earlier this century (Governerskop and Welcome Woods). Therefore, on both dated deposits and typological grounds, LSA occupation of the CFB begins in the terminal Pleistocene.

In contrast, LSA occurrences to the north of the CFB only begin at considerably later dates (Fig. 3.16). For example, the basal date at Edgehill is 5500 ± 70 BP (Pta-3581) and at Welgeluk it is 4560 ± 70 BP (Pta-3948) (Table 3.3). Furthermore, there are no artefacts typologically referrable to the terminal Pleistocene and early Holocene Robberg or Albany Industries found in the shelters of the CFB to the south. While the dated sample is small, eleven other shelters with evidence of LSA occupation in the lower Fish River Basin have no deposits deeper than 1,0 m and by crude extrapolation to the ca 2 m deposits at Edgehill and Welgeluk, must have been initially occupied at equivalent or younger dates. Both Edgehill and Welgeluk are riverine shelters and therefore it is possible that early Holocene LSA occupations have been scoured out through high river levels. Apart from the reasons already given above, this is considered unlikely because palaeo-environmental evidence already discussed suggests that mean river levels were much lower in the early and mid-Holocene.

Another point which may temper emphasising the mid- to late Holocene chronology of Edgehill and Welgeluk as culturally significant is that no systematic open site survey has been undertaken. The lack of an open site survey is partly filled by excavations at Middledrift (Fig. 3.16) where Derricourt (1977) dates a basal LSA occupation at an open site to 5050 ± 70 (Pta-1031). This is similar to the basal dates from Edgehill and Welgeluk. Terminal Pleistocene LSA groups may have been economically geared to high mobility patterns which did not emphasise rock shelter localities as home base camps (Deacon, H.J. 1976). As a case in point, LSA groups in the extensively surveyed Seacow Valley generally 'shunned' rock shelter sites. However, some Lockshoek material is present in certain rock shelter localities (Sampson 1985:61). Moreover, for the Seacow Valley Sampson also states that Lockshoek settlement patterns dictate, "...that shelters will not be occupied unless they are very close to water" (Sampson 1985:67).

If terminal Pleistocene settlement patterns are in any way similar in the eastern Cape, then it is anomalous that no debris relating to this period has been found at either Edgehill or Welgeluk. Therefore, the absence of Robberg or Albany artefacts at Edgehill and Welgeluk is not a product of different local settlement preferences. It reflects a real absence of LSA people in the region or an incompatability between settlement patterns, the habitat and the sites.

The LSA archaeological visibility in the Subtropical Thicket north of the CFB, ca 5500 years ago, does suggest a correlation between moister, later Holocene environments and the effect they had on local population expansion. However, it first needs to be asked why Robberg and Albany artefacts are found in the eastern extension of the CFB but not in the Subtropical Thicket if the post glacial maximum climate was so mesic and warmer and encouraged rapid absolute population increase (Deacon & Thackeray 1984). The question is even more intriguing, given that the archaeological visibility of the similarly aged Lockshoek Industry in the more marginal Seacow Valley habitat of the Karoo is overwhelming (Sampson 1985:61 ff.; Parkington 1984b).

The absence of terminal Pleistocene occupation in the Subtropical Thicket may relate simply to an incompatibility between this habitat and LSA social and economic strategies at that time. If the Subtropical Thicket north of the CFB became extensively established from 14 000 to 12 000 years BP this would have greatly reduced open grassland areas to which LSA hunter-gatherer settlement strategies in the terminal Pleistocene were geared. The existence of, and preference for, more open habitats is reflected in the predominantly grazer species in the pre-Wilton fauna at Melkhoutboom (Deacon, H.J 1976:114) and such habitats obviously existed in the more varied and higher topography of the CFB. The high archaeological visibility throughout the LSA in the CFB reflects that different and changing settlement strategies could always be complemented by the variability in the habitats. To the north, in the lower Fish River Basin, however, a predominantly Subtropical Thicket would have been incompatible with settlement preferences and, therefore, unutilised.

The further delay of LSA Wilton occupation of the region inland of the CFB until about 5500 years BP as a direct response to early and mid-Holocene aridity is now addressed. The chronological profile (Fig. 3.16) conforms to the previously noted pattern of a widespread absence of LSA occupation inland of the CFB in the first half of the Holocene (Deacon, J. 1974; Deacon & Thackeray 1984; Hall, S. 1988a). Positing a direct relationship between mid-Holocene environmental amelioration and the uptake of LSA occupation within the Subtropical Thicket requires an examination of the factors which are assumed to have stopped Wilton occupation prior to the mid-Holocene. The correlation is more intriguing when the general preference of Wilton groups to more closed habitats is considered, as well as the small geographic scale between the eastern extension of the CFB and the lower Fish

River Basin. While the climatic and environmental gradients between the two areas are extremely steep, it is anomalous that changing intensity in environmental gradients was the only factor in creating a 2000 to 3000 year settlement lag over a distance of no more than 40 km.

Comparison of the oldest known basal date for LSA occupation in the lower Fish River Basin (Edgehill: ca 5500 years BP) with locally derived indicators for palaeoenvironmental change shows that there is no clear cut relationship (Fig. 3.17). The strongest signal for vegetational change occurs at around 8000 BP and the riverine habitat appears to have been in a relatively poor condition when Edgehill was first occupied. Furthermore, the first use of Welgeluk was well after the environmental change shown by the local indicators. In terms of vegetation it is postulated that the scale of climatic change from the time of the inferred establishment of Subtropical Thicket at ca 12 000 BP was not of sufficient weight to alter significantly vegetation productivity or ungulate biomass (Palmer pers. comm.) and suitability for LSA occupation.

If this is so, then the most obvious environmentally limiting factor for LSA Wilton settlement prior to the mid-Holocene could have been the availability of surface water. Reduced summer rainfall in the northern catchments of the Koonap River and the other Second Escarpment tributaries of the Great Fish River could have turned them into highly sporadic and unpredictable systems. Recent extreme drought conditions do show, however, that water is always available in these river courses at some point. This turns attention to the potential impact low and intermittent river flow could have had on fish, mussel and riverine fringe biomass. It is suggested that higher summer rainfall from the mid-Holocene increased riverine biomass and encouraged better defined and more predictable riverine protein 'patches'. These 'wet patches' must have contributed to greater habitat heterogeneity and complemented the plant carbohydrate foods and less predictable terrestrial ungulates. It is possible therefore, that increased habitat diversity within the Subtropical Thicket provided a better congruence with Wilton patch foraging strategies. Thus, a mid-Holocene amelioration and subsequent Wilton LSA occupation is related to resource adjustments which created a mix that became increasingly viable culturally. By the same token, continuous LSA Holocene occupation in the CFB indicates that the necessary variability and resource mix were maintained through the Holocene, irrespective of whether a herd animal hunting strategy on the one hand, or the Wilton emphasis on patch foraging on the other, was employed.

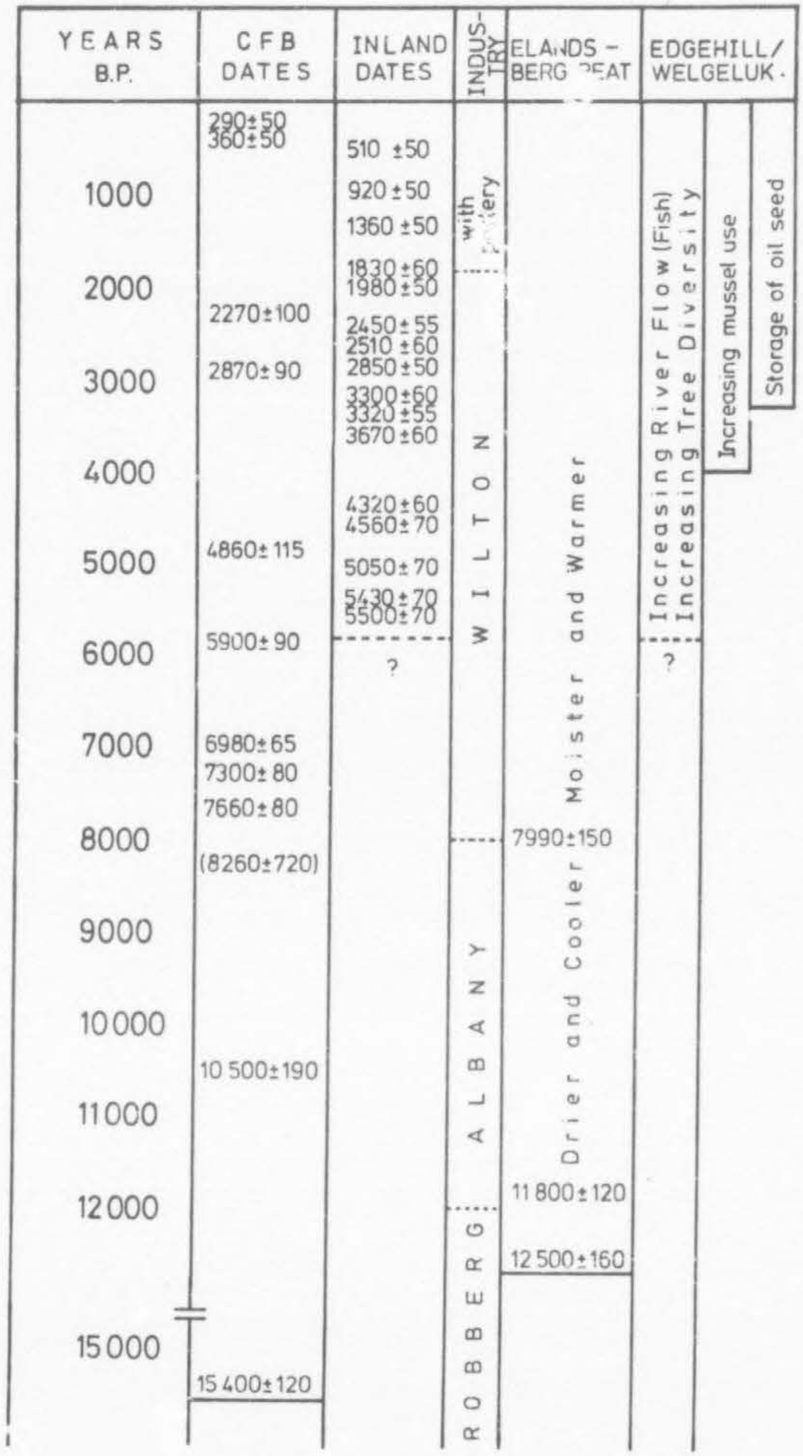


Figure 3.17. Comparison between radiocarbon dates and the palaeoenvironmental indicators

A model can be put forth linking changes in habitat heterogeneity and the new potential this offered to a Wilton economy orientated around patch foraging. It is similar to the glacial/interglacial-productivity-population-behaviour model discussed by Deacon and Thackeray (1984). In this case, however, it is applied on a much smaller scale to the development of Wilton populations and patch foraging within one specific habitat type. The linkage between environmental change and the population-settlement consequence is not seen as unidirectional and determinant, driving the system towards the archaeologically measured consequence. The orientation suggested here focuses upon the developing Holocene environment as providing a *passive potential*, which is then socially tapped. New patterns of environmental use are culturally imposed patterns which reflect the internal potentials and needs of the society itself (Faris 1975). Thus the increasing heterogeneity of the mid-Holocene environments is seen to provide a set of external conditions which are made relevant through their compatibility with a patch foraging economy.

This perspective orientates causal forces away from environmental control towards social choice and imperatives. This leads to a focus on why a specific choice is made. It is too simple only to suggest that riverine occupation is a result of Wilton groups moving into the lower Fish River Basin because conditions there were improved. It is argued here that articulation with a new habitat is made not only because people could but because they had to.

While this is all very well theoretically, what can the archaeology contribute to this discussion in terms of social imperatives, needs and demands? It is suggested that while the mid-Holocene occupation of the Subtropical Thicket reflects increasing congruence between habitat and people, it is at base a choice made also because of an increasing imbalance between the two in the more optimal area of the CFB. At Uniondale, LSA occupation intensity between 10 000 and 7500 years BP is low (Leslie-Brooker 1987:308) and although Albany settlement strategies may have laid less emphasis on shelters, it is nonetheless inferred that population density is low. In contrast, at the same site, "The most intense occupation begins about 5000 years ago" (op. cit.:309). At the Wilton site itself, it has been pointed out that there could be a considerable hiatus in Layer 3, perhaps in the early Wilton occupation at the site inferring again lower populations (Parkington 1980:80). Like Uniondale, artefact densities peak at Melkhoutboom in the Marker, Wedge and Main Bedding Units from about 6900 years ago through to the early later Holocene (Deacon, H.J. 1976:186-7). It is perhaps no coincidence that this episode of increasingly intense site use correlates with the addition of new sites in new habitats, such as Edgehill and Welgeluk, and probably new sites in the CFB itself, to the overall cultural landscape.

If the association between increasing artefact density and higher populations is in any way correct then the timing of this association also demonstrates, in a very rough way, that there is no straightforward correlation between this and the evidence for Holocene environmental change. This may have encouraged population increase but is not the only cause. I suggest that the process is tied just as much to the dynamics of an increasingly better defined patch foraging strategy which was relatively continuous in the CFB from about 8000 years BP and which reached a break point during the mid-Holocene. While this is speculative the events which occur in the eastern Cape from the mid-Holocene point to this process as one which is continually ongoing. It is through a more detailed examination of these sequences that this conclusion is reached and it is to these that we now turn.

Table 3.1. Rainfall figures for four eastern Cape stations: A=Grahamstown, B=Adelaide, C=Springfield D=Hogsback (Weather Bureau 29 & Springfield Farm records 1924 to 1950)

	Station			
Month	A	B	C	D
J	62.5	46.5	43.2	157.4
F	65.6	58.3	66.0	150.6
M	80.6	69.7	76.2	152.6
A	53.1	40.8	38.1	89.4
M	49.3	26.6	58.4	61.8
J	32.7	16.3	20.3	40.6
J	31.6	13.9	25.4	39.4
A	36.8	17.1	20.3	48.3
S	62.3	36.1	33.0	88.7
O	74.8	45.7	45.7	124.9
N	77.6	47.4	61.0	142.1
D	60.9	48.8	38.1	156.2
TOTAL	687.8	467.2	522.1	1250.0

Table 3.2. Tree species identified from Edgehill charcoal samples (Data given by Tusenius pers. comm.)

Unit	1			5			7						8					
Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Rhus spp.			x			x	x	x		x	x			x	x		x	x
Euclea/ Diospyros												x	x			x		
cf. *Acacia*				x														
Type 1	x																	
Type 2		x																
Type 3					x													
Type 4									x									

Table 3.3. Listing of radiocarbon dates pro essed in the course of this research

Welgeluk

Lab. No.	Date	Provenance
Pta-3934	510±50 BP	Base of unit 1A (SBVA)
Pta-3960	1360±50 BP	Middle of unit 1B (CH)
Pta-3984	1980±50 BP	Base of unit 1B (WFBA)
Pta-3948	2510±60 BP	Middle of unit 2 (GALWC)
Pta-3936	3300±60 BP	Base of unit 3 (HWC)
Pta-3947	4560±60 BP	Near base of unit 4B (Spit 1)

Edgehill

Lab. No.	Date	Provenance
Pta-3564	1830±60 BP	Base of unit 1 (GA 1)
Pta-3574	4320±60 BP	unit 4 (ABMNE)
Pta-3571	5430±70 BP	unit 6 (OGE)
Pta-3581	5500±70 BP	unit 8 (TLL)

Springs rock shelter

Lab. No.	Date	Provenance
Pta-4372	360±50 BP	Sq 3 unit II
Pta-4369	290±50 BP	Sq 4 unit III

Klandsberg vlei deposits

Lab. No.	Date	Provenance
Pta-4207	12 500±160 BP	Dunedin base
Pta-4318	11 800±160 BP	Salisbury base
Wits-1434	7960±100 BP	Dunedin 2,10 m organic band

Table 3.4. Welgeluk sediment analysis (from Candler 1983)

Unit	Depth	% Clay	% Silt	% Sand	% Organic
1A GVA	0,20 m	0,0	1,1	64,8	27,71
1A VBL	0,45 m	3,0	21,0	60,0	6,77
1B BOA	0,60 m	1,8	20,2	62,0	7,37
2 LGMA	0,80 m	3,0	17,5	66,5	5,52
2 GALWC	0,90 m	3,5	26,7	57,8	19,06
2 LDRS	1,00 m	3,7	26,3	60,0	7,15
3 PA	1,20 m	3,2	30,8	57,5	13,71
3 DPA	1,30 m	3,3	31,7	57,0	0,87
3 HWC	1,35 m	6,0	32,0	53,0	4,39
3 MSL	1,45 m	0,8	18,2	78,3	2,62
4B RC	1,75 m	1,8	14,7	67,5	3,82
4B SPIT 1	1,85 m	1,2	10,8	62,5	7,32
4B SPIT 2	2,00 m	0,0	0,0	77,0	4,08

Sediment definitions

Clay: 0,0020-0,00024 mm
Silt: 0,0625-0,0020 mm
Sand: 2,00 - 0,0625 mm

Table 3.5. Welgeluk: approximate sedimentation rates

Units with radiocarbon dates	Time difference	Distance	Rate
Historic dung crust to SBVA	450 years	0,20 m	25 yr/cm
SBVA to CH	850 years	0,17 m	50 yr/cm
CH to WFBA	620 years	0,20 m	31 yr/cm
WFBA to GALWC	530 years	0,20 m	26 yr/cm
GALWC to HWC	790 years	0,35 m	22 yr/cm
HWC to SPIT 1	1260 years	0,50 m	25 yr/cm

CHAPTER FOUR

SUBSISTENCE

INTRODUCTION

Even though the subsistence, artefactual and burial data are presented and discussed in separate chapters it is emphasised that the changes isolated in these 'separate' categories underpin patterns reduceable to fundamental social form and any changes evident in this. In essence, this is what Hodder refers to as 'wholeness', where underlying "...idea and belief are present, and are reproduced, in all action, however economic and mundane" (Hodder 1982:213; see also Myers 1988:272-3). The above concept of 'wholeness' is a theoretical ideal and it will perhaps be inevitable that conclusions will [illegible]es reduce 'wholeness' to more superficial functional relationships between differ[illegible]ies of data. The value of anticipating a behavioural unity which crosscuts different physical domains is particularly attractive for generating potential relationships between burial practices, for example, and 'everyday' social and economic structures. To ignore this would deny profitable comparison in which each category relates to and informs upon the other.

The previous chapter has investigated the nature of environmental changes during the Holocene and its relationship to time lags in LSA settlement between the eastern extension of the CFB and the Subtropical Thicket habitats to the north. It has been suggested that the initiation of occupation at Edgehill is part of a complex interplay between population, increasing resource definition, settlement requirements and environmental change. The primacy of environmental change in determining regional settlement patterns is downplayed because of relatively weak correlations at the local scale between the two. This has drawn attention to settlement changes as symptoms of necessity and a regional perspective indicates increasingly intense use of sites and probably more sites being occupied within the CFB and, as discussed above, to the north as well. Increasing regional settlement intensity and the use of new marginal habitats as additions to pre-existing settlements in the CFB point towards an initial stage in the intensification process as highlighted in Chapter Two.

This chapter examines the development of and changes in the subsistence resource mix specifically within the Subtropical Thicket as further indicators of intensification. This concentrates upon indicators of increasing niche-width as well as the more intensive exploitation of high biomass, low trophic level resources. Considerable attention is given to the riverine resources, especially freshwater mussel and freshwater fish. This is done because it is an aspect of the eastern Cape LSA archaeology which has received little attention in the past. I believe this is required because changes in the frequency use of freshwater mussel exploitation in particular, have been confused through drawing correlations with external influences (i.e. pastoralists). The endogenous theoretical perspective emphasised here 'frees' the data from external forces and permits discussion of intensification as an *in situ* and temporally longer term process.

The key point argued from the examination of the subsistence base and changes to it is that hunter-gatherers increasingly selected resources which provided predictable 'aseasonal' proteins in time and space. These filled in seasonal 'gaps' which could no longer be filled through mobility. Although none of the riverine resources can of themselves be seen as staple foods, it is assumed that their use reflects social changes in the way that risk was managed.

The concentration on riverine resources is also warranted when general settlement preferences in the region of the major inland river valleys are examined. Eleven other rock shelters in the region of Edgehill and Welgeluk show some traces of occupation either in the form of deposit or rock paintings. These all cluster along the riverine fringe. While geologically the immediate river banks are the most likely places at which shelters will form and survive, three other shelters located up to 5 km from a perennial water course showed no evidence of LSA occupation. The conclusion is obvious. When LSA hunter-gatherers scheduled visits to the area the main settlement focus was orientated along the river bank. Specialist trips away from the banks would have been undertaken, but predictable water and riverine resources would have focused 'permanent' camps close to the river.

The subsistence data from both sites is presented and discussed together within the general headings given below.

LARGE MAMMALS

EDGEHILL

A main feature of the Edgehill large mammal remains is their fragmentation and the low incidence of cranial bone, especially teeth. Because most of the diagnostic bone is post-cranial, the majority of bovids can only be assigned to the size classes as outlined by Brain (1974). The species list is given in Table 4.1. The Minimum Number of Individuals (MNI) counts were made by assuming that all bone in a level or layer was discrete to it. Although this procedure could inflate MNI counts, it generally still gives a conservative estimate of the absolute MNIs in a given sample (Brink pers. comm.).

From this list it is clear that browsing antelope such as grysbok and steenbok (*Raphicerus sp.*) dominate the frequencies. These species fall within the small bovid class in the post cranial remains and the picture is the same there. Small medium bovids are relatively numerous on the basis of the post cranial remains and these would correspond to species such as *Tragelaphus scriptus* (bushbuck). Bush-pig are consistently present from unit 5 and it can be assumed that most, if not all of the indeterminate suid material refers to this species as well. If so, then they provided a significant amount of meat to the diet, particularly from unit 5. The other consistent meat source is the Cape buffalo (*Syncerus caffer*).

In the large medium class, the near absence of *Tragelaphus strepsiceros* (kudu) is unusual, especially in light of the high profile currently held by this species in the nearby Andries Vosloo Kudu Reserve. Furthermore, given the emphasis in the species list on animals which favour closed, browsing habitats, the absence of kudu is more suprising. It cannot be ruled out that some individuals may be represented among the post-cranial remains alone. Allen-Rowlandson (1980), however, has suggested that the current kudu numbers are not a reflection of its traditional status in this part of the eastern Cape, which is at the limit of the kudu's range. The absence of kudu in the Edgehill large mammal fauna certainly backs up this observation and may be explicable in this light. Such an explanation, however, appears not to be applicable at Melkhoutboom where kudu are prominent, particularly in the Holocene deposits (Deacon, H.J. 1976:220).

The specific identity of the medium-to-large bovid post cranial remains is a problem given the near absence of cranial remains. Recovered and identifiable teeth can all be referred to *Syncerus caffer* (Cape buffalo). On the basis of this it seems highly probable that all the other large bovid post-cranial material can be referred to this species rather than eland (Brink pers. comm.). This is even more probable because the largest ungulate identified at Uniondale (Leslie-Brooker 1987) is also the Cape buffalo.

There does, however, remain a good deal of post-cranial bone for which specific identification remains problematical. In keeping with the stronger signal for LSA selection for the smaller territorial browsers, it is possible that the medium post-cranial remains also come from a larger browser, such as bushbuck. It also cannot be ruled out that some of this material is derived from larger grazers such as hartebeest and wildebeest, found in the more open habitats immediately to the north and west of the site. The analyst has suggested that one metapodial fragment may come from an equid. Consequently, the absence of cranial bones may be attributable to the greater distances between the kill and the home base and the effects this would have had on the body part distribution. The possible contribution of gregarious grazers to the meat diet remains speculative and somewhat puzzling, given that the presence of species such as warthog and the grey rhebuck indicate the ecotonal setting around the site. Without any evidence to the contrary, it is clear that hunting of large animals was geared very specifically to the thicket habitat.

The adiagnostic mammal bone mass per unit volume shows that the highest density of bone occurs in unit 6. Otherwise bone density is variable but with a general tendency to decline somewhat in the younger units. No time trends in species frequencies interpretable as an index of environmental change occur at Edgehill. The relatively clear terminal Pleistocene/Holocene shifts from predominantly gregarious grazers through to territorial browsers recorded at Melkhoutboom and Wilton are not apparent at Edgehill because of the maximum mid-Holocene age of the sequence. Leslie-Brooker (1987) does, however, note that at Uniondale, where the time depth may be expected to reflect this change, it is not marked and the mixed character of the large mammal fauna persists throughout the sequence. It is possible that the large bovids (Cape buffalo?) at Edgehill are better represented in units 4 and 5 and decline in number in the upper units. This contrasts with the growing importance of small browsers and suids over this same period and particularly in the ceramic unit 1. Buffalo are heavily dependent upon water (Pienaar 1969) and require a daily intake of between 30 and 40 litres and therefore would have always come into the riverine catchment around the site. Their decline cannot be explained in environmental terms. It is suggested that their greater incidence in units 4 and 5 corresponds to the high amount of bone in units 4A and 4B at Welgeluk (see below) which may be tied to active hunting in an aggregation phase. Certainly, the territoriality of the small browsers and the nocturnal habits of bush-pig indicate that 'passive' trapline or pit-fall hunting techniques were favoured rather than the bow and arrow.

The marked increase in *Raphicerus* sp. and also bush-pig in the pottery unit 1 may have implications for the nature of the hunter-gatherer and herder or mixed farmer interactions over the last 1800 years and is discussed within an appropriate context in Chapter Seven. It is also clear from Table 4.1 that carnivore remains are more abundant in unit 1. While these may be the result of natural mortality in the shelter it cannot be ruled out that pelt hunting for exchange with food-producing neighbours was an important economic activity within the contact situation.

The Edgehill large mammal fauna is, in general character, similar to the Holocene faunas identified from Melkhoutboom and Wilton (Deacon, H.J. 1976; Deacon, J. 1972). This pattern is less clear at Uniondale where the diversity of the large mammal fauna reflects in turn the diversity of habitat types within close range of the site (Leslie-Brooker 1987). Consequently, large grazers, mixed feeders and the usual smaller territorial browsers are all represented in that assemblage. Both Edgehill and Uniondale were bases from which the Cape buffalo was hunted and reflect the easy access of the Uniondale hunters to the Subtropical Thicket to the north and Edgehill's situation within this vegetation type.

One positive identification of *Ovis aries* (sheep) from the same spit level which produced the ca 1830 BP date has been made as well as other query sheep/goat and goat remains (Table 4.1).

It is difficult to quantify the Edgehill large mammal remains in terms of changes in meat contribution through time. A tentative qualitative observation, however, is that while an increasing emphasis on browsing species through time, especially from unit 6, may represent increased meat yields, it also indicates that more predictable species and more predictable methods were being used. Predictability in this instance refers to animals with highly territorial habits which can sustain relatively high cropping rates. In principle, this is no different from the increasing exploitation of freshwater mussel and fish, which is dealt with below.

WELGELUK

Large mammal bone is not well represented at Welgeluk and the cranial parts upon which most specific identifications are based are poorly preserved (Table 4.2). This is similar to the large mammal bone recovered from Edgehill, but at Welgeluk the paucity of bone and low minimum individual counts is even more marked. Although the excavation size is small the amount of identifiable cranial bone is much lower than might be expected and this also applies to a certain degree to the post-cranial bone as well.

The species list is based upon cranial parts only and was analysed by the writer using the comparative collection at the South African Museum in Cape Town. The post-cranial remains have still to be analysed but in terms of a general appreciation of the large mammal fauna it is thought that this will not significantly alter the picture.

The commonest bovids represented are grysbok and steenbok, subsumed here under *Raphicerus* spp. As noted above, the same situation applies at Edgehill. Of note is the relatively high count for *Raphicerus* spp. in the youngest unit 1A, with almost negligible numbers below except for a slight increase in the oldest unit 4B. Most of the *Raphicerus* individuals in 1A were juveniles. As mentioned above this is discussed more fully in Chapter Seven.

Unit 1A stands out from the rest of the deposits by having a relatively restricted species list, compared to the moderately fuller species diversity in the units below. It is possible that species diversity in 1A is low because of the increased impact placed on the mammal fauna through the additional hunting pressure from pastoralists and mixed farmers. Antelope in the larger size classes (bushbuck and kudu) are slightly better represented in the units below 1A. A single large bovid in unit 4A perhaps provides some confirmation of the trend noted at Edgehill where large bovids of buffalo size were more frequently represented in the older ca 4300 BP deposits.

As can be expected the species list reflects the type of browsers found in the local Subtropical Thicket. Consequently, the fauna is similar to the Holocene hunter-gatherer preference in the eastern Cape for these smaller territorial species (Deacon, H.J. 1976).

There is no clear indication that hunting during the occupation at Welgeluk ranged into the open grasslands to the north of the site. However, the paucity of bovid individuals based on cranial remains conflicts with the overall weight of bone being returned to the site, especially in unit 4B. Unit 4B has by far the most mammal bone returned to the site, but this is certainly not reflected in the minimum number counts (Table 4.2). On the basis of the bone mass more meat was being returned to the site in 4B than the counts indicate. It is speculative but this may indicate wider hunting ranges which focused also upon gregarious grazers in the open habitats to the north of Welgeluk, the distance between kill and home base influencing the body parts being returned to the site. The same may also apply to unit 4A because when large mammal bone mass is graphed per unit volume, the density in 4A is similarly high but drops off markedly in 3 and above (Fig 4.1).

The high bone mass in units 4A and 4B, is interpreted, in conjunction with the artefactual data (Chapter Five), as a further index of the site being used at that time for aggregation purposes. It is during an aggregation phase that most hunting takes place, usually in the form of First Buck rites. Meat and fat are important during an aggregation phase because more people need to be fed, but meat also plays an important part in social and ritual interaction (McCall 1970 in Wadley 1987). Seasonally, fat levels vary considerably in African ungulates in response to fluctuations in grazing quality and the reproductive cycle. Both the blue wildebeest and impala show sharp drops in body fat levels in winter as measured by a kidney fat index (Brooks et al. 1977; Brooks 1978) and to a certain degree this applies to other species as well. If grazers were hunted at all, it can be speculated that summer would be favoured, during which time animals are in good condition and a combination of quality carbohydrate and fatty meat was available. Both are important components in a balanced diet (Speth & Spielman 1983). The 'sweeter' quality of the Eastern Province Thornveld during winter possibly eases fat drop off, but this may be complicated by ungulate density increases as small 'sweetveld' patches concentrate game during winter.

Fat drop off in browsers in the Subtropical Thicket during winter is less marked and body condition can be retained at a good level all year round (Palmer & Drager pers. comm.). The close proximity of both prime grazing and browsing habitats indicates that a number of large mammal protein options were available to hunter-gatherers in the area. Fluctuations in animal species could theoretically be examined in relation to combinations of social and nutritional requirements. That such nutritional factors were recognised is evident at Boomplaas, in the southern Cape, where a series of relatively large charcoal filled features are interpreted as smoke pits for drying meat (Deacon, H.J. 1979:251). It is plausible to suggest that such activities would be pursued when the ungulates were in prime summer condition. Drying in turn implies storage and delayed consumption at a later time when either availability or nutritional quality, or both, is reduced.

Two secure identifications of sheep have been made with one individual in each of the pottery units.

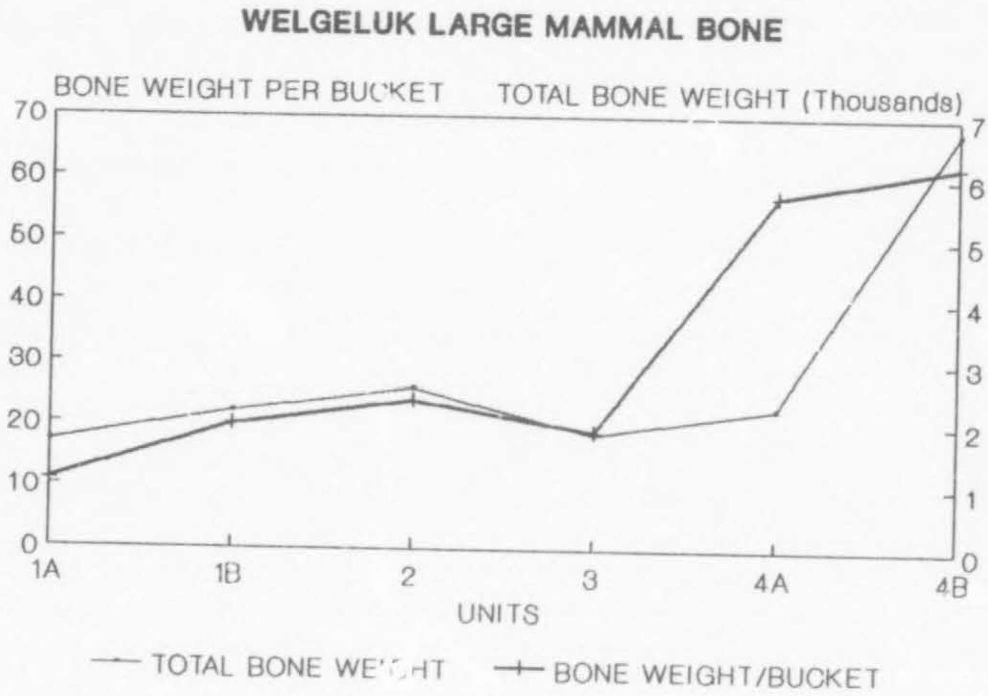


Figure 4.1. Welgeluk: the distribution of large mammal bone weights

SMALL ANIMALS

TORTOISES

Hunter-gatherer groups using both Edgehill and Welgeluk collected and consumed relatively large numbers of tortoises. This is not suprising, because species diversity and numbers are high in this part of the eastern Cape (Greig & Burdett 1976). Four species have been identified of which the 'padlopertjie' (*Homopus areolatus*) and the rooipens (*Chersine angulata*) are the best represented. Also present are the mountain tortoise (*Geochelone pardalis*) and the freshwater turtle (*Pelomedusa subrufa*).

Tortoise limb bones, particularly the femur and humerus, upon which MNI counts have usually been made, are difficult if not impossible to separate into species. Although analysis of the limb bones was undertaken, better MNI counts can and have been made from sorting and counting the bones of the plastron (the belly plates of the tortoise). Furthermore, distinctions between the two best represented species, the padlopertjie and the rooipens, can easily be made on any of the plastron plates, while the turtle is also easily identified on both limb and plastron bones (Hall, S. 1985; Leslie-Brooker 1987). In many cases the complete plastrons of one individual are reconstructable which indicates that the MNI counts are an accurate reflection of tortoise abundance in the area excavated. The mountain tortoise was present in low numbers and identification was based on the size of bones and on distinguishing features of the nuchal scute. The MNI counts represent the most frequently occurring bone for each species for the whole excavation.

The tortoise raw frequencies at Edgehill show no clear time trends, apart from the obvious increase in the padlopertjie and rooipens in the pottery unit 1. However, when densities of tortoise bone are examined it is clear that the unit 1 jump in frequencies is not present (Table 4.3). Density figures also show that the highest value occurs in unit 7, with a sharp decline in units 6 and 5 but thereafter density clearly and significantly increases.

Whereas the smaller tortoise species at Edgehill were represented by relatively complete plastron and limb bones, the bones of the large mountain tortoise were extremely fragmented and no contiguous plastron plates were found. This may indicate that the counts in Table 4.3 under-represent the contribution of this animal to the protein diet because it was butchered in the veld, and only the meat returned to the site.

The fresh water turtle, which is still abundant in the Koonap River today, must have been a more elusive animal to trap. Its consistent presence throughout both sites is of interest because Lee records that the Dobe !Kung ranked two species of turtle in Class 4 (not eaten) in an edibility classification (Lee 1979:229). The placement of a complete turtle carapace with Welgeluk Burial 2 (Hall & Binneman 1987: Appendix I) does, however, indicate that the animal was used in other contexts. That it was eaten is suggested by an observation of John Barrow in 1799. Travelling in the vicinity of Graaff Reinet towards the end of September, arrival at the Sundays River revealed that it was "...nearly dry, which gave our people an opportunity of taking plenty of turtle with great ease. These when full grown, are in size generally about a foot in diameter; the females are exceedingly prolific in eggs, and the flesh is by no means wanting in flavour" (Barrow 1806:187).

Barrow's observation raises interesting points about riverine settlement and exploitation in general. Apart from the probability that LSA settlement was geared towards riverine habitats during winter because of the paucity of surface water away from them, the low river levels also provide the added attraction of easier access to resources such as the fresh water turtle. The mention of females ripe with eggs also adds another attractive element to both the winter/spring exploitation of both turtles and tortoises (Branch pers. comm.).

At Welgeluk the same tortoise species were exploited (Table 4.4). The padlopertjie (*Homopus areolatus*) was also the commonest animal taken. Raw frequencies indicate no significant time trends but density calculations show slightly more tortoise per unit volume of deposit in units 3 and 4A. Comparison with Uniondale (Leslie-Brooker 1987) shows that tortoises were also exploited at this site but apparently not to the same extent. Uniondale's locality militates against the exploitation of the fresh water turtle but the species *Psammobates tentorius* is present in sub-member QR but is absent at both Edgehill and Welgeluk. This species is uncommon in the region today, preferring more karroid conditions. This fact may account for its presence at Uniondale because sub-member QR probably dates before the ca 5500 BP age at the base of Edgehill and therefore perhaps correlates with a more karroid local environment.

FRESH WATER MUSSEL

Although the Cape clawless otter and water mongoose both eat freshwater mussel, they are consumed on rocks in the river or on the river bank, sometimes associated with a rock/anvil upon which they are broken open (Jubb 1980, 1981; pers. observation). While some confusion may well arise in the separation of hunter-gatherer and otter mussel middens in open contexts, the dominant agency of mussel accumulation in rock shelters must be man.

Freshwater mussel (*Unio caffer*) occurs in all the units at Edgehill except the basal unit 8 (Table 4.5). The most significant time trend in the raw frequencies as well as the density calculation indicates increasing mussel exploitation from unit 4. This pattern has been noted previously at other CFB LSA sites (Deacon & Deacon 1963; Deacon, J. 1972:38; Deacon, H.J. 1976; Leslie-Brooker 1987) and has been interpreted as a shift away from coastal resources, towards greater utilisation of those inland. Within this scenario, increasing competition by pastoralists for the coastal areas has been suggested as a cause. However, if the Edgehill data are examined, the increasing exploitation of freshwater mussel begins well before the arrival of pastoralists in unit 4 at some 4300 years ago. The influx of pastoralists may have exacerbated a trend which was already underway but the primary explanation for the increase in this resource has to be found elsewhere.

Freshwater mussel frequencies at Welgeluk show a marked increase from units 4A and 3 (Table 4.6). This increase correlates with the same trend noted at Edgehill and elsewhere. The significant depth and hence better resolution of the Welgeluk pottery sequence shows, however, that freshwater mussel frequencies do not continue to increase in the pottery units. Frequencies in fact decline from a high in unit 2 of 488 individuals to 32 in the upper pottery unit 1A (Table 4.6).

In this instance, the scenario of LSA hunter-gatherers being forced to exploit freshwater mussel only upon the arrival of food producers, or increasing their exploitation of this resource once they had arrived, is not supported. The mussel decrease in the pottery units at Welgeluk may equally be seen as hunter-gatherers being outcompeted for this resource by pastoralists or being denied easy access to the riverine fringe. Certainly the large freshwater mussel middens with pottery occurring on the banks of the middle and upper reaches of the Fish River demonstrate that pastoralists made extensive use of this resource (pers. observation).

The increase in freshwater mussel exploitation at Welgeluk from unit 4A at ca 4000 BP (Table 4.6) correlates well with the similar increase evident at Edgehill from unit 4 at ca 4300 BP. Further afield at Uniondale, freshwater mussel valves are recorded from all units above T and show an increase from unit L (ca 4000 BP?: Leslie-Brooker 1987). This is similar to the trend already noted above. The presence of freshwater mussel at Uniondale is seen more in terms of raw material for barter items than directly representing food waste

The distance of the site from suitable riverine habitats makes this a reasonable inference. However, the increase is seen as a response to better riverine conditions and higher run off. When it is remembered that there is a possible improvement in river conditions from ca 5000 BP the above suggestion may seem plausible. However, when the freshwater mussel increase is examined in conjunction with other lines of subsistence and artefact evidence, an environmental explanation for the freshwater mussel increase is considered unlikely. Equally, the drop off in mussel in the pottery units at Welgeluk could also be explained in environmental terms but there is no evidence for this. Again the cause lies in more competition for the riverine habitat.

It is useful to return to Barrow's quote above (Barrow 1806:187) for suggestions as to the optimal time of year during which freshwater mussel exploitation was most viable. No doubt, freshwater mussel could be collected at any time of the year, but common sense suggests that low river conditions during winter and early summer would provide easier and more predictable access to this resource. Detailed seasonal work on freshwater mussel from middle and late Archaic sites in North America has demonstrated a predominantly spring to fall collecting strategy when river levels render the resource more accessible (Claassen 1986; Klippel & Morey 1986:808).

Access to freshwater mussel probably was a factor in its exploitation. Consequently, the late Holocene increase could be tied to an increasing emphasis on scheduling riverine visits during the winter months. However, the mussel increase is archaeologically visible in diverse and widespread habitats, including the CFB sites and more obviously at Edgehill and Welgeluk. This indicates, rather, a regional process that has less to do with changes in scheduling visits than with absolute reductions in mobility. It is suggested that the increase in freshwater mussel is best examined in terms of its changing role to the LSA hunter-gatherer diet in relation to changes in population density, decreased mobility, increasing circumscription and definition of territorial areas and longer seasonal occupations of fewer sites through an annual cycle. In order to examine the possibilities in this relationship some discussion on nutritional stress and the nutrient value of shellfish is required.

It has been suggested that if the Dobe !Kung suffered from a 'hungry season', it falls in the spring dry season, after food resources have been gradually depleted through the winter and before the summer rains can rejuvenate the landscape. According to Truswell and Hansen (1976:194) "...the only nutritional weakness of the San's diet is a shortage of energy (calories) usually in the spring dry season". Further investigation of this question by Lee (1979) provided little evidence to show that a reduction in San body weight (as an index of nutritional stress) occurred during the predicted early spring period. Lee found instead that there was a low point in body weight in January, although this is complicated by the different physiological demands and requirements of different age cohorts and between the sexes at different times of the year. This body weight reduction is in the order of 1-2% but is relatively small in comparison to the pre-harvest weight loss of 4 to 6,5% experienced among some agriculturalists (Lee 1979:301).

San weight loss in January is at odds with the prevailing resource conditions at that time which is one of increase and abundance. In explaining this logical discrepancy Lee examined his measured sample in relation to their degree of mobility and came up with an important insight. January for the !Kung San is the time of maximum dispersal. Small groups concentrate their efforts around temporary water holes which are points of access to the surrounding environmental abundance. Lee admits that his body weight study did not reach these dispersed !Kung, but concentrated on San who elected to remain at the permanent waterholes where nutritional stress was experienced after food in the catchment areas became scarce. This focus on largely sedentary San highlights the importance of hunter-gatherer mobility as a strategy for maintaining calorific requirements and nutritional balance and quality. Hitchcock (1982) has also noted that among the Nata River Basarwa, increasing sedentism has altered demographic patterns and created nutritional problems. Simply put, mobile San experience little if any nutritional stress. This ethnographically derived relationship between decreased mobility and nutritional stress is of value in the examination of the freshwater mussel increase after the mid-Holocene in the eastern Cape. What, though, would the nutritional value of shellfish have been to these LSA hunter-gatherers? What was being intensified or compensated for: a shortfall in protein, carbohydrates or mineral supplements?

Explanations for the general post-Pleistocene increase in both marine and freshwater shellfish exploitation have been sought in terms of population increase, population pressure and the need to maintain key dietary components, particularly protein, in the face of these pressures (Cohen 1977; Osborn 1977:161). This resource stress model points out that some radical explanation is required because protein weight comparisons demonstrate that the amount of shellfish required to equal the protein equivalent of a single terrestrial animal is enormous. This leaves one asking why bother with shellfish at all? Osborn, for example, calculates that one whitetailed deer provides about 32 kg of edible meat (approximate African equivalent would be a male warthog at 39 kg: Lee 1979:230). This value is equivalent to collecting and processing 83 422 shellfish (Osborn 1977:172). While Erlandson (1988) thinks that some of Osborn's calculations quantitatively misrepresent the extremes between terrestrial bovid and shellfish protein contribution equivalents, he agrees that extra protein is the primary dietary component being selected for. He also suggests that this would apply more so when relatively good carbohydrate rich plant foods are available as a dietary complement. He also draws a relationship between shellfish use and an increase in sedentism.

> A protein perspective suggests that there may be nothing inconsistent with large shell middens reflecting relatively sedentary occupations where shellfish served as a long-term dietary protein staple (Erlandson 1988:106).

When the nutritional makeup of shellfish is considered, the protein perspective is plausible because shellfish generally are a poor source of calories. Two North American freshwater mussels (Pink Heel-Splitter and the Mucket) average about 65 calories for every 100 g compared to up to 218 calories for terrestrial animals. Protein values are about half those of terrestrial resources, fat is very low but carbohydrates are present but is absent in the other animals (Parmalee & Klippel 1974:431). If these values are in any way similar to *Unio caffer*, it suggests that any increase in shellfish exploitation is selecting specifically for protein.

This has been countered by Claassen (1986), who suggests that the increasing importance of shellfish exploitation has to do primarily with shellfish as a seasonal staple food. Furthermore, her contention is that it is the carbohydrate value of the resource which is important, because during the spring fast growth period, carbohydrate levels are high and a viable source. These levels, on the approximate values given above, are still low and when placed within the whole resource 'pool', it appears unlikely that hunter-gatherers had to intensify carbohydrate intake outside of the plant food components.

The seasonal carbohydrate question is critical for high latitude North American hunter-gatherers and in such a context any late winter and spring supplements would be critical to health. Speth and Spielman (1985) emphasise that hunter-gatherer health is threatened at times of the year when there is little dietary choice beyond lean, low fat meat and when carbohydrates are poorly supplied. When reasonable levels of fat and carbohydrate are available, metabolism of body protein is spared and consequently, health remains good. When hunter-gatherers are "... under conditions of marginal calorie, protein, or glucose intake the protein sparing effect of carbohydrate is much greater than that of fat" (Speth & Spielman 1983:14).

Using this perspective Noli and Avery (1988) have pointed out that models of coastal exploitation which highlight a dominant subsistence role for shellfish are nutritionally unsound and that dietary diversity would have been essential if protein poisoning was to be avoided. It seems improbable that freshwater mussels are sufficiently high in quality carbohydrate to have been selected for purely in these terms during the later Holocene in the eastern Cape, particularly given the good evidence for extensive exploitation of plant food carbohydrate staples (Deacon, H.J. 1976).

This discussion on the nutritional quality of shellfish also needs to consider a third factor in increasing shellfish exploitation after the mid-Holocene. Parmalee and Klippel (1974) and Klippel and Morey (1986) emphasise that shellfish are relatively poor resources when looked at from a protein, carbohydrate and fat point of view. They do point out that few other resources in hunter-gatherer diets could have matched shellfish in terms of important vitamins and minerals. They are high in iron and calcium as well as phosphorous, sodium and potassium (Klippel & Morey 1986:809). In this regard freshwater mussels can also be seen as important qualitative supplements to the hunter-gatherer diet.

The amount of shellfish recovered from Edgehill and Welgeluk does not encourage a view of this resource being a staple food, but on the other hand, amounts are great enough to elevate the resource out of a purely vitamin support role. On this basis it is suggested that the post mid-Holocene mussel increase does signal a hunter-gatherer demand for more protein, with the qualitative mineral and vitamin additives as another advantage. When considered in conjunction with the other food waste, it is clear that it provides one of several additions to the diet.

In searching for possible causes for this increase the relationship between absolute population increase has been put forward as well as correlations between nutritional stress and sedentism and shellfish exploitation and sedentism (Osborn 1977; Lee 1979; Erlandson 1988). All these factors are considered important in contributing towards the shellfish trend but the emphasis is placed on the relationship between decreasing mobility ranges and intensification. Increasingly higher populations decrease settlement options which in turn require that perhaps smaller territorial ranges have to be defined in order to maintain a predictable structure to the economic and social landscape. Subsistence risk is therefore increasingly transferred from mobility and the social practices which facilitate it, to intensifying and defining specific landscape 'patches' at both a regional and local scale.

Ethnographically, Hitchcock's work among the Nata River Basarwa provides backup for these assertions, particularly with regard to increasing sedentism. This material is used advisedly, given the association of sedentism with food producer contact (Hitchcock 1982; Hitchcock & Ebert 1984). Nevertheless, he does state that there is a good deal of oral history which points to relative sedentism among a number of eastern Botswana Basarwa before both the Bamangwato and British were factors in the region. Based in part on the ecological diversity of the Nata region Hitchcock notes that residential mobility declined as regional population saturation was approached. Range size is small compared to other Kalahari San groups and population density is higher (Hitchcock & Ebert 1984:336). Storage of wild plant foods is also undertaken.

Most importantly, the erosion of residential and logistical space increased competition between groups and sharing shifted from generalised to a more balanced reciprocity in which economic ranges become increasingly impermeable to other groups (Hitchcock 1982). Birdsell (1953:185-6) draws attention to the extremely reduced territorial ranges and high population densities of Australian Aborigines along the lower Murray River. Significantly in this example, it is the 'unearned' river water and the food base it supports which is important because the adjacent territory is extremely arid.

The archaeological interpretation presented so far may appear unwarranted when viewed quantitatively against the shellfish increase after the mid-Holocene. It is maintained, however, that these shifts do monitor these demographic trends. The case can be strengthened when other aspects of the resource mix and artefact assemblages are examined.

One last attribute of freshwater mussel needs to be mentioned in this regard. Increasingly limited mobility and scheduling options suggest that occupation at perhaps fewer sites is lengthened and stretched beyond the seasonal availability and capacity of 'traditional' resources to sustain this. Consequently new resources such as shellfish are selected because they are 'aseasonal' and allow longer lay-overs at specific sites. Whereas, in highly mobile hunter-gatherer economies the end of summer decline in essential protein, mineral and vitamin sources can be compensated for by relocating, any pressure which reduces the possibility of a successful relocation will be translated into alternative strategies. In the eastern Cape selection for shellfish underpins the logic behind these strategies which require resources that provide high sustainable yields, high predictability and perhaps most importantly, are evenly available throughout the year. Specifically it is suggested that resources which permit extended occupations into winter are of importance.

The argument so far is based on a changing in later Holocene LSA emphasis on only one food item. The argument is now examined in the light of the other dietary components.

FRESHWATER FISH

Of the five known fish species in the Koonap River, four were exploited by the LSA occupants of Edgehill and Welgeluk. Hunter-gatherers are considered to be the main if not the only depositing agency. Most leguaan scats (*Varanus niloticus*) predominantly preserved crab remains with little fish bone. These are found on rocks in the river or upon the bank and never in rock shelters. The fifth species is a small minnow (*Barbus anopalus*), which could have provided an extremely high biomass during spawning. If exploited its small size militates against any recovery of the remains.

The analysis of the fish bone was comprehensive. All diagnostic body parts were identified and separated into right or left elements and the highest figure was used as the MNI count. This method in all likelihood gives a conservative estimate because it was obvious when measuring some of the *Labeo umbratus* bones that although left and right bones may give similar totals, only a few of the rights and lefts matched in size, thereby indicating that individuals would have been 'lost' by the right/left counting procedure. No one bone had the same degree of representation in all the species. For *Labeo umbratus* the pleural rib of the 4th vertebra consistently gave the best counts, whereas for *Sandelia bainsii* the best counts were obtained from the cleithrum.

The species lists for Edgehill and Welgeluk are given in Tables 4.5 and 4.6. The total at Edgehill is much lower than at Welgeluk. The excavations are similar in size and this difference may be attributable to the greater distance between Edgehill and the main river. Both tables show that the mud-mullet or moggel, *Labeo umbratus*, is the commonest species. This is a simple reflection of its greater natural abundance and biomass in the river compared to the other species and does not reflect cultural preference or a specific discriminating technology. The smaller *Sandelia bainsii* (rocky) is the next most numerous fish followed by the eel and the freshwater mullet. The raw frequencies for total fish at Edgehill show that in units 4 and 5, few fish were being returned to the site while a distinct peak occurs in unit 7. From unit 4 and above there is a marked increase in fish exploitation (Table 4.5). At Welgeluk (Table 4.6) fish are relatively abundant in the basal unit 4B, decline in 4A but thereafter, like freshwater mussel, increase sharply in frequency. Fish drops off somewhat in the top two pottery units. The main interest in the freshwater fish frequencies is that, like freshwater mussel, it was increasingly utilised by LSA hunter-gatherers from about 4000 BP.

The identification of the freshwater mullet at both sites is of some interest because it does not occur in the Koonap River today. This fish does not breed in freshwater, but migrates downstream to estuaries whenever river flow permits and spawning takes place within the surf zone at the mouth. After spawning, both adults and juveniles move back up the river (Bok 1979, 1984). This catadromous habit, in which a freshwater cycle is essential for the fish's propagation has been badly disrupted through the construction of weirs which block migration. Bok (1979) has recorded this species 110 km up the Fish River from the estuary mouth and its presence at Edgehill and Welgeluk extends its known range by well over 100 km. The presence of the freshwater mullet in all units at both sites except unit 4 at Edgehill suggests that there was always sufficient flow to allow movement through the system. It is of interest that no eel have been recovered from unit 4 at Edgehill either, another species which requires consistent flow to migrate upriver from the sea. The measurement of *L. umbratus*, bones and the changes evident in the size of the fish have previously been discussed in Chapter Three in connection with palaeoenvironmental change. No size changes are noted in *L. umbratus* through time at Welgeluk and the younger basal chronology of the site accounts for this.

No specific fishing 'kit' was identified from the artefacts and certainly no bone "hooks" as identified at Driel Shelter in Natal (Maggs & Ward 1981); or by Carter (1978) and Opperman (1987) from the southern Drakensberg, were found. If the identity of these artefacts as fishing hooks is correct, it is improbable that they were effective for catching *L. umbratus* anyway. This species feeds by dredging bottom muds for algae and microscopic animals (Jubb 1967) and consequently the mouth parts are small, ventrally orientated and sucker like. Bone points may have doubled as harpoons, but this is unlikely given the extreme turbidity and bad visibility in the rivers north of the CFB. "Mats", acting as nets, are described by Thompson along the Orange River (Thompson 1827 II:64) while Lichtenstein (1812 II:55) observed the use of pointed baskets. Barrow (1806:246) also mentions "...baskets placed in the river for the purpose of taking fish". It is not unreasonable to suggest that such traps were used by the LSA occupants of Edgehill and Welgeluk to catch fish, though the good preservation of plant material at Welgeluk provides no direct evidence. Lichtenstein (1812) also reports from the Orange River that stone fish traps were also built. Suggestions as to the technology employed in fish capture may be pointless when the vulnerability of *L. umbratus*, in particular, to collection during summer spawning or winter low water levels is considered. In this light freshwater fish are locationally predictable and can be extensively exploited at any time of the year and still maintain a high sustainable yield. Essentially no technological elaboration beyond either picking the fish out by hand or stunning them with rocks is required. This applies equally to periods of low river flow as well as spawning (pers. observation).

Spawning runs appear, at f[illegible] o have been attractive events for hunter-gatherers to intercept. Parkington (1977, [illegible] eculates that summer spawning of fish along the Olifants River in the western Cape would have been a valuable addition to the diet of hunter-gatherers scheduling their visits to these areas at that time. No fish bone has been recovered from excavations at Andriesgrond and this possibility remains untested.

The potential of spawning runs of *L. umbratus* to LSA hunter-gatherers along the Koonap River must have been no less attractive a proposition. Spawning takes place in early summer when it is triggered by the first strong summer flows (Gaigher et al. 1975). Although a large percentage of mature adults will congregate, migrate and spawn at this time, a smaller percentage can delay spawning until later in summer, an adaptation which spreads the risk if the early spawning episode fails. Spawning usually takes place on newly flooded ground as the fish move out of the main river channel. Up-river migration is not essential, but fish can migrate considerable distances, especially to repopulate the river after drought. Only one spawning event of *L. umbratus* has been recorded and published. This was observed during a November flood of the New Year's River just to the west of Grahamstown (Jackson & Coetzee 1982). The fish massed and spawned on flooded grassy banks and the density was such that three quarters of a ton were collected over a short period. The whole episode was completed within forty hours.

While exploitation of spawning runs appears to be a logical subsistence pursuit and something for which to schedule riverine visits, the Koonap River and other similar systems are, within certain limits, unpredictable and consequently the scale and timing of spawning would have been difficult to anticipate. Furthermore, there would seem to be little utility in having a short term super-abundance of fish when there is no evidence to show that drying and storage of this resource was undertaken. Mention has already been made above of Barrow's observation that winter low water levels in the Sundays River facilitated easy exploitation of turtle but he also notes that "...the river abounds with short thick eels..." which presumably could also be more easily caught at that time (Barrow 1806 I:187).

Along the Fish River in Namibia Du Pisani (in Robertshaw 1979) recorded that Nama pastoralists move to the river banks between September and January. This is primarily to offset the lack of water and grazing away from the river during that time of year. Fishing is also undertaken at this time. Men built stone fish traps in shallow pools into which the fish were driven. Thompson mentions how fish could be caught easily along the Orange River after they had been stranded in pools. Low water level is repeatedly mentioned as a significant factor in any riverine exploitation and for the Koonap this means that the more favourable time of year for LSA hunter-gatherers would have been during the winter and early spring months.

In this regard, the fish species caught by the LSA inhabitants at Driel Shelter on the Tugela River in Natal are relevant (Maggs & Ward 1981). This site is considered to have been occupied during winter and the fish recovered from the site add weight to this interpretation. Fishing by the LSA occupants at Driel was apparently undertaken with bone hooks and the dominant species identified is *Barbus natalensis*, which can be caught with this method. The second species is *Labeo rubromaculatus*, which is not easily caught using a hook. In this instance the technology has selected heavily for *Barbus natalensis* because *L. rubromaculatus* is numerically the dominant species in this particular system (Cambray pers. comm.). This suggests that the fish were not taken from spawning runs, because hooks would not have been an inappropriate or necessary technique in that context. The *Labeo* species would also be present in much higher numbers. Also of interest is that only moderate sized fish were caught. This suggests winter occupation because the shallow and cold water would have driven the larger individuals downstream (Maggs & Ward 1981).

It appears that no matter what the riverine setting, evidence derived from early travellers, fish ecology and the archaeology point to winter as a more optimal time for fish and riverine exploitation in general. A study by Limp and Reidhead (1979) on the harvestability among other things, of freshwater fish from low water level ox-bow lakes in the Great Miami River, demonstrated the extremely high yield in terms of fish mass/man-hour labour investment especially when compared against the yield for hickory nut production. They emphasise that high fishing efficiency is tied to slacks and sloughs out of the main channel, a situation which is comparable to low pools in the main channel of the Koonap River during the winter months.

Access and predictability aside, it is also worth considering this possibility from a nutritional perspective. Most southern African fish species of economic value to LSA hunter-gatherers are extremely bony, but provide good quality protein. This is evident in the efforts being placed upon providing alternative protein sources by controlled mass production through fish farming. The high fecundity and reproductive capacity of species such as *L. umbratus* and the large catfish, *Clarius gariepensis* are particularly appropriate in this regard. While alternative protein sources provided by fish were an obvious attraction to LSA hunter-gatherers, the annual reproductive cycle also significantly changes fish fat levels.

After spawning and particularly during the winter months *L. umbratus*, for example, reduce their feeding levels and become largely 'sedentary'. During this time, however, they convert a significant amount of their body weight into fat. In a study undertaken on fish from P.K. Le Roux Dam (Gaigher et al. 1980) it was found that in both mature male and female *L. umbratus*, fat is abundant in July and relatively high in October. The lowest fat levels were recorded in January (Gaigher et al. 1980:106-7, 199). This winter fat store is rapidly resorbed in spring when energy is required for gonad development, as well as the physical effort of spawning itself. This fat store is known and eagerly utilised by local residents, as witnessed by its extraction from barbel along the Orange River (Cambray pers. comm.).

As with the freshwater mussel, it is reasonable to suggest that the seasonal optimality of freshwater fish, particularly *L. umbratus*, increased in winter when the availability and nutritional quality of other resources may have dropped off. If carbohydrate and fat supplies decrease, the fat and protein obtained from freshwater fish could have maintained nutritional quality in the leaner months. The increase in freshwater fish exploitation at both sites from about 4000 BP is interpreted in the same way as the increased freshwater mussel exploitation. LSA hunter-gatherers were increasingly restrained within smaller foraging ranges and any nutritional stress had to be solved at a more local level rather than depend upon larger scale seasonal movement. Freshwater fish provide a supplement which contributes, as do freshwater mussel, towards solving this problem.

Although optimal fishing conditions may have been during winter, a time which also coincides with high fat reserves, it is obvious that freshwater fish can also be exploited at any time of the year. It is also 'aseasonal'. This suggests that freshwater fish exploitation also points towards longer time periods spent at sites before new residential moves were undertaken. In this regard it is possible that LSA hunter-gatherers were either staying on at Edgehill and Welgeluk for longer periods of the winter months or that increasing elaboration of resources within a traditional riverine winter scheduling strategy was developed.

Obviously the indications for increasing exploitation of freshwater mussel and fish are best documented at sites such as Edgehill and Welgeluk which are more optimally located with regard to a riverine system. With increasing distance between river system and the settlement focus, archaeological indications of riverine resource use fall off. At the CFB sites this is largely correct. Nevertheless, the freshwater mussel frequencies are of sufficient size to have led workers to recognise their increasing exploitation through time, even though the better resolution allowed through the Edgehill and Welgeluk sequences shows that the chronology of this pattern is more complex than originally thought (Deacon, J. 1972; Deacon, H.J. 1976; Leslie-Brooker 1987). The presence of freshwater fish remains in the CFB sites is scarce to non-existent. Vertebra are present at Wilton (Deacon, J, 1972) and this could be expected given the site's proximity to the New Years River. From the material excavated by Hewitt and others from Welcome Woods, Spitzkop and Hellspoort, further fish remains have been identified. Although no values can be placed on the changing importance or the chronology of these remains they do indicate a widespread regional interest in riverine resources. Furthermore, if the Edgehill and Welgeluk sequences are seen as baselines for patterns in Holocene LSA riverine exploitation, it is not unreasonable to extrapolate this pattern into the wider regional scale.

OTHER ANIMAL FOOD RESOURCES

At both sites amphibian remains are present but no counts have been undertaken. Samples are small and they do not appear to be a significant part of the diet, if in fact they were brought to the sites as hunter-gatherer food and not by some other agency. Species identified are the bullfrog (*Pyxecephalus adspersus*) and the platana (*Xenopus laevis*).

Freshwater crab (*Potamon perlatus*) is well preserved at Welgeluk but less so at Edgehill. Counts were made on left or right mandibles (Table 4.6). As with freshwater mussel and fish frequencies, there is a marked increase in crab in unit 3 and in particular in unit 1A. Although under certain conditions crab remains do not preserve well, the trend noted at Welgeluk is culturally significant and not a reflection of decreasing preservation with depth. As noted above for fish bone, the contribution of crab to the cave fill through the scats of leguaan is considered unlikely.

At both sites large numbers of ostrich eggshell fragments (OEF) were recovered which presumably were brought in initially as food. At Edgehill (Table 4.5) OEF frequencies are high in units 3 and 4 and significantly so in unit 1. When density of OEF is calculated, however, the unit 1 peak is much reduced while the peaks in units 3, 4 and 7 are increased.

At Welgeluk OEF are well represented in the basal unit 4B but drop to almost nil in unit 4A (Table 4.6). This may be related more to bead manufacture than to subsistence and the marked drop-off between units 4B and 4A has to do with changes in site use related to aggregation and dispersal between 4500 and 4000 BP. This is discussed in the following chapter. Further examination of the OEF frequencies show, however, that there is a significant increase after unit 3. Of further interest is the parallel increase in burnt OEF (Table 4.6; Fig. 4.2). While speculative, this may indicate an increasing emphasis on ostrich eggs as food and the charring relates to preparation. Even though unit 4B has the highest amount of OEF, significantly only 6 pieces are burnt and the associated artefacts suggest strongly that the primary purpose of ostrich eggshell use in 4B was in a social/ritual context. It is suggested that the ostrich eggshell peaks in unit 4B at Welgeluk and in units 3 and 4 at Edgehill are correlated.

THE ANIMAL RESOURCE MIX: DENSITY COMPARISONS

The densities of the major animal foods identified at both sites are graphed in Figures 4.3 (Edgehill) and 4.4 (Welgeluk). These are of interest for the summary they provide of the main trends as well as contrasting trends in different resources. At Edgehill all animal food waste is relatively low in unit 8 compared to the units above. Freshwater mussel, however, was not exploited in unit 8. It is suggested that this reflects a combination of a low pioneer population density and perhaps relatively high mobility in which occupation episodes were short. Unit 7 is of interest for all major animal food waste counts increase sharply, except freshwater mussel. The fact that fish was readily exploited indicates that ephemeral mussel collecting was culturally and not environmentally determined. It is reasonable to suggest on the basis of the animal food waste that by 5500 BP population had increased or occupation of the site was now on a more regular basis and for longer periods of time.

After unit 7 the rough covariance between all animal food resources ceases and it is apparent that different resources are given different emphases. The essential contrast is between large mammal bone which increases in unit 6, and tortoise, fish and to a lesser extent mussel exploitation, which all markedly decrease through to unit 4. While large mammal bone does fluctuate downwards in unit 5, the subsistence emphasis appears to be placed on them, in contrast to the other animal foods. Even if one assumes that plant foods were also exploited, the resource mix between unit 7 and 4 (ca 5500 to ca 4300 BP) suggests that most of the protein was derived from the large mammals with lower contributions from the other animal resources.

From unit 4 (ca 4300 BP) the contribution of fish, mussel and tortoise significantly increases. Large mammals are still important but there is an indication that, in relation to previous units, exploitation of them declines. It is in the time period represented in the deposits

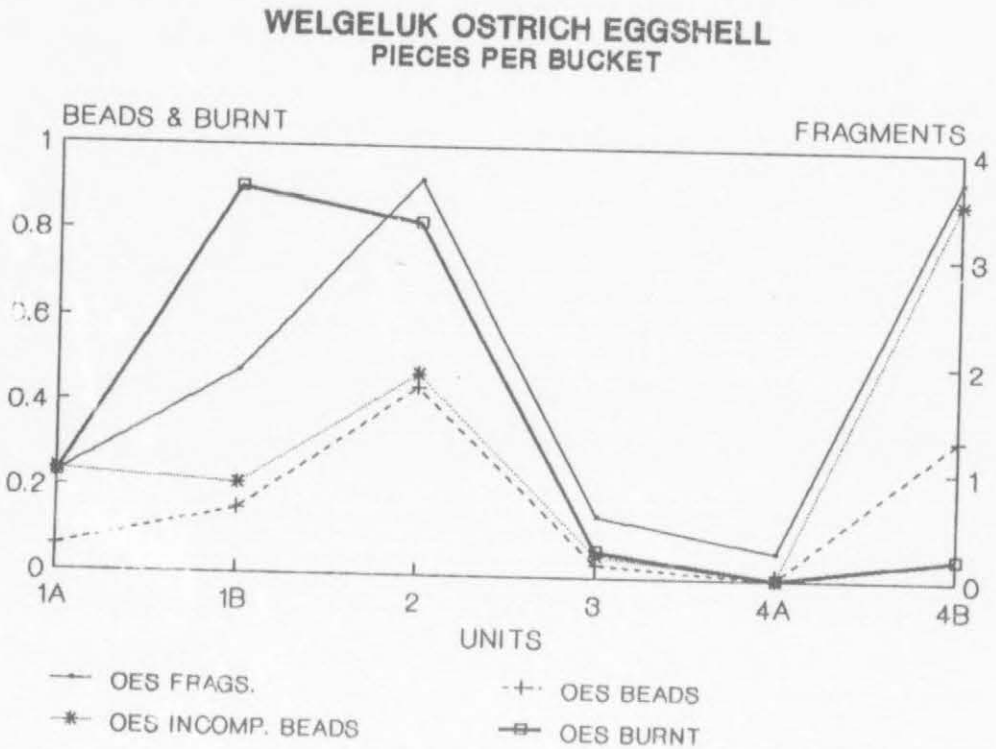


Figure 4.2. Welgeluk: the distribution of ostrich eggshell beads and unmodified fragments

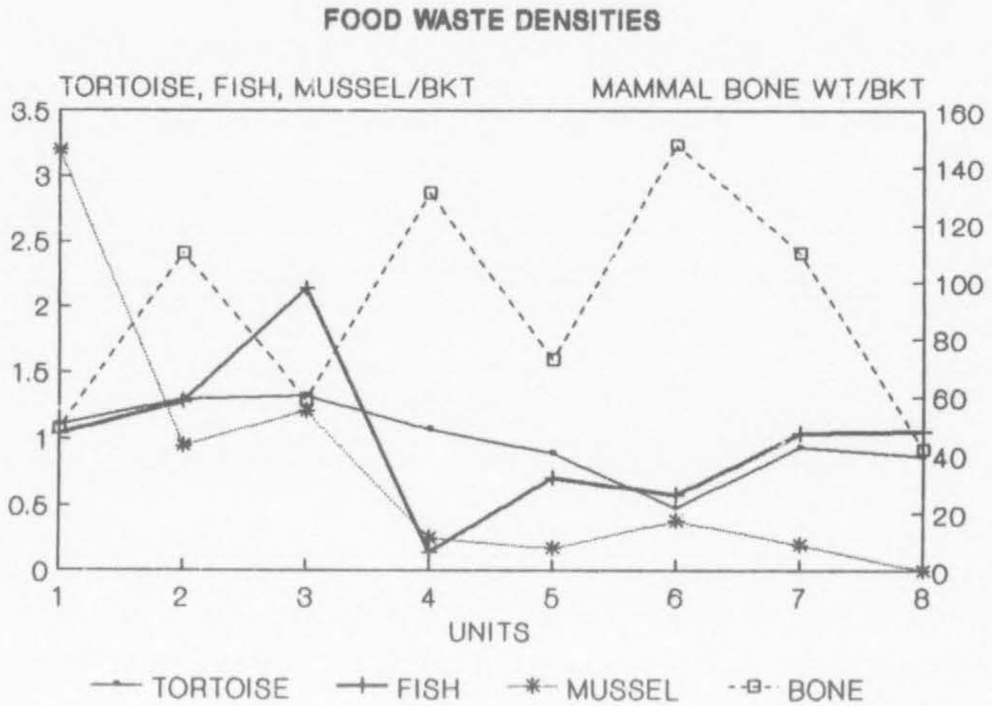


Figure 4.3. Edgehill: comparison of different food waste densities

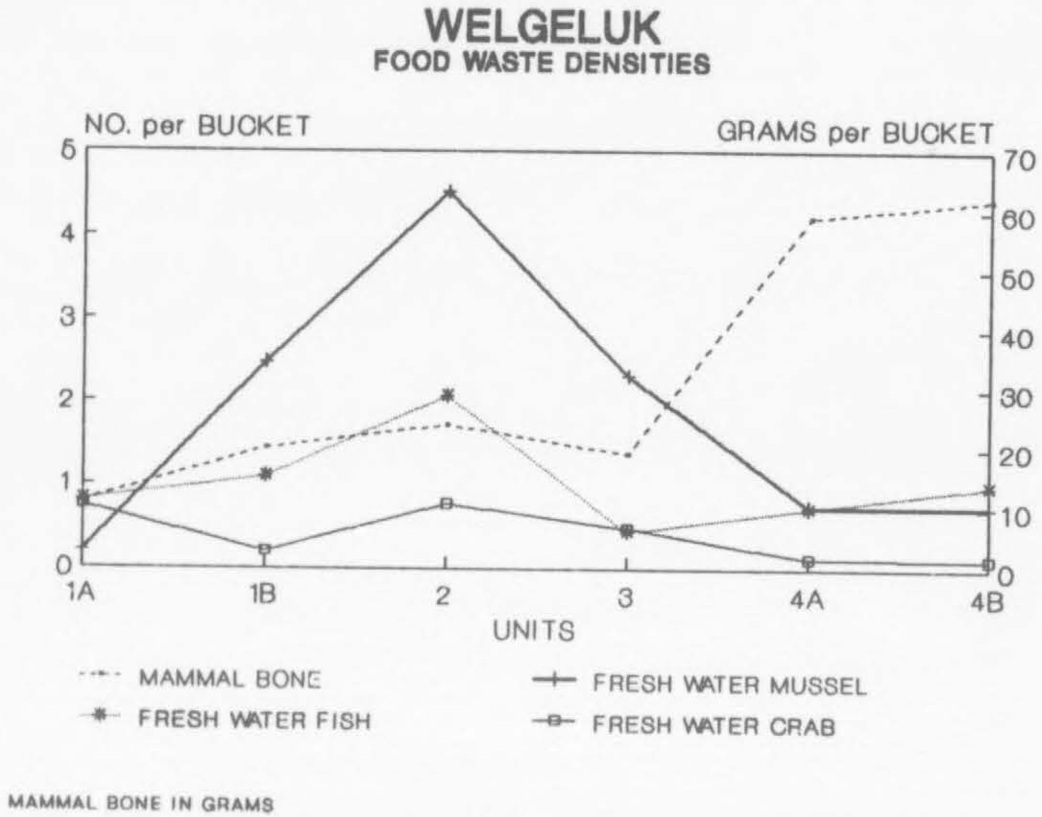


Figure 4.4. Welgeluk: comparison of different food waste densities

between units 4 and 5 at Edgehill, that the initial occupation at Welgeluk takes place (ca 4500 BP). In Figure 4.4 it is quite clear that at Welgeluk large mammal bone decreases significantly from unit 4B in contrast to the marked increases in mussel, fish and crab exploitation. The relatively deep pottery sequence at Welgeluk indicates that these upward trends between unit 4A and 2 are halted. The resource mix within the pottery units is discussed in Chapter Seven, the main point of interest focusing on the decline in freshwater mussel frequency. The main point highlighted by Figures 4.3 and 4.4 is that intensification of animal resources is not evenly paced through time. Freshwater fish occur in the basal Edgehill deposits and their exploitation obviously formed part of the initial subsistence 'package'. Without a long riverine sequence in the more optimal CFB, it remains unclear whether the freshwater fish exploitation at Edgehill signals intensification of this resource within the Wilton or was already intact at the start of the Wilton. Whatever the case, it does indicate that LSA food resource ranking favoured fish before mussel.

It is only after LSA occupation along the Koonap River had been in progress for about 2000 years that mussel intensification takes place, at about 4000 BP. This is paralleled by a distinct increase in the number of fish being caught. It has already been postulated that this has to do with several interrelated factors including population increase, reductions in mobility and a concomitant trend towards longer occupations at fewer sites. Overall, hunter-gatherers developed their resource mix towards 'aseasonality'. Intensification of small food 'parcels' low down on the trophic scale from about 4000 BP are, however, visible symptoms of an ongoing process, and the mid-Holocene occupations of Edgehill and later Welgeluk, are earlier manifestations of it. This interpretation is now developed further with a description and discussion of the Welgeluk plant food residues.

THE WELGELUK PLANT MATERIAL

Excavations at Welgeluk have been particularly useful in providing some insights into plant use by hunter-gatherers in the immediate environs of the site. This aspect is lacking at Edgehill and is attributable to poor preservation.

A key site in the CFB for insights into Later Stone Age plant use is Melkhoutboom (Deacon, H. J. 1976) in the Suurberg, which provides a basis for comparison with the Welgeluk material. The plant remains from Scott's Cave provide general confirmation of LSA plant collecting patterns (Wells 1965). Preservation of large plant food waste samples at Melkhoutboom is good and indicates that extensive staple plant food collection was part of Wilton LSA foodways from its start. The abundance of plant material at Melkhoutboom required that units and features were sampled for a representative list of species present and their relative abundance. At Welgeluk no sampling strategy was employed due to more manageable amounts of plant remains.

THE SPECIES LIST

It is clear from Figure 4.5 that most of the plant material was recovered from the pottery units, especially the upper unit 1A. Better preservation in 1A is the cause of this rather than any cultural explanation. Stratigraphic evidence has already been mentioned which suggests that plant use by the LSA inhabitants was a regular feature throughout the build up of deposits. This evidence comes in the form of the relatively hard and large grey/white ashy crusts which have been identified as combusted plant rich units. The pit feature also provides some evidence for the collection and storage of seeds, possibly *Pappea capensis*. However, it is possible that the sharp increase between the lower pottery 1B and upper pottery unit 1A may also have a behavioural component. This could be tied to increased food getting resulting from greater resource and territorial competition contributed by the presence of food producers and their stock on the landscape. This may be similar to the situation suggested for hunter-gatherers in the western Cape over the last 2000 years for which the site of De Hangen is an example (Parkington & Poggenpoel 1971; Parkington 1984a).

Table 4.7 provides a list of species identified and their relative abundance expressed in grams. Unlike the plant food waste from Melkhoutboom (Deacon, H. J. 1976) Iridaceae, are not well represented at Welgeluk and *Watsonia* spp. not at all. In the case of *Watsonia* spp. this is accounted for through their preference for the wetter areas of the CFB and the coastal forelands to the south (Martin & Noel 1960). The most common geophyte at Welgeluk has been identified on the basis of corm tunics as a *Tritonia/Freezia* type and it is possible that *Freezia corymbosa* is indicated with its preference for dry and stony grassland habitats. Corm tunics distinct from the *Tritonia/Freezia* type belong to a Moraea species and it is possible that *Moraea polystachya* is represented. This has been the only Moraea observed by the writer in flower over the period of work in the area. *Moraea polystachya* (bloutulp), is well known for the toxicity of its leaves and can be particularly devastating to grazing livestock (Smith 1966). Whether this toxicity also applies to the corm is not known (Deacon, H. J. 1976) and it is therefore possible that it is an edible 'uintjie'. The other two Iridaceae in the species list are both known to be edible, particularly *Cyperus usitatus* (Boesmansuintjie), but are present in almost negligible amounts.

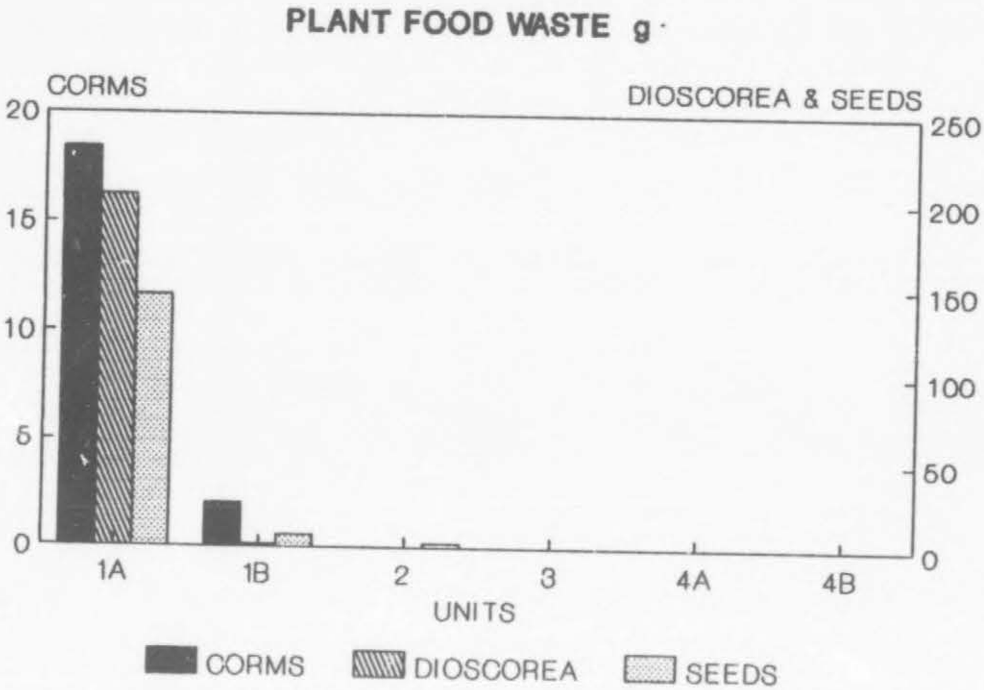


Figure 4.5. Welgeluk: distribution of plant food waste

The most abundant underground storage plant belongs to the Dioscoreaceae family and it is possible that one or two species are present. *Dioscorea elephantipes* is found in semi-karoo areas and in some coastal regions while *D. sylvatica* is known from the margins of inland and coastal forests (Martin & Noel 1960). *D. elephantipes*, known as 'Hotnotsbrood', was observed being eaten by Burchell (in Smith 1966). The inner white flesh of the tuber was cut into strips and roasted. Even among the Xhosa it is eaten as a famine food and is known to contain both starch and sago (Watt & Breyer-Brandwijk 1962).

It is difficult to assess the importance of *Dioscorea* sp. to the hunter-gatherer diet because it is a relatively large tuber and while the mass is considerably more than that recorded for the other geophytes, this measure may be misleading. Comparison with the species list from Melkhoutboom (Deacon, H. J. 1976:213) shows that *Dioscorea* sp. is hardly present. This may be a function of its relative absence in the habitats around the site but may also reflect ranking and preference. Where easily accessible Watsonia patches were present, these were the preferred plants foods. The absence of *Watsonia* spp. from the Welgeluk and Edgehill environs suggests that the ranking of *Dioscorea* spp. was elevated in importance in the diet and it is possible that its bulk provided a replacement when *Watsonia* spp. were absent.

By far the greatest number of species identified at Welgeluk are seeds and fruits (Table 4.7). These are the only plant species which are preserved below the pottery units apart from wood and bark. *Olea africana* is present throughout the sequence and the fruit is known to be edible (Watt & Breyer-Brandwijk 1962). *Grewia occidentalis* is also relatively abundant and both the Xhosa and Zulu eat the yellow berry (op. cit.). All the other seed species represented also provide some nutritional value. *Pappea capensis* seeds are known to be a particularly rich source of oil (Palmer & Pitman 1972) and the kernel represents some 65% of the fruit (Watt & Breyer-Brandwijk 1962). While the oil is regarded as edible, most ethnobotanical information available suggests that its preferred use was as a purgative or that it was applied externally to treat skin diseases. At Melkhoutboom most *Pappea capensis* remains are associated with pit features (Deacon, H. J. 1976) and the similar pit feature at Welgeluk may also be interpreted as such. The specific association between storage and *Pappea capensis* is of some interest because it indicates some investment in effort in order to prolong access to this resource. Apart from nutrition, this could have been for medicinal or even ritual purposes.

The majority of the seeds recovered from Welgeluk were uncharred and indicate that they were collected and eaten without any preparation. A consistent feature, however, of those remains referrable to *Podocarpus* sp. as well as the seeds and rinds of *Diospyros* sp. is that they are all charred and may indicate that they were roasted in order to increase their palatability. Such preparation has been recorded for *Schotia afra* (Fox & Norwood-Young 1982). It is also of interest that *Podocarpus* sp. was not recovered from the upper pottery unit 1A. *Podocarpus* sp. would not have been particularly abundant in the environs around the sites and its absence in the younger units may indicate that it was soon cut out for timber during the period when mixed farmers became more prevalent on the landscape.

Comparison of the seed species from Welgeluk with those recorded from Melkhoutboom shows a wider range of species at Welgeluk. At Melkhoutboom *Schotia* sp., *Podocarpus falcatus* and *Calodendron capense* make up most of the seed assemblage but it is not known how many species are represented in the category "other" (Deacon, H. J. 1976:212). While the species diversity at Melkhoutboom is lower, the quantities of those species present is considerably higher. It is possible that all of these were specifically collected for their oil content rather than as primary food. Most of the species present at Welgeluk, apart from *Pappea capensis*, appear to have provided more primary food resources. Although it is speculative, it is a possibility that the relatively meagre nutritional returns from fruits and seeds were more important to hunter-gatherers in the more marginal Welgeluk habitat than in the habitat around Melkhoutboom and other sites in the CFB.

Two species of plants recovered from the upper pottery unit 1A have been designated as domesticates (Table 4.7). These are *Citrullus lanatus* and *Lagenaria siceraria* and they must have been obtained by hunter-gatherers from food producers. Their presence in unit 1A, which is interpreted as a period of increasing farmer influence in the region, can be explained by contacts between them and hunter-gatherers. Martin & Noel (1960) list *Citrullus lanatus* as an alien in the Albany Magisterial District of the eastern Cape, its origin being in the Transvaal. Therefore, its introduction must have been by way of early Xhosa farmers. This species is also described as having a ruderal habit. *Lagenaria siceraria* is not listed as occurring in the eastern Cape, either as an indigenous species or as an exotic introduction (Martin & Noel 1960). This species was identified from gourd fragments rather than seeds and therefore it cannot be ruled out that its presence was due to its use as a container rather than as food. The young gourd is edible and improved varieties are cultivated for their edible fruit.

Citrullus lanatus goes by the general name of 'bitterappel', a name used for a number of species of the Cucurbitaceae and Solanaceae. It is equivalent to the tsama melon of Botswana which provides more moisture than nutrition, although the seeds have been recorded as being ground up and made into a 'bread', or simply roasted (Watt & Breyer-

Brandwijk 1962). While the amount of these domesticates is small, they must have come from farmer settlements through trade and exchange. The nature of the interactions between hunter-gatherers and farmers is discussed in Chapter Seven.

Two other species are also exotics to the region and are alien to southern Africa and indicate the expansion of the European frontier into the area. The first of these is the well known prickly-pear, *Opuntia ficus-indica*, which became established in the eastern Cape from about AD 1750 onwards, having already been cultivated at the Cape from the late seventeenth century (Stirton 1978). The second exotic has been identified as the burrs from *Xanthium spinosum* (boetebessie). This species was first collected at the Cape in 1692, having been introduced from Europe but was established in the eastern Cape as a weed by 1856 from an independent introduction via angora goats from Asia Minor (Smith 1966). These exotics were unequivocally located in primary context in the upper units of 1A and are of interest for documenting the continuity of the hunter-gatherer sequence into the historic period.

In the general category (Table 4.7) bark, wood and twigs make up the bulk of the material, none of which has been specifically identified. Of interest in the preserved plant material from the upper units is that little to no grass bedding has been identified. At sites in the CFB a considerable amount of bedding material has been found. It is possible that the combusted ash lenses in the pre-pottery deposits represent bedding rich units.

Plant artefacts in the form of wood shavings and plant cordage were found in unit 1A. The wood shavings appear to have resulted from woodworking with metal tools.

SEASONAL INDICATORS FROM THE PLANT REMAINS

Figure 4.6 lists some of the more prominent species identified from Welgeluk and the time of year during which they would be available for exploitation. The list is not particularly informative because there is considerable overlap in availability. If the identifications of *Moraea polystackya* and *Freezia corymbosa* are correct then the seasonal availability of these species shows that occupation could have taken place at any time between April and November. However, if one examines the frequency of these two species in units 1A by individual layers, it is clear that out of the 23 layers in which geophyte corm tunics were identified, the *Tritonia/Freezia* type occurs in 21 of these units, while the *Moraea* type was found in only 9 of the units. In other words, 12 units in 1A preserved only *Tritonia/Freezia* type corms tunics. This could be interpreted as indicating a greater emphasis on spring/summer occupations. However, because of the toxic properties of *Moraea polystachya*, this

Month	J	F	M	A	M	J	J	A	S	O	N	D
Freezia corymbosa								XXXXXXXXXXXXXXXXXX				
Cyperus usitatus	XXXXXXXXXXXXXXXXXXXXX											
Moraea polystachya				XXXXXXXXXXXXXXX X X X X X X X X X X								
Podocarpus latifolius	XXXXXXXXXXXX										XXXXXXX	
Podocarpus falcatus	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX											
Schotia afra	XXXXXXXXXX X X X									XXXXXXXXXXX		
Schotia latifolia				XXXXXXXXXXXXXXXXXXXXX								
Rhus lancea	XXXXXX								XXXXXXXXXXXXXXXXXX			
Pappea capensis		XXXXXXXXXXXXXXXXXXXX										
Grewia occidentalis	XXXXXXXXXXXXXXXXX											
Ziziphus mucronata			XXXXXXXXXXXXXXXXXXXXXXXXXX									
Olea africana		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX										
Diospyros lycoides	XXXXXXXXXXXXXXXXXXXX											
Euclea undulata				XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX								

Figure 4.6. The seasonality of selected species from the Welgeluk species list

species may have been avoided and therefore its lower frequency, both by mass and frequency in individual layers, may not be a seasonal indicator.

The resolution of plant seasonal indicators is further confused when the approximate availability of the seed species present is taken into account. Most species ripen and are ready for exploitation from late summer and autumn and some species may well be still available into winter. When this is added to the seasonal range already discussed above any attempts to pinpoint season of occupation become rather fruitless. Furthermore, if a species such as *Pappea capensis* was collected between February and June and then stored, occupation well into the winter months is again possible. If all these indicators are taken into account we can do no better than speculate that season of occupation could have been at any time of the year or even permanently on a year round basis.

Having arrived at this conclusion, it is worth considering that attempts to force a specific season of occupation out of the data could be misleading. Rather than question the quality or accuracy of the data, we should perhaps question the ethnographic models which guide the search for highly seasonal indicators in the archaeology. In other words, the seasonal overlap may indicate that no strict and structured seasonal settlement strategies were being employed. It must be admitted, however, that this viewpoint is derived from the plant species preserved from only the youngest and best preserved unit 1A. This unit correlates with the presence of mixed farmers who may have considerably altered traditional pre-contact hunter-gatherer settlement strategies. The data at hand do not provide a test for this possibility. The poor plant preservation in the pre-contact deposits does not permit us to see whether hunter-gatherers employed different seasonal scheduling strategies during those times.

However, when the evidence from the plant food waste is combined with the inferences already drawn from the animal components, pre-contact occupation along the Koonap River could have been at any time of the year. This is similar to the conclusion reached for the hunter-gatherer occupations at Melkhoutboom (Deacon, H.J. 1976).

THE SIGNIFICANCE OF STORAGE

Stratigraphically the pit at Welgeluk can be placed well before the first appearance of pottery in the sequence at about 1800 BP and the mouth of the pit is bracketed by the ca 3300 and 2510 BP dates. The Edgehill pit also pre-dates the arrival of pastoralists. It is possible that the pits located at Melkhoutboom are also pre-pottery in age (Deacon, H.J. 1976:32). This is confused, however, by their correlation with the presence of pastoralists as was the increase in freshwater mussel frequency (op. cit.:35).

The Melkhoutboom pits preserve their original contents which are clearly identified as the oil rich seeds of *Pappea capensis*, *Calodendrum capense* and *Podocarpus falcatus*. A pit 'swarm' at Boomplaas in the Swartberg dates to ca 2000 BP and the *Pappea capensis* contents indicate similarities to those in the eastern Cape (Deacon, H.J. 1979). Of further interest is that several of these pits were marked with painted stones. The Welgeluk and Edgehill pits can also be identified as storage facilities. They are of much interest because of their development well before any possible influence from food producing herders or farmers. The chronological development of seed storage pits, therefore, is another facet of intensification which is roughly coincident with the shellfish, fish, tortoise and crab intensification already highlighted.

At the outset it must be made clear that debate about the social significance of storage concerns hunter-gatherers who store staple foodstuffs. Clearly the storage implied by the pre-contact seed pits at Edgehill, Welgeluk and Melkhoutboom is not of the same subsistence scale. However, it is considered relevant to discuss them in relation to the factors seen as significant in requiring storage among more 'complex' hunter-gatherers. Rather than trivialise these storage pits by referring to them merely as 'caching', the approach used here is to go in the other direction and examine these pits within the wider debate over the significance of hunter-gatherer storage. The wider ethnography shows that storage in hunter-gatherer contexts is relatively common (Testart 1982; Ingold 1983). In Testart's view this draws attention to similarities between hunter-gatherers who store and farmers. More important for this discussion is the difference between hunter-gatherers who store and those who do not and the significance this distinction has for population densities and degrees of sedentism. By definition storage is seen as a contradiction to hunter-gatherer mobility (Testart 1982:524). In the case of hunter-gatherer storage of staple foods, the practice inhibits movement and, in a chicken and egg situation, also removes the need for mobility (Ingold 1983:554). Whatever the scale of storage, its practice must imply a subsistence strategy in which mobility is reduced. At any level, it implies that hunter-gatherers are going to stay on for a longer time at a particular place, or alternatively, that they are not moving very far away.

Another correlate of storage is higher population densities. Of relevance here is the increased labour and time scheduling needed to lay in a store. Furthermore, a common correlation is drawn between greater sedentism and the impact this has upon childbearing, birth spacing and population increase (see Harris 1977). Storage both requires and creates people.

Storage may also imply subtle changes in an individual's or a group's attitude towards others. It may encourage increasing distinctions between 'us' and 'them' because people need to protect the increased time and resource investment locked up in a store. Another important consideration is that storage focuses people's subsistence dependencies upon specific areas, patches and the actual storage locale. This embeds an identity between a group and place at a number of different spatial scales. Obviously questions of ownership arise with storage and the location of storage has to be marked or regionally recognised as "...symbolically associated with particular groups" (Ingold 1983:561). This may reinforce and coincide with other socio-spatial markers such as cemeteries and sharply focus the landscape in terms of a group and a series of places appropriate for their economic, social and ritual needs.

Testart (1982) also suggests that above all, staple food storage among complex hunter-gatherers must imply changes in social relations and ideology. This is rejected by Ingold (1982) who makes the valid distinction between practical storage and social storage. The development of hunter-gatherer practical storage is seen as a response to conditions in the environment in which basic resource availability is out of phase with scheduling and consumption needs. Practical storage will not develop if an annual round of movement, activity scheduling and resource availability follow unimpeded in a 'linear' way, one after the other. Mobility provides the safeguard against shortfalls and resource fluctuations. Against this background, practical storage must be seen as a response to interference in a 'round' in which incongruence and incompatability between resource needs and availability arises.

Practical storage, however, need not imply fundamental ideology changes or realignments in social relationships. The key issue is whether storage of any kind erodes egalitarian principles, particularly rules concerned with sharing. In Ingold's (1983:562) words:

> There is no necessary contradiction between storage and sharing if the former is conceived in the practical sense, occasioned by the non-concurrence of production and consumption schedules. In other words, the activity of practical storage does not constitute "in the social order a transgression of the rule of sharing" (contra Testart 1982:527) .

With this background attention can now be focused on the archaeology at hand as it relates to storage. The development of storage in certain areas of the Cape can in no way be seen as social in the sense oulined by Ingold. It is not "...the appropriation of materials in such a way that rights over their future distribution or consumption converge upon a single interest" (Ingold 1983:561). Nevertheless, I suggest that the development of seed storage facilities at these sites does imply impeded mobility patterns, territorial focus and demographic shifts which also imply changing social emphases. Woodburn and Testart dwell upon social differences in distinguishing between storing and non-storing hunter-gatherers. These rather inflexible synchronic classifications mask gradations towards a 'complex' storing state (Testart 1982; Woodburn 1982). This applies equally to the distinction between practical and social storage (Ingold 1983). Even though practical storage does not contradict basic hunter-gatherer principles the development and intensification of practical storage must monitor changes in the ways these are emphasised.

It has already been mentioned that the nature of the foods being stored can hardly be seen as staples. *Pappea capensis* cannot be seen as a staple food, and the emphasis on its storage revolves around the extremely rich oil present in the seed kernel (Watt & Breyer-Brandwijk 1962:931). It has been suggested that P. capensis oil was used as a 'cosmetic', rather than a foodstuff (Deacon, H.J. 1979). Whatever need the seed filled it was clearly important enough to ensure extended access to it. A few pits were marked with painted stones at Boomplaas (Deacon, H.J. 1979) and these may also imply a ritual context for seed use or, alternatively, that pits were marked to indicate specific rights of individual or group access.

The intensification of seed exploitation as monitored through the appearance of storage pits coincides with increasing mussel and fish exploitation. The harvesting time of *P. capensis* is around late summer and autumn and its storage implies delaying consumption until nutritional needs arise later in winter or perhaps even in spring. This suggestion fits well with the other subsistence trends which all seem to be related to maintaining energy levels and nutritional quality during the winter gap.

In combination with the other resource trends, seed storage also implies that changes in population levels and territorial configurations require compensatory strategies in the face of reduced mobility and scheduling options. In order to maintain subsistence needs, risk increasingly is transferred from a mobile, regional strategy to one which diversifies more locally. The practice of storage plus the other lines of subsistence evidence indicate that mobility was both curtailed and impeded.

Hunter-gatherers were storing seeds in both the CFB (for example Melkhoutboom and Hellspoort), as well as at Welgeluk and Edgehill. This suggests that any seasonal resource and scheduling complementarity between the two areas did not exist because groups in both areas employed similar strategies at the same time of year. I suggest that increasing landscape saturation in terms of people and groupings reduced the chances of successful seasonal moves, but at the same time contributed towards removing the need to do so.

SUBSISTENCE SUMMARY

Overall, the impression gained is that LSA hunter-gatherers added the storage of nutritionally important oil rich seeds to an expanding repertoire of subsistence innovations inseparably linked to population increases, mobility reductions and the complications this caused for traditional transhumant patterns. The timing of the appearance of storage pits at ca 3000 BP indicates that it is interlinked with the intensification trends noted for other resources.

The main points about the Edgehill and Welgeluk subsistence data are that intensification appears to only pick up from about 4000 BP with freshwater fish, mussel, tortoise and oil rich seeds being the resources increasingly favoured. The development of the resource mix over the last 4000 years at Edgehill and Welgeluk is a symptom of altering cost benefits associated with subsistence strategies. In this discussion costs and benefits have largely been couched in an economic and more specifically a nutritional framework. The intensification of low trophic level, high biomass foods from about 4000 BP may have another related component which has to do with increasing subsistence 'autonomy' of individual and perhaps smaller groups. The marked decrease in large mammal bone after 4000 BP is curious given that such quality meat is an important component in intra-and inter-group social relationships. The smaller more lower ranked protein supplements in the form of tortoises, shellfish and fish can hardly be seen as suitable replacements. Although speculative, the decrease in large mammal bone may point towards changes in the nature of inter-group contacts and at the very least indicate that the intensity of interaction decreased. The nature and structure of people to people interactions forms the focus of the next chapter.

Table 4.1. Edgehill: large mammal minimum number of individual counts
(-/- = minimum number of individuals/number of identified bones

SPECIES	UNITS 1	2	3	4	5	6	7	8	TOTAL
Primates									
Papio ursinus, baboon	2/2	1/1							3/3
Carcopithecus sp. monkey	1/1								1/1
Tubilidentata									
Orycteropus afer, aardvark		1/2	2/6	1/1		1/2	1/1		6/12
Lagomorph									
Lepus cf L. capensis, Cape hare	1/1				1/1		3/4		5/6
Pronolagus crassicaudatus, red rock hare							2/3	1/1	3/4
Leporidae sp., indet. hares	4/8	1/1			1/1	1/1			7/11
Rodentia									
Hystrix africae-australis, porcupine	1/1					2/2			3/3
Pedetes capensis, spring-hare	1/1		1/1						2/2
Hyracoidea									
Procavia capensis, dassie	22/36	7/12	7/11	8/18	4/4	9/22	5/6	3/9	65/118
Carnivora									
Canis cf C. mesomelas, blacked-backed jackal	2/3	1/1			2/2	1/1			6/7
Canidae indet.	3/3	2/2	1/1		1/2	1/1			8/9
Viverridae indet.	1/3								1/3
Panthera pardus, leopard	4/4	1/1				1/1	1/1		7/7
Felis libyca, African wild cat	1/1		1/2			1/1			3/4
Felidae indet.	1/1			1/1					2/2
Galarella pulverulenta, Cape grey mongoose	1/1				1/1				2/2
Genetta sp.	1/1								1/1
Aonyx capensis, Cape clawless otter	1/1					1/2			2/3
Artiodactyla									
Potamochoerus porcus, bush-pig	2/2	1/1	1/1	4/4	1/1				9/9
Phacochoerus aethiopicus, warthog						1/2			1/2
Suidae indet. pigs	14/42	6/10	2/3	7/12	5/7	1/2	3/3		38/79
Tragelaphus strepisceros, kudu						2/2			2/2
T. scriptus, bushbuck	8/10	4/5		2/2	1/1	1/1			16/19
Syncerus caffer, Cape buffalo	1/1	2/2	3/5	6/17	6/13	2/2	2/4	3/3	25/47
Hippotragus sp., roan/sable	2/2	1/1				1/1			4/4
Raphicerus sp., grysbok/steenbok	29/96	8/27	8/28	10/29	7/14	7/36	8/22	9/32	86/284
Sylvicapra grimmia, grey duiker	1/1							1/2	2/3
Pelea capreolus, grey rhebuck	1/1	1/1							2/2
Hippopotamus amphibius, hippo						1/1			1/1
Ovis aries, sheep	1/1								1/1
Capra hircus, goat	?1/2								1/2
Ovis/Capra, sheep/goat	3/4								3/4
TOTAL	110/230	37/66	26/58	39/84	30/47	34/80	25/44	17/47	318/657

Table 4.1. Continued

SPECIES	1	2	3	4	5	6	7	8	TOTAL
Bovidae indet.									
small	32/184	19/96	17/70	13/54	18/54	7/51	9/56	6/55	121/620
small-medium	33/139	11/39	10/30	12/33	12/22	8/26	8/26	6/23	100/338
large-medium	15/24	12/31	7/19	6/25	11/23	10/36	9/18	1/2	71/178
large	13/22	8/19	10/29	9/28	14/37	8/60	5/11	3/3	70/209
TOTAL indet. Bovidae	93/369	50/185	44/148	40/140	55/136	33/173	31/111	16/83	362/1345

Table 4.2. Welgeluk: large mammal minimum number of individual counts and bone weight per unit

SPECIES	UNITS 1A	1B	2	3	4A	4B
<u>Papio ursinus</u>, chacma baboon	--	--	1	--	--	1
<u>Homo sapiens</u>, Man	--	--	--	--	--	6
Small carnivore	2	2	2	--	--	1
Large carnivore	--	--	--	--	--	1
<u>Procavia capensis</u>, dassie	3	3	2	1	3	3
<u>Potamochoerus porcus</u>, bushpig	--	--	1	--	--	--
<u>Phacochoerus aethiopicus</u>, warthog	--	--	--	--	--	1
<u>Raphicerus</u> spp, steenbok/grysbok	11	1	1	1	1	4
<u>Silvicapra grimmia</u>, Grimm's duiker	--	1	1	--	--	--
<u>Pelea capreolus</u>, vaal rhebuck	1	1	--	--	--	--
<u>Tragelaphus scriptus</u>, bushbuck	--	1	--	--	--	--
<u>Ovis aries</u>, sheep	1	1	--	--	--	--
Indeterminate Bov. II	1	1	--	1	--	--
Indeterminate Bov. III/IV	--	1	1	--	1	1
Indeterminate Bov. IV	--	--	--	--	1	--
<u>Pronolagus crassicaudatus</u>, red rock hare	--	--	1	1	--	--
Indeterminate Lagomorph	--	--	1	1	--	1
<u>Hystrix africae-australis</u>, porcupine	--	--	--	--	--	1
Total	19	12	11	5	6	20
Bone weight in grams	1723	2222	2580	1856	2273	6759
Bone weight per bucket	11	20	24	19	57	62

Table 4.3. Edgehill: tortoise minimum number of individuals and densities of all species combined per unit

	UNITS								
Species	1	2	3	4	5	6	7	8	Totals
Homopus areolatus, padlopertjie	119	43	51	19	27	30	53	23	365
Chersina angulata, rooipens	28	9	9	13	6	2	14	2	83
Pelomedusa subrufa, freshwater turtle	7	2	4	2	1	0	5	2	23
Geochelone pardalis, mountain tortoise	2	2	1	1	1	1	1	1	10
Total	156	56	65	35	35	33	73	28	481
Individuals per bucket	1.11	1.30	1.32	1.07	0.89	0.48	0.94	0.87	

Table 4.4. Welgeluk: tortoise minimum number of individuals and densities of all species combined per unit

	UNITS						
SPECIES	1A	1B	2	3	4A	4B	Total
Pelomedusa subrufa, turtle	6	5	2	5	1	2	21
Homopus areolatus, padlopertjie	5	16	15	22	8	20	86
Chersine angulata, rooipens	10	7	5	5	7	5	39
Geochelone pardalis, mt. tortoise	2	0	0	0	0	0	2
Total	23	28	22	32	16	27	148
Densities per bucket	0.14	0.24	0.20	0.32	0.39	0.24	

Table 4.5. Edgehill: minimum number of individuals and densities of freshwater fish, freshwater mussel, landsnail (Achatina sp.) and ostrich eggshell fragments

	UNITS								
Species	1	2	3	4	5	6	7	8	Totals
Unio caffer, freshwater mussel	451	41	58	9	7	26	16	0	608
Individuals per bucket	3.22	0.95	1.18	0.27	0.17	0.38	0.20	0	
Labeo umbratus, moggel	95	33	87	4	20	34	56	33	362
Sandelia bainsii, rocky	31	12	13	1	-	3	14	4	83
Myxus capensis, freshwater mullet	9	6	3	0	1	2	7	2	30
Anguilla mossambica, eel	12	4	1	0	2	1	4	2	26
Total Fish	147	55	104	5	28	40	81	41	501
Fish density (individuals per bucket)	1.05	1.27	2.12	0.15	0.71	0.58	1.04	1.28	
Achatina sp. land snail	33	17	13	0	1	10	9	0	83
Ostrich eggshell fragments	252	20	109	109	40	62	55	21	668
Density (fragments per bucket)	1.8	0.46	2.22	3.35	1.02	0.91	0.70	0.65	

Table 4.6. Welgeluk: minimum number of individuals and densities of freshwater mussel, freshwater fish, crab and ostrich eggshell fragments

	UNITS						
SPECIES	1A	1B	2	3	4A	4B	TOTAL
Unio caffer, freshwater mussel	32	27[illegible]	488	230	30	81	1139
Labeo umbratus, moggel	132	123	222	44	29	108	658
Sandelia bainsii, rocky	39	17	21	23	2	16	118
Anguilla mossambica, eel	14	10	15	11	2	4	56
Myxus capensis, freshwater mullet	5	4	5	8	2	7	31
Potamon perlatus, crab	122	23	83	48	5	12	293
Ostrich eggshell fragments	151	214	397	57	10	406	1235
Burnt Ostrich eggshell fragments	44	102	89	6	0	6	247
DENSITIES							
Unio caffer/bkt	0.20	2.47	4.52	2.31	0.74	0.74	
Labeo umbratus/bkt	0.81	1.09	2.06	0.44	0.72	0.99	
Potamon perlatus/bkt	0.75	0.20	0.77	0.48	0.12	0.11	
OES fragments/bkt	0.92	1.90	3.68	0.57	0.25	3.72	
OES burnt fragments/bkt	0.23	0.90	0.82	0.06	0.00	0.05	
Mammal bone/bkt (grams)	11.00	20.00	24.00	19.00	59.00	62.00	

Table 4.7. Welgeluk: plant material expressed in grams per unit (amounts less than 0,1 gm expressed as present = X)

UNIT	1A	1B	2	3	4A	4B
UNIT VOLUME (Bkts)	163	112	108	99	40	109
DATING (X 1000 yr)	0	1	2	3	4	5
Corms and bulbs						
Tritonia/Freezia tunics	11,7	0,5	---	---	---	---
Moraea tunics	3,7	---	---	---	---	---
Tritonia/Freezia bases	1,8	1,2	---	---	---	---
Carbonised corms	0,5	0,3	---	---	---	---
Cyperus usitatus	0,1	---	---	---	---	---
Oxalis sp.	0,6	X	---	---	---	---
Dioscorea sp.	203,2	1,5	---	---	---	---
?*Watsonia*	X	---	---	---	---	---
Seeds and fruits: relatively abundant						
?*Ficus*	2,1	X	0,1	---	---	---
Schotia sp.	6,1	1,1	0,7	---	---	---
?*Schotia* pods	0,3	---	---	---	---	---
Rhus lancea	4,6	---	---	---	---	---
Pappea capensis	6,4	---	---	---	---	---
Grewia occidentalis	37,8	1,7	0,4	---	---	X
Diospyros sp. cf. *lycoides*	5,9	0,4	0,2	---	---	---
Olea africana	67,3	3,8	1,4	X	0,2	0,3
Ziziphus mucronata	12,4	X	---	---	---	---
Seeds and fruits: relatively sparse						
Podocarpus sp.	---	0,2	0,4	X	X	0,1
Rhus undulata	X	---	---	---	---	---
Eugenia sp. cf. *capensis*	0,1	---	---	---	0,3	---
Carissa sp. cf. *bispinosa*	X	---	---	---	---	---
Azimia tetracantha	0,3	---	---	---	---	---
Euclea sp. cf. *undulata*	1,4	0,3	X	---	---	---
Rhoicissus sp. cf. *digitata*	0,8	---	---	---	---	---
Scutia myrtina	X	---	---	---	---	---
Ehretia rigida	0,5	---	---	---	---	---
Cussonia spicata	X	---	---	---	---	---
Myrsine sp. cf. *africana*	X	---	---	---	---	---
?*Cyphostemma*	X	---	---	---	---	---
?*Melianthus*	X	---	---	---	---	---
?*Jasminum*	X	---	---	---	---	---
?*Cassine*	X	---	---	---	---	---
?*Coccinia*	X	---	---	---	---	---
?*Kedrostis*	X	---	---	---	---	---

Table 4.7. Continued

LAYER	1A	1B	2	3	4A	4B
LAYER VOLUME (Bkts)	163	112	108	99	40	109
DATING (X 1000 yr)	0 1		2	3	4	5
Possible domesticates						
Citrullus lanatus	1,1	---	---	---	---	---
Lagenaria siceraria	1,5	---	---	---	---	---
Exotics						
Opuntia ficus-indica	X	---	---	---	---	---
Xanthium spinosum	X	---	---	---	---	---
Incidental species						
Antizoma capensis	0,4	---	---	---	---	---
Medicago aschersonia	0,7	---	---	---	---	---
General						
Restionaceae	5,5	---	---	---	---	---
Bark wood and twigs	994,4	9,2	---	---	---	---
Wood shavings	119,0	X	X	---	---	---
Acacia thorn	5,6	0,1	---	---	---	---
?*Acacia* gum	0,4	---	---	---	---	---
Unidentified leaf	2,4	---	---	---	---	---
Unidentified pods	0,7	---	---	---	---	---
Vegetable cordage	X	---	---	---	---	---
Total	1499,3	20,3	3,2	0,0	0,5	0,4

CHAPTER FIVE

TOOLS AND ORNAMENTS

INTRODUCTION: STYLE, BEHAVIOUR AND BOUNDARIES

The preceding chapter outlined changes in the subsistence base and interpreted them within a framework of intensification. From the indicators for intensification it is inferred that greater economic competition resulted from regional population saturation which gave rise to risk reduction strategies that emphasised more socially exclusive behaviour.

If this is so one expectation is that people would have expressed exclusivity by symboling their identity and their rights to places at a number of different spatial scales. The increasing identity between people and places on the landscape in terms of economic, social and ritual practice; "...a place pivotal within the cognitive scheme of things..." (Bender 1985a:26) is the main focus of this and the following chapter. The juxtaposition of a theory concerning the primacy of place in economic and social process raises questions concerning boundaries, their establishment and maintenance and how (in the current context) these might be archaeologically identified. The artefactual data are examined from the viewpoint of isolating and tracing the development of a regional boundary and provides some idea as to what this boundary looks like 'on the ground'. Specifically I show that certain attributes in the lithic assemblage contribute towards the definition of a socio-spatial boundary which provided a stable basis for LSA intra-and inter-group interaction between about 5000 and 2000 years ago. Before doing this I discuss the theoretical relationship between style and behaviour.

Proof of boundaries is difficult to furnish archaeologically. In its pursuit, one of the fundamental debates in archaeology, particularly in Stone Age studies, is brought to bear; that of attempts to isolate functional attributes from stylistic ones which may be used in some general way as evidence of group or ethnic identity. If such stylistic attributes can be isolated, how can we transpose any distinct spatial or temporal patterning we observe into anthropologically comparable units? More basic, however, is the behaviour underlying the construction of style and its social manipulation. It is the conclusion that style is actively manipulated that underpins the following analyses of the tools and ornaments. Issues raised by the more recent debate between Sackett (1985) and Wiessner (1985) are germane to the problem of style definition and its behavioural basis. Elements from both their approaches are employed in this analysis (Sackett 1982, 1986; Wiessner 1983b, 1984).

Wiessner's approach to style is placed within a general framework which holds that the overriding purpose of style is information exchange. Style functions to communicate an economic or social posture in order to create a basis for predictable interaction and interchange between individuals and groups (Conkey 1978, 1980; Wiessner 1983b, 1984, 1985). Active stylistic manipulation of objects summarises social roles and alliances and identifies the appropriate behaviour and responses to an individual as an individual, or to an individual as a member of a particular social group. Of importance in the context of this study is that style broadcasts information concerning boundaries, their shape and their social content. Style perceived in this way is iconographic or emblemic (Sackett 1982:60). Fundamentally, its constitution and manipulation is active, conscious and purposeful and its deliberate manufacture is aimed at 'messaging' and targeting [illegible] groups. It can be consciously held as an emblem of group affinity.

In the analysis of San beaded headbands and projectile points Wiessner (1983b, 1984) found that the social context of active symbolling is not uniform between these different artefacts. Beaded headbands give information about an individual and an individual's relations which bear no resemblance to boundaries and which are not actively manipulated for the maintenance and definition of boundaries. On the other hand, style in projectile points did correspond to ethnic groups at the level of the band nexus and linguistic group. This expresses group identity and coherence.

Sackett (1982, 1986) has introduced the concept of isochrestism (equivalent in use) into the style debate. Style, to Sackett, is not an iconographic residue left over once purely functional attributes have been isolated, but is something which permeates both realms. Both style and function "...share equal responsibility for all formal variation observable in artefacts" (Sackett 1982:68). Consequently, the term isochrestism denotes that "...there normally exists an appreciable range of equivalent alternatives, of equally viable options, for attaining any given end in manufacturing craft products" (Sackett 1985:157). A suggested local example comes from Leslie-Brooker (1987:147-8) who sees the functionally equivalent (woodworking) but morphologically variable strangulated scrapers of Natal, 'slugs' in the western Cape and adzes and kasouga flakes in the eastern Cape as isochrestic variants.

While both Sackett and Wiessner admit that iconicism and isochrestism need not be mutually exclusive theories of style and indeed, that both types can be present, the nub of the debate really concerns the behavioural basis of these. As already mentioned, San projectile points are considered by Wiessner to impart information concerning ethnic identity at the band nexus and language level (Wiessner 1983b). This symbolling is actively asserted at these scales in order to provide an appropriate basis for behaviour. Just as style is purposive and conscious in the context of boundaries, it is actively suppressed at the inter-band scale. This, Wiessner argues, is to facilitate freedom of movement within economic and social interactive networks. Stylistic manipulation therefore operates in risk reduction to define both the range and the boundaries of an interactive sphere. We can, on the basis of this, predict and expect that changes in risk management strategies may be manifest in corresponding adjustments to the range over which like-stylistic attributes are distributed.

To Sackett, however, the development of stylistic differences is habitual within developing craft traditions and the choice of any attribute is passive. These attributes are not actively asserted to provide information to target groups about interaction and boundaries (Sackett 1985). While style may come to do this, it was not originally intended to do so. In the case of the San projectile points, Sackett takes the simpler explanation and posits that style differences at the inter-band level do not exist simply because people do come together. Style differences emerge as a result of a lack of familiarity with another craft tradition, which results in divergence and isochrestic variation.

Formulating an appropriate behavioural framework for explaining stylistic attributes, whether specific or of a general assemblage character, is difficult, given that in the case of stone tools there are no ethnographic guidelines which help identify what attributes are relevant. It is for this reason that I choose the behavioural background posited by Wiessner. This is consistent with a general framework that people actively constitute their material world and in so doing allow identity through comparison (Wiessner 1984:190) and which would be visible for interpretation in the archaeological record.

This position does not deny the usefulness of isochrestism, but questions the lack of a behavioural basis for explanation. Isochrestism does allow an approach to style which can be orientated at the assemblage level and not simply attempt to isolate stylistic 'adjunct' attributes. Such an approach considerably broadens the use to which 'conventional' functional typologies can be put. This has been done, for example, by Mazel (1989) for isolating "social regions" in the Natal Later Stone Age. However, Sackett himself cautions against this: "In truth, given the present state of lithic archaeology, we are largely ignorant of how ethnicity and activity, style and function, express themselves at the level of the assemblage" (Sackett 1982:77). Given the complete lack of any lithic San ethnography I prefer to use the conceptually firmer position adopted by Wiessner. I also maintain, as is suggested below, that 'adjunct' style can be isolated in the lithics to be described.

Where a reasonable case for adjunct stylistic attributes can be made, I propose that these are preferable for the aims of this study, but also acknowledge that judicious use of aspects of assemblage variability may also have utility for the definition of boundaries. In this regard Leslie-Brooker's (1987) suggestion of kasouga flakes as an isochrestic variant of adzes is a useful starter. Furthermore, on the basis of Wiessner's analyses, it is apparent that different stylistic aspects of an assemblage work in different scales of social context other than simply the definition of group boundaries. While not developed to any degree, this is an important consideration for explaining the peculiar heterogeneity within certain artefact classes in the eastern Cape.

LITHIC ARTEFACTS

PROCEDURES AND DEFINITIONS

The analysis of the artefacts is divided into two sections. First, the lithic components of both Edgehill and Welgeluk are described, followed by tools and ornaments made from materials other than stone. Regional comparisons between both sites and those in the eastern extension of the CFB, specifically Wilton (Deacon, J. 1972), Melkhoutboom (Deacon, H.J. 1976) and especially Uniondale (Leslie-Brooker 1987) are made when relevant. When these latter sites are referred to collectively, they will be called the CFB sites. Lithic artefacts were recovered from all excavated units. Sample size required that units be lumped to facilitate meaningful comparison. The way in which layers and levels were combined into units depended in some measure on general shifts in the lithic assemblage composition. (These have already been detailed in the section dealing with stratigraphy.)

Lithic analysis has followed the typology developed and used for previous analyses of the CFB site assemblages (Deacon, J. 1972, 1984; Deacon, H.J. 1976; Leslie-Brooker 1987). Where sample size has allowed, procedures used by the above writers for the metrical description of selected tool classes have been followed. These methods allow a good summary of the data and, above all, allow direct comparison with the other sites. The definitions of the typology for the most part follow common usage. Two types, however, require definition. These are kasouga flakes and scraper-adzes.

Kasouga flakes were first defined by Hewitt (1921) and as Leslie-Brooker (1987:81) points out, the term flake is a misnomer, because bladelets were selected for this tool and not flakes. Retouch is particularly characteristic, comprising shallow and invasive flaking from the laterals for the most part on the main flake surface.

A minor sub-class of scrapers has been separated because of a distinctive form and temporal distribution. These are variously known as 'duck-billed scrapers' or 'scraper-adzes'. The latter term is used here. As the name implies, these tools combine both scraper and adze attributes with the usual convex scraper retouch as well as laterals which have distinct adze-like steep step flaking.

Raw material types

Silcrete. As mentioned above, this material is not locally available in the region but was obtained from the Grahamstown peneplain, some 40 km to the south (Mountain 1980)(Fig. 3.3). Considerable importance is attached to the fact that silcrete is 'exotic' at Edgehill and Welgeluk.

Hornfels. Other terms for this material include lydianite and indurated shale (see Robertshaw 1984). The term hornfels is used here. Hornfels refers to dense, highly metamorphosed shale. This material is commonly available locally from the Koonap River gravels. As the above implies, hornfels was collected as river pebbles and not actively quarried from dyke locales (Fig. 3.3).

Quartz. This occurs in both crystal and 'milky' form and is locally available.

Sandstone. Sandstone is locally available from the Adelaide Formation. It was also collected as pebbles from the Koonap River gravels.

Chert and chalcedony. Neither rock type is common at the sites. The chalcedonies undoubtedly originated from the Zuurberg volcanics. The origin of the chert is less certain. It is possible that it is a local variant of highly metamorphosed shale.

Quartzite. This term refers to an indeterminate rock type which is either a specific variant of the local sandstone or, alternatively, has some similarity to Witteberg quartzite of the Cape Supergroup.

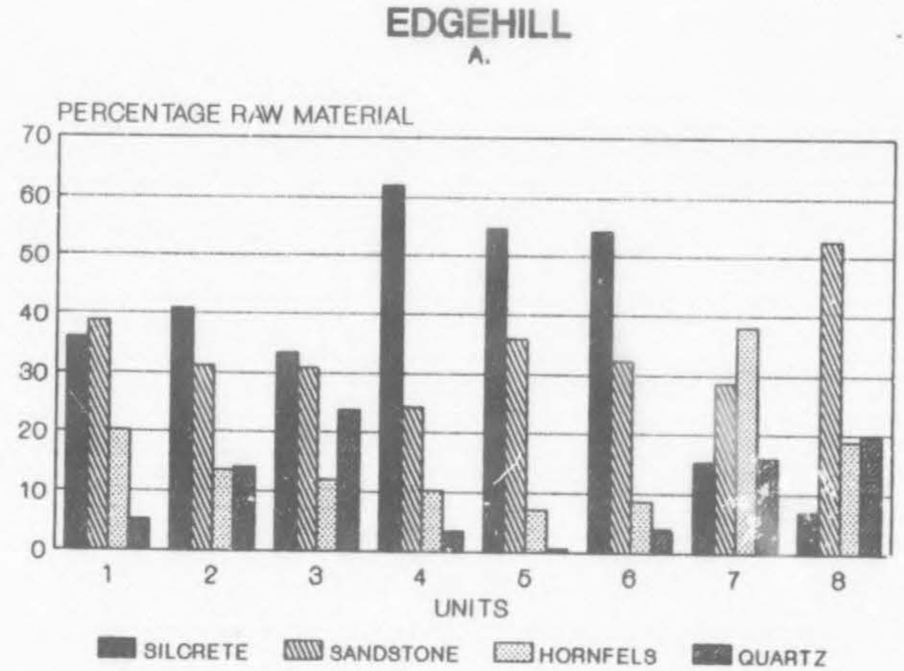
RAW MATERIALS: TEMPORAL DISTRIBUTIONS

Raw material change through time, both at Edgehill and the CFB sites, has been isolated as one of the most obvious and interesting aspects of the lithic assemblages for the purposes of this study. Because of the disjunction between the natural distribution of raw material types and their occurrence at Edgehill and Welgeluk one can explore the potential relevance of raw material changes in terms other than simply that of opportunistic local use. It is suggested that raw material and change in raw material frequency is actively selected, constituted and manipulated as a socio-spatial stylistic marker. This holds great potential for pursuing the themes in this thesis and while relevant in the context of Edgehill and Welgeluk also sheds further light on similar changes at the CFB sites. It is this aspect which is given most attention.

Edgehill

The percentage frequencies of raw materials for total waste, utilised and formal tools are given in Table 5.1, while percentage raw material use for each type within a class are in Tables 5.2, 5.3 and 5.4. In the waste class percentage frequencies show that silcrete, sandstone and hornfels dominate (Fig. 5.1a). Materials classified as chert, quartzite and chalcedony are minor in the waste but, nevertheless, are of interest in that most of them are found in the lower deposits dating between ca 4500 and 6000 BP (Fig. 5.1b). Raw material diversity is, therefore, greatest in these lower deposits and also indicates that by whatever mechanism, these materials are coming from a considerable distance. Silcrete would have been obtained from the Grahamstown peneplain and chalcedony from the Zuurberg volcanics.

Of further interest is that silcrete, while it is used in the ca 5500 to 6000 BP units 7 and 8, comprises only 15,4 and 7,1% respectively, but between units 6 and 4, it contributes between 50 and 60% of total waste forming a sudden and sharp increase (Fig. 5.1a). This interchange from hornfels to silcrete is clearly demonstrated when only these materials are graphed one against another for waste flakes and blades (Fig. 5.2a,b). The increase in silcrete usage at Edgehill partly corresponds to the decline in the minor raw materials pointed out above. The dominance of silcrete above unit 6 also comes at the expense of hornfels which contributes just under 40% in unit 7, but which drops to around 10% between units 6 and 2. Hornfels becomes somewhat more popular in the pottery unit 1. Quartz use shows a sigmoidal distribution reaching peaks of use around 20% in units 8 and 3 (Fig. 5.1a).



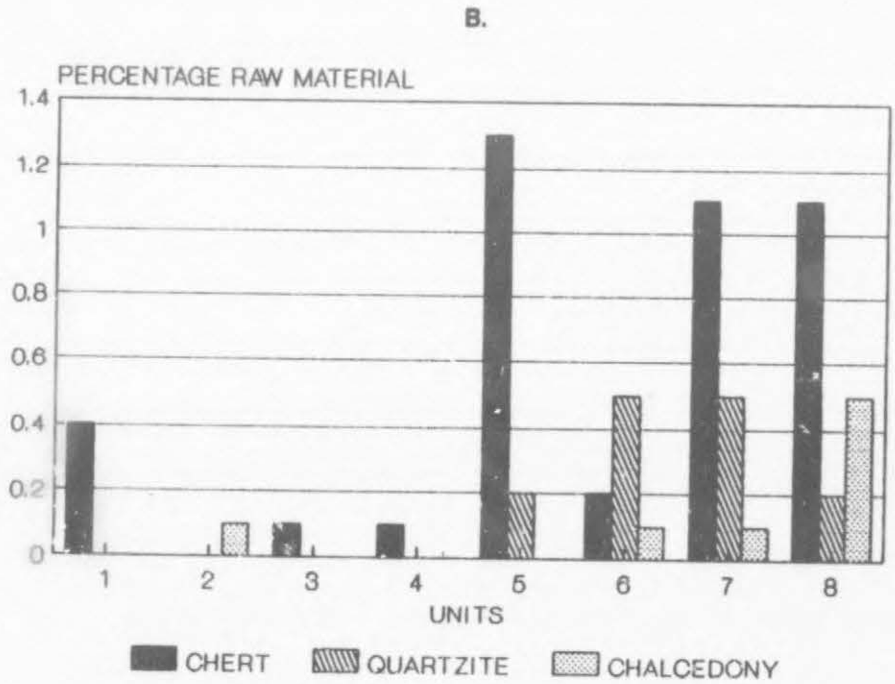


Figure 5.1. Edgehill: percentage raw materials for total waste

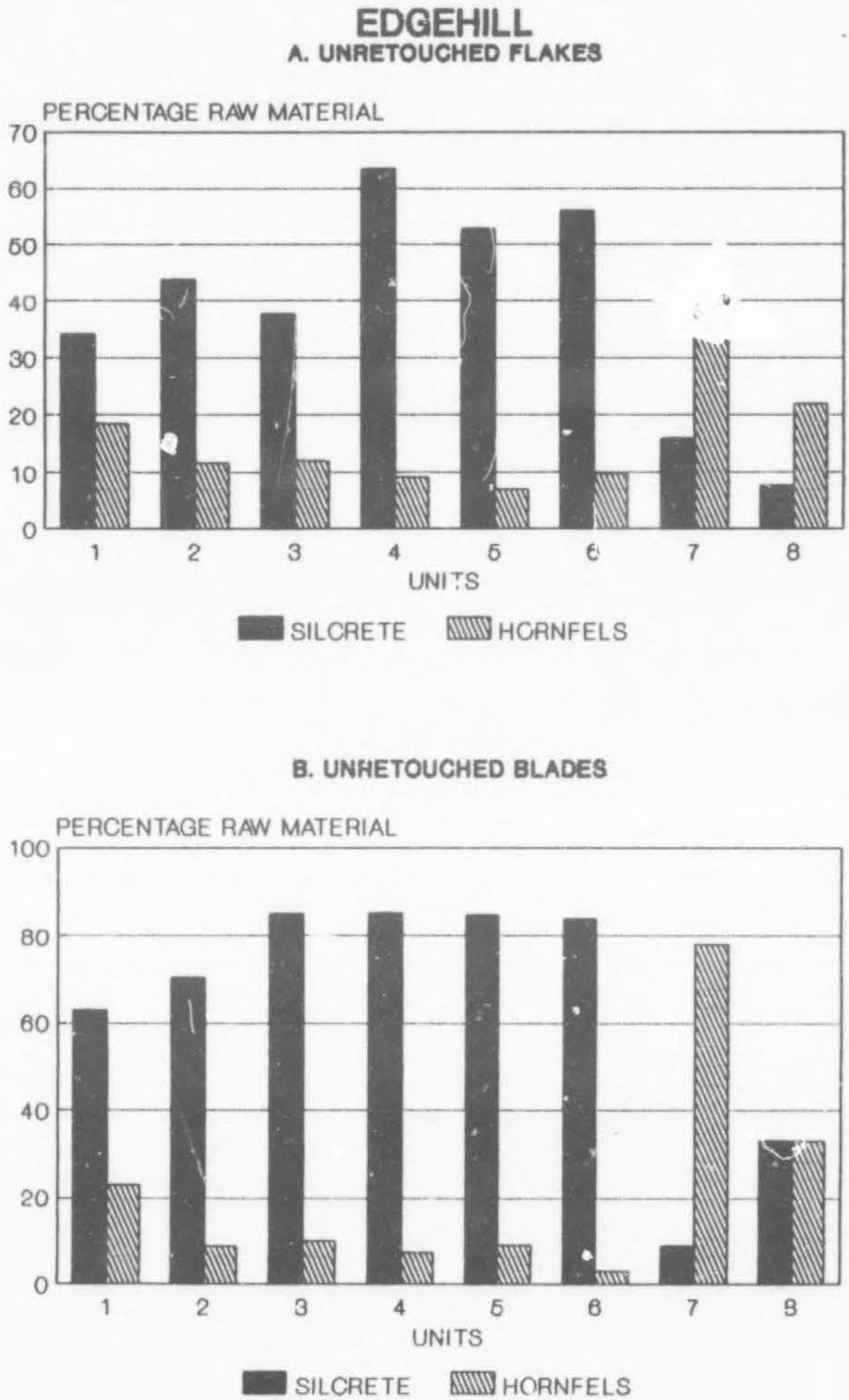


Figure 5.2. Edgehill: percentage raw materials for unretouched flakes

When raw material usage in the utilized and formal classes is examined, it is clear that there is greater selectivity, with silcrete and hornfels being the most favoured materials (Fig. 5.3a,b) (Table 5.1; 5.3 & 5.4). Among the formal tools raw material diversity is again highest in the lower unit 8. The shift at ca 5500 BP from hornfels to silcrete is again clearly present in the utilised and formal classes. In the utilised class sandstone accounts for just under 40% in the basal unit 8.

The raw materials of individual formal tool types indicate an overriding preference for silcrete above unit 7 and for hornfels below (Table 5.4) (Figs 5.4 & 5.5). This is in keeping with the general pattern already highlighted. Adzes are an exception and even in the silcrete units above 7, are still made for the most part from hornfels (Fig. 5.4). The percentage frequency of silcrete declines in the pottery unit 1 where local raw material use increases. This trend is also noted at Uniondale (Leslie-Brooker 1987).

The preference for silcrete in the formal tools of the post ca 5000 BP CFB site assemblages is repeated. Prior to this time, the frequency of chalcedonies was much higher. The shift towards silcrete from chalcedony is less marked at Melkhoutboom than at Wilton and Uniondale. This is explained by its proximity to chalcedony sources. It is of interest that at Melkhoutboom, segments in the post raw material 'flip' continue to be made exclusively on chalcedony, whereas silcrete is preferred for backed bladelets (Deacon, H.J. 1976:71, 73).

Welgeluk

When the distribution of raw materials for the waste and formal classes is graphed for all the layers (Fig. 5.6) (Table 5.5), it is clear that sandstone dominates in the waste class while in the formal class, silcrete is preferred. Silcrete also dominates in the utilised class (Table 5.6). In the ca 4000-4500 BP basal units 4A and 4B, however, silcrete is more prominent in the waste class but drops to well under 20% in the top three units. In the formal tools, silcrete is the preferred material all through the sequence except in the upper pottery unit 1A where only one formal tool was recovered which was made of local? chert.

Raw material diversity in the general waste and formal classes is relatively high in unit 4B then drops in 3 and 4A but is again higher in units 1B and 2. The diversity in 4B reflects a wide raw material catchment including chalcedony, while the unit 2 and 1B diversity points to a broader range of local materials being used with a particular increase in hornfels, sandstone and chert (Fig. 5.6). The percentage frequency of quartz in unit 4B (12%) is relatively high while in all the units above, it is only barely present or entirely absent in the

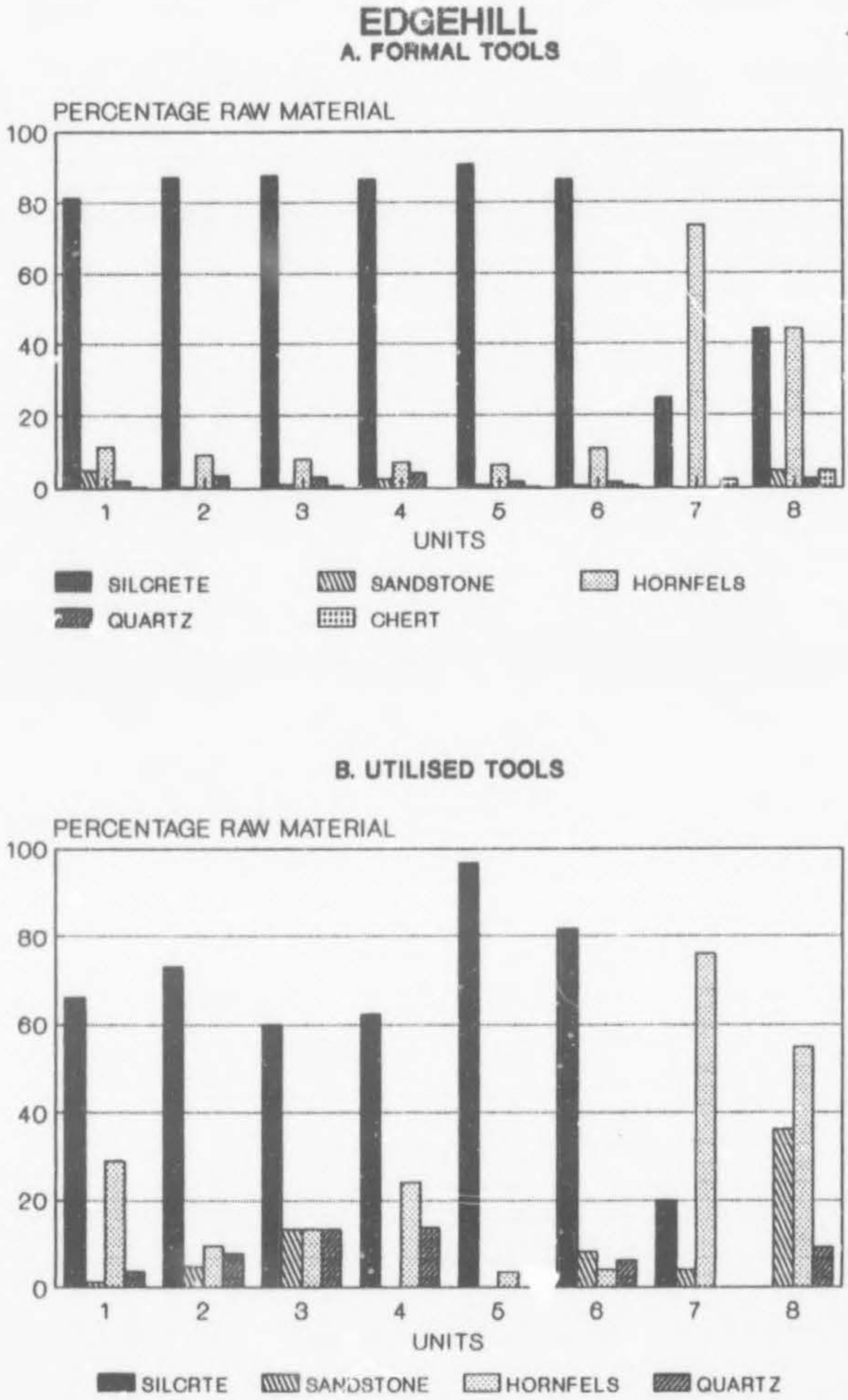


Figure 5.3. Edgehill: percentage raw materials for total formal tools

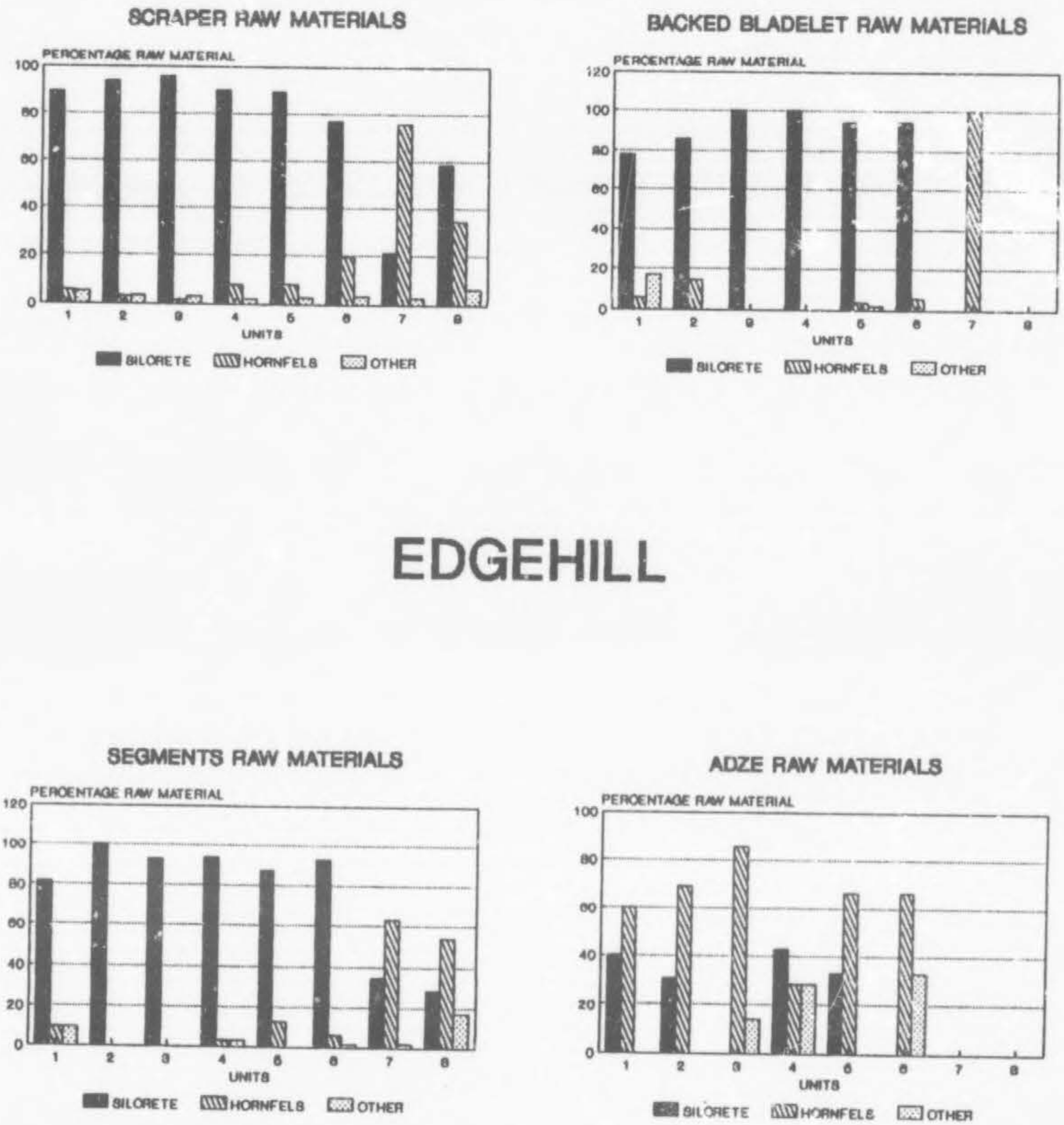


Figure 5.4. Edgehill: percentage raw materials for scrapers, backed bladelets, segments and adzes

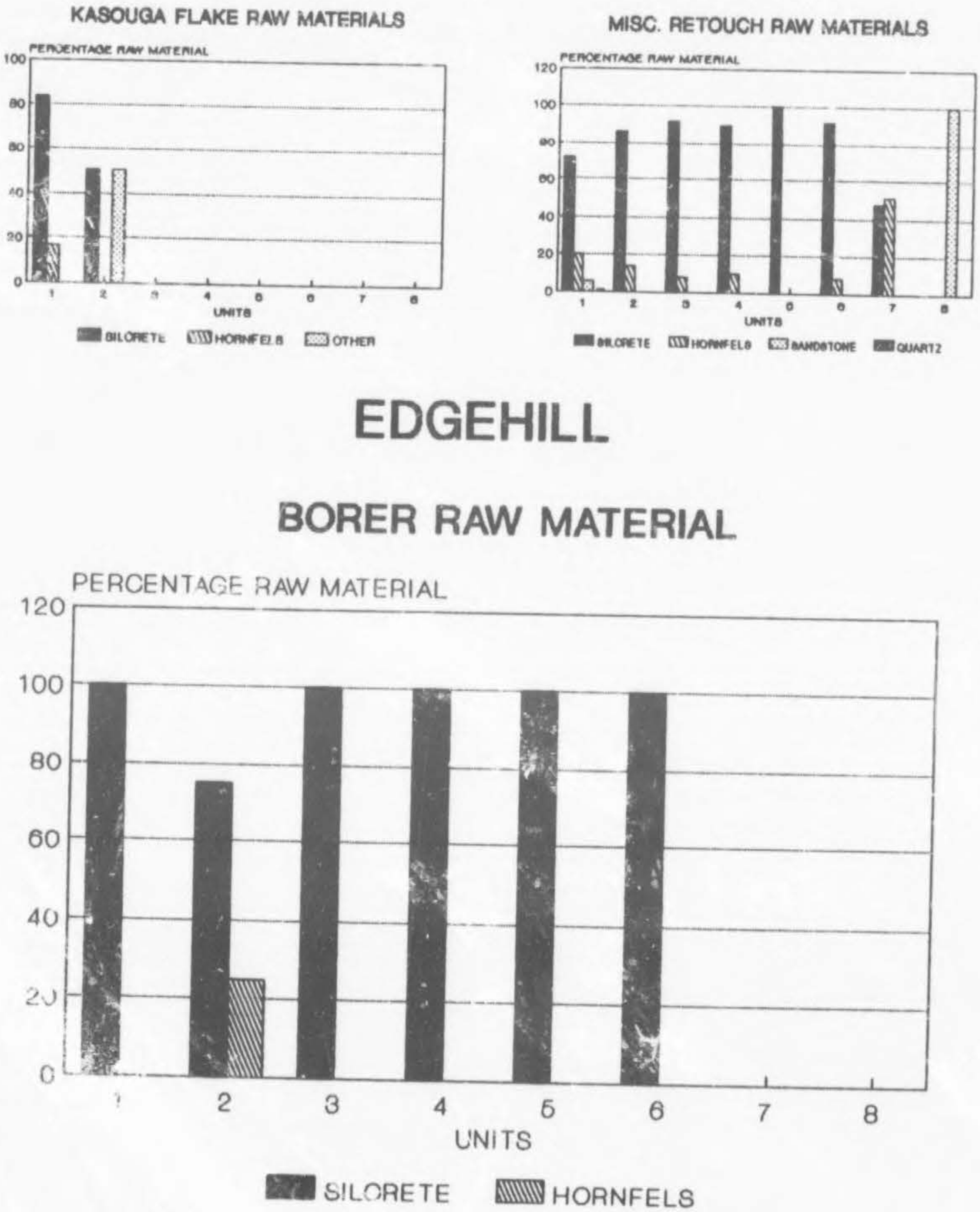
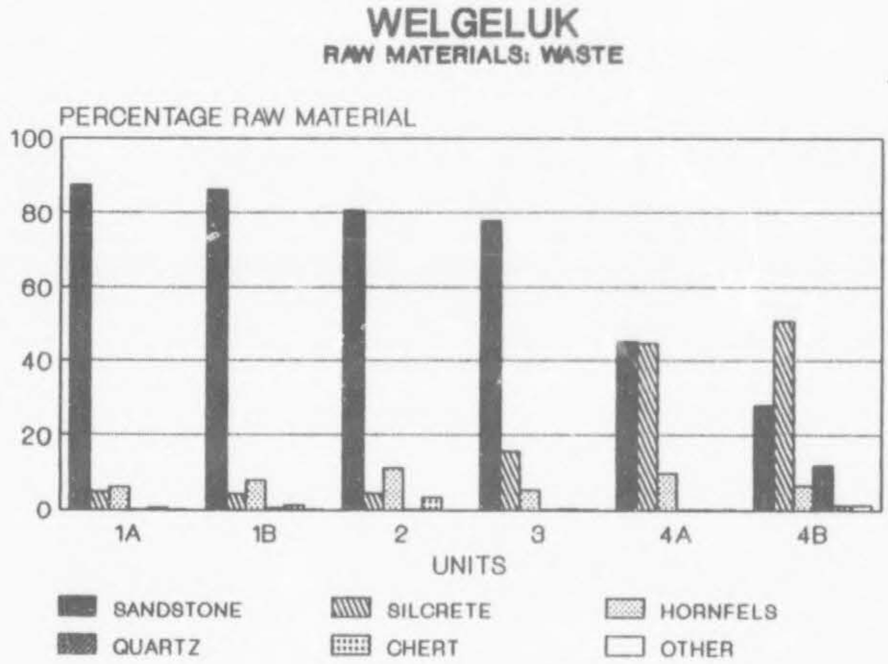


Figure 5.5. Edgehill: percentage raw materials for borers, kasouga flakes and miscellaneous retouched pieces



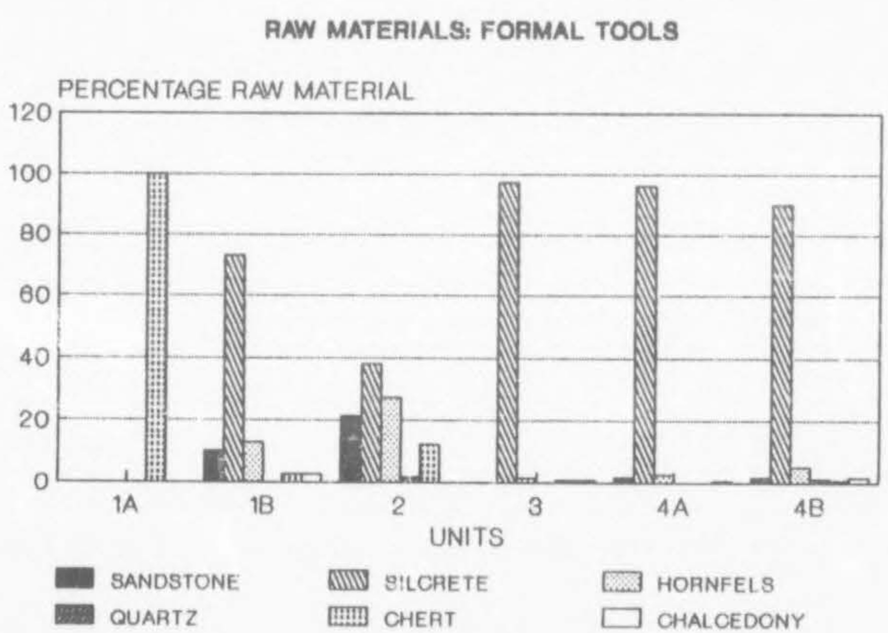


Figure 5.6. Welgeluk: percentage raw materials for total waste and formal tools

assemblage. The addition of these other raw materials is more apparent when pie charts for units 4A and 4B are examined (Fig. 5.7).

The distribution of raw materials in each tool type within the utilised and waste classes is given in Tables 5.6 & 5.7. When the percentage frequencies of raw materials in the formal classes are examined, it is clear that many of the observations made for the waste classes are repeated (Table 5.8; Fig. 5.8). Silcrete dominates the formal tool assemblage in all units except 1A, where the sample size of two formal tools provides no realistic picture. Raw material diversity tends to be highest in 4B, 2 and 1B.

Examination of raw materials within each formal tool class shows that for scrapers the distributions are similar to those outlined for the whole class together and that backed bladelets are made mostly from silcrete although hornfels and sandstone also feature in 2 and 1B. Segments are made from a variety of materials but silcrete again dominates in 4B where the highest segment frequencies occur. Adzes are made most frequently from hornfels while kasouga flakes are predominately in silcrete (Table 5.8). This pattern is repeated at Uniondale (Leslie-Brooker 1987).

THE INVENTORIES

Edgehill

Nearly 43 500 stone tools are used in the analysis which represents the complete sample of artefacts recovered. The gross and percentage frequencies are given in Tab.. 5.9. Of these, just over 95% have been classified as waste and 4,1% as formally retouched. Examination of the grand totals for each unit suggests that the densities of artefacts throughout the deposit are relatively even. To get another perspective on possible density fluctuations the number of tools per unit is divided by the total volume of the unit. This density index is precisely the same as the adjusted densities used at Byneskranskop (Schweitzer & Wilson 1982) (Table 5.10). The results of this adjustment for total waste, utilised and formal tools are shown in Figure 5.9.

Artefact densities vary through time. All main categories are relatively low in the 5500-6000 BP basal deposits (unit 8). Waste artefacts show the highest rates of discard in the 5500-4500 BP units 7, 6 and 5, with concentrations between 14 and 16 tools per bucket of deposit (Fig. 5.9; Table 5.10). In these same units, formal tools also increase in density but only

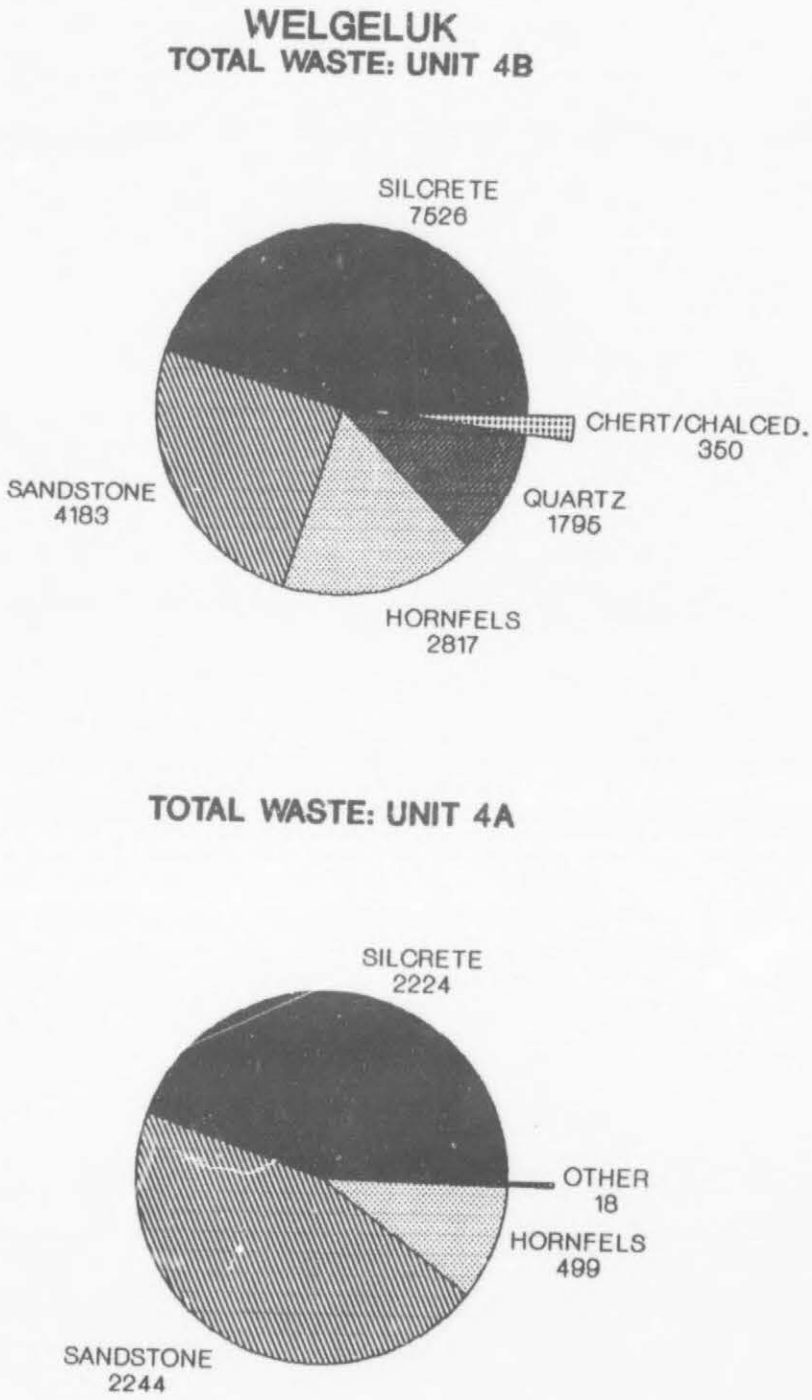


Figure 5.7. Welgeluk: raw material frequencies in units 4A and 4B

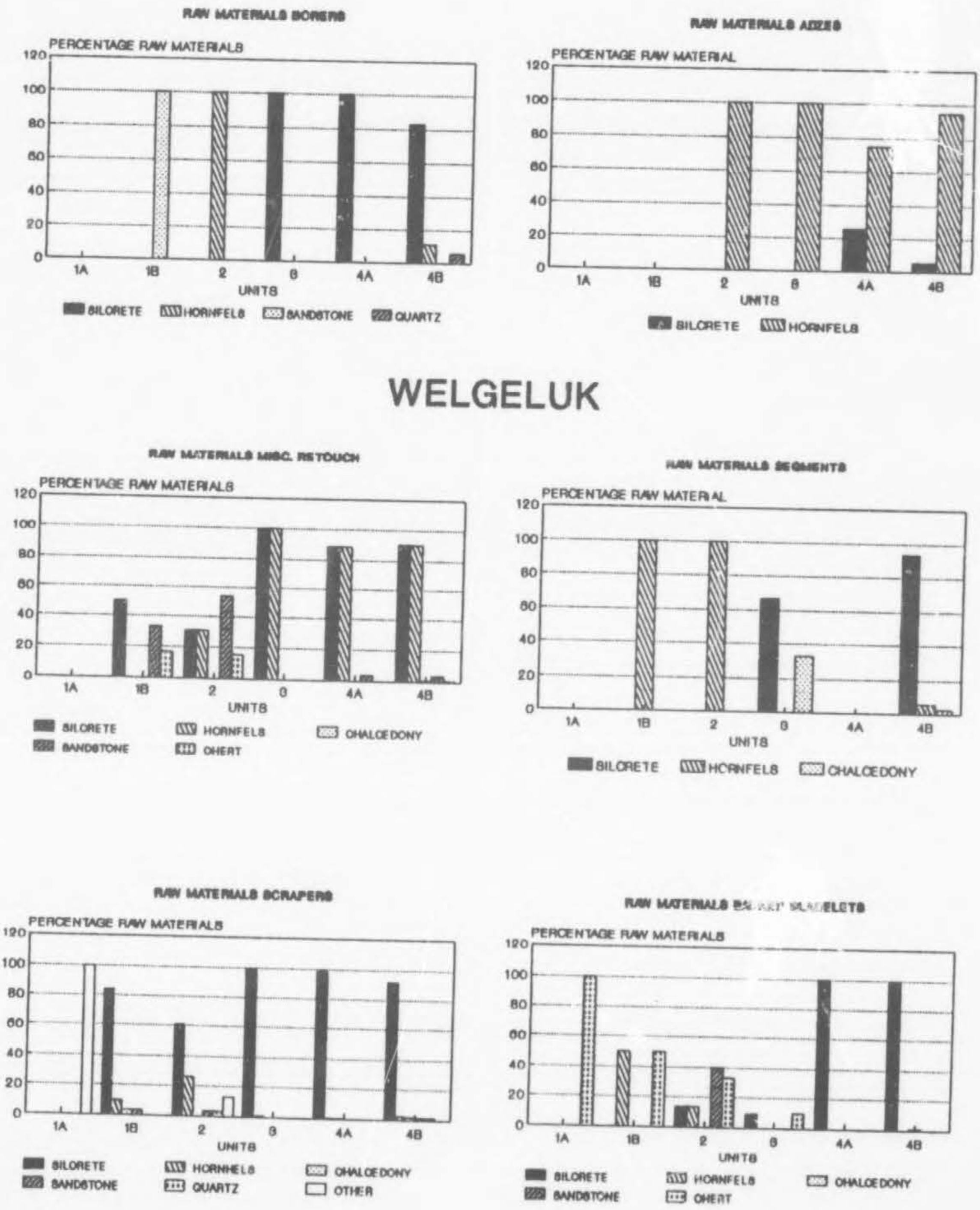


Figure 5.8. Welgeluk: percentage raw materials for individual formal tool classes

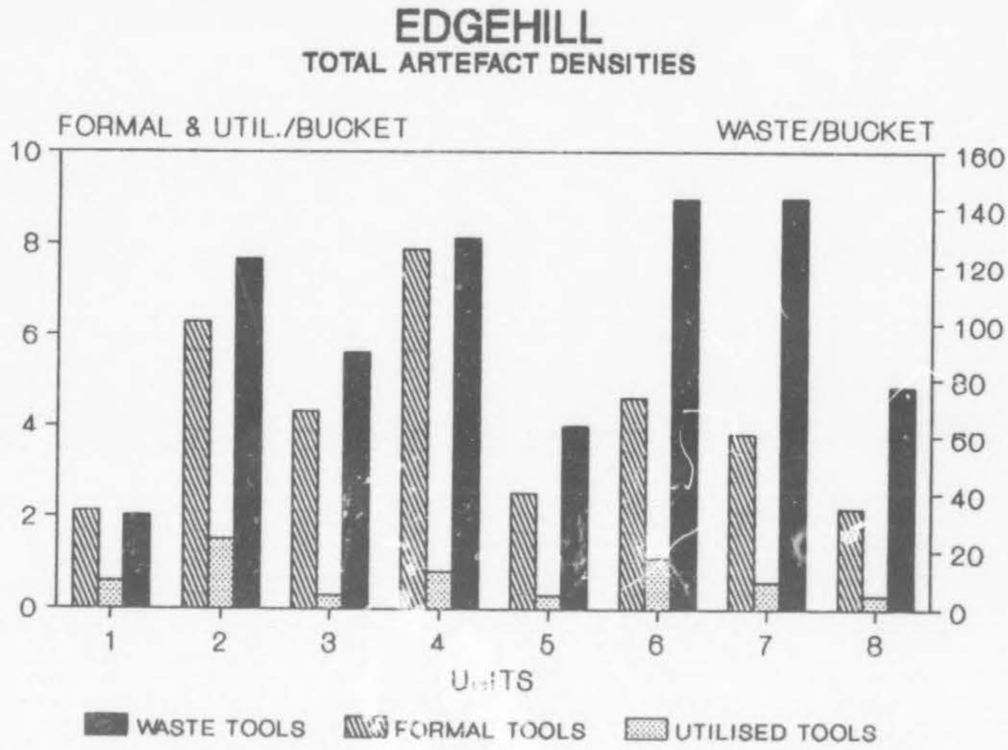


Figure 5.9. Edgehill: artefact densities for total waste, formal and utilised tools

reach their maximum density in the ca 4300 BP unit 4. Above unit 4 formal tools drop in density, particularly in the immediately pre-pottery unit 2 and the pottery unit 1.

As is usual for LSA stone tool assemlages, waste artefacts comprise 95% of the total sample (units 5, 6 and 7 having the highest overall densities) (Fig. 5.9). Within the waste class, unretouched flakes make up the bulk of this debitage (62 and 73% in each unit; Table 5.9; Fig. 5.10a). When unretouched flake densities are graphed there is much variability with no clear trends. There is, however, a marked drop off in the pottery unit 1 from over 80 flakes/bucket in unit 2 down to 20 in unit 1 (Fig. 5.10c).

Chunks vary in relative frequency from 13 to 24% with the higher frequencies in the top two pottery units. This may be attributable to the larger amounts of sandstone, and hence shatter of material in these units. The frequency of chips tends to increase with depth, averaging 10% of the total waste for units 1 to 4 and 19% from 5 to the base. This could be a product of the finer flaking techniques involved in the manufacture of smaller scrapers, segments and backed bladelets which all occur in higher numbers in these units. This is also reflected in the density calculation (Fig. 5.10c). No subdivision of the core class was made in this analysis and their distribution is relatively even although the relative frequencies reveal a lower incidence in the bottom three units compared to units 4 and 5 (Table 5.9; Fig. 5.10b,c). Unretouched blades are most common in unit 4 but are low in frequency in all other units. This is also clearly shown in the density calculation (Fig. 5.10d). Although there are eight formal tool types (Table 5.9), their distribution through the sequence varies considerably. Diversity in unit 8 is low and comprises scrapers, segments and a single miscellaneous retouched piece while the diversity in unit 7 only increases marginally through the addition of two backed bladelets (Table 5.9; Fig. 5.11a). Thereafter, however, adzes occur in low frequencies as do backed bladelets and borers (Fig. 5.11a,b). Scraper-adzes are restricted in their distribution to units 3 and 4 while kasouga flakes are only found in the upper two units. When the other tools are included, such as edge abraded blocks (see below), then the greatest diversity of tool types occurs from unit 4 upwards.

As is common for the formal tool component of LSA assemblages, scrapers dominate at Edgehill and contribute just over 50% of the formal tools. Gross scraper frequencies are relatively low in units 8, 7, 6 and 5 compared to the upper units. This is clearly reflected in the densities (Fig. 5.11c). The percentage frequency of scrapers in the pottery unit 1 seems high, but the density calculation shows a sharp drop off.

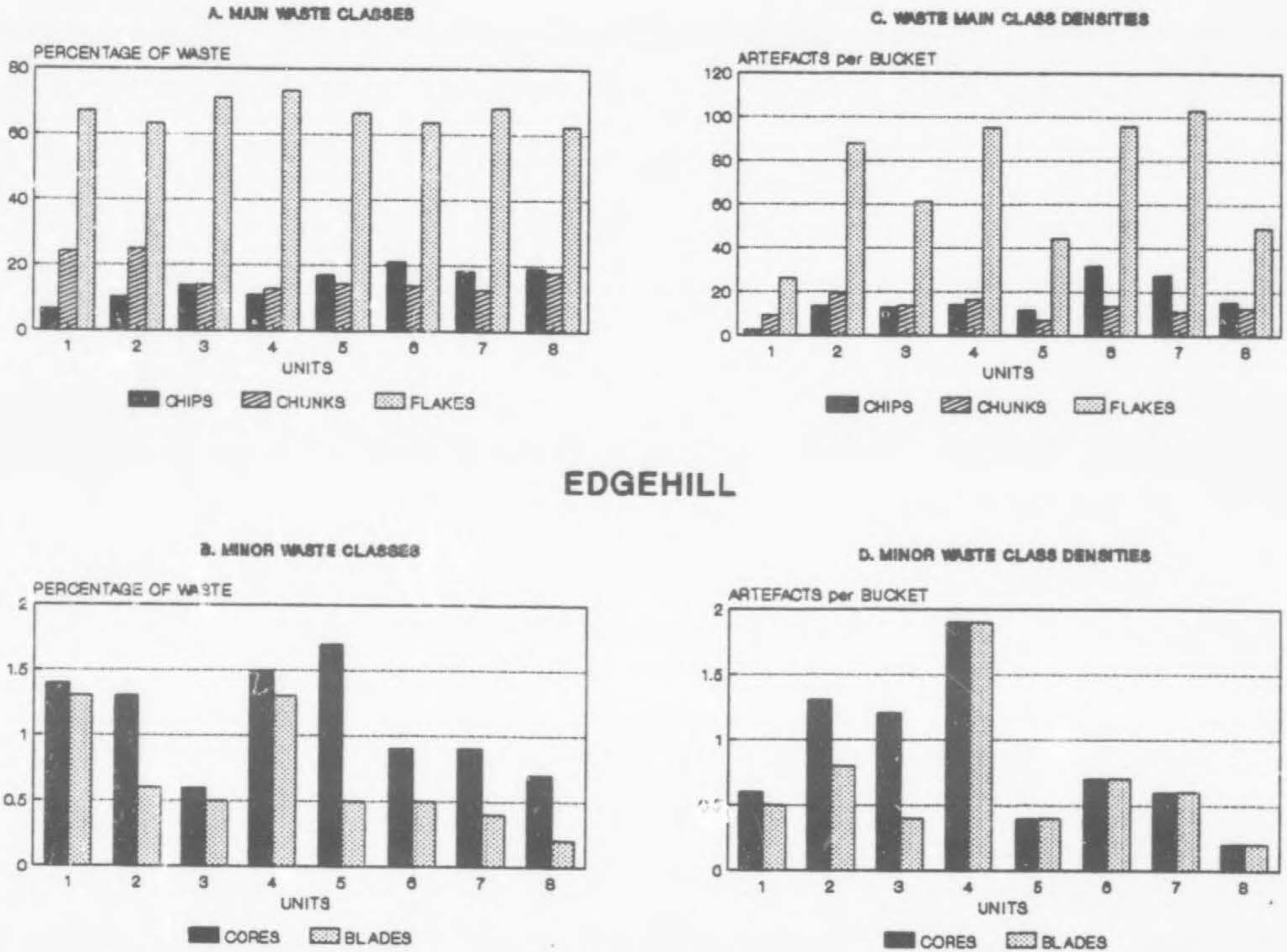


Figure 5.10. Edgehill: percentages and densities for total waste classes

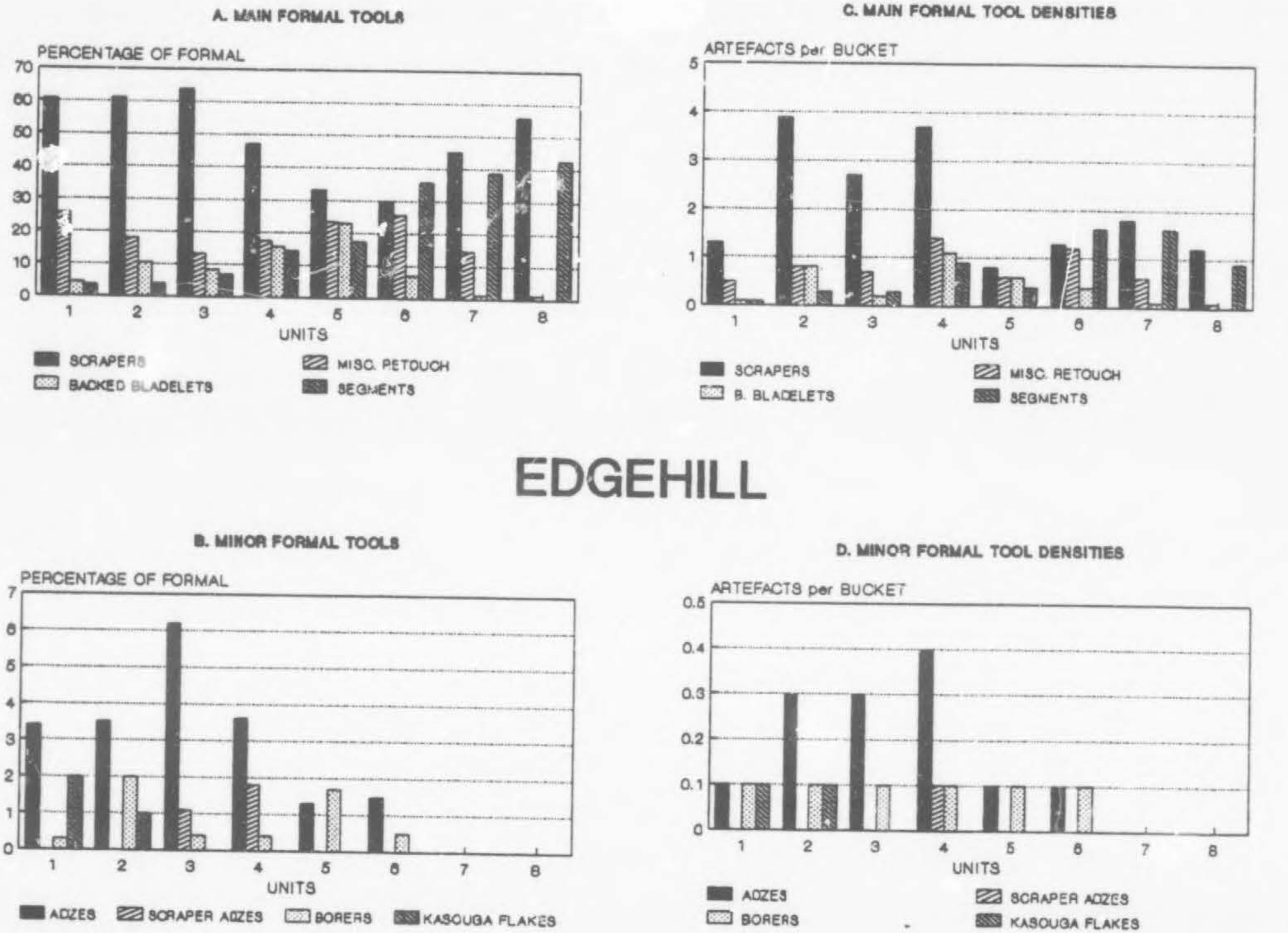


Figure 5.11. Edgehill: percentages and densities for total formal tool classes

Backed artefacts account for nearly 27% of the formal tool assemblage (Table 5.9). Backed points and segmented backed bladelets are more prominent from unit 5 upwards, representing nearly 23% of the formal tools in unit 5. In unit 7 backed bladelets drop markedly to 1,3 % and are entirely absent in unit 8 (Fig. 5.11a,c). The relative frequencies of segments consistently decreases from a high of just under 43% in unit 8 to 3,7% in unit 1 (Table 5.9; Fig. 5.11a,c). Table 5.11 shows the relative percentages of scrapers, backed bladelets and segments and Figure 5.12 graphically presents this and indicates the changes in relative importance of these three tool types through the Edgehill sequence.

Adzes are not common at Edgehill and are entirely absent from units 7 and 8 (Table 5.9; Fig. 5.11b,d). Most of the adzes were made from water worn hornfels pebbles with considerable amounts of the cortex unflaked. Leslie-Brooker (1987) suggests this feature is compatible with the woodworking function of the tool, because the smooth ventral aspect allowed for an easier planing action. The density calculation shows that there is a sharp drop off in adzes in the pottery unit 1.

Scraper-adzes are restricted in their distribution to units 3 and 4 while borers largely parallel the distribution of backed bladelets but are absent from units 7 and 8. Kasouga flakes are restricted to the upper two units (Fig. 5.11b,d).

Welgeluk

Waste classes at Welgeluk make up the bulk of the assemblage (96%) where chips and flakes are dominant (Table 5.12). Unit 4B is distinctive in terms of the gross frequencies with 40% of the total waste from the site recovered from this unit alone. Above 4B, gross frequencies remain relatively even but all waste classes show a sharp decline in the upper pottery unit 1A (Table 5.12; Fig. 5.13).

When the densities of waste classes per bucket are considered it is clear that 4A and 4B are similar in that waste densities are high in these basal units when compared to those above (Figs 5.13 & 5.14c,d). This is especially marked in the blade category (Fig. 5.14b,d). The densities of waste classes in 1A are low compared to those units below.

Utilised tools make up only 0,6% of the total assemblage and utilised flakes provide 63% of the total tools showing use (Table 5.12). The frequencies and percentages of utilised tools are generally low throughout the sequence. As with the waste classes, the utilised classes also exhibit a marked drop in densities after 4A and again are negligible in 1A.

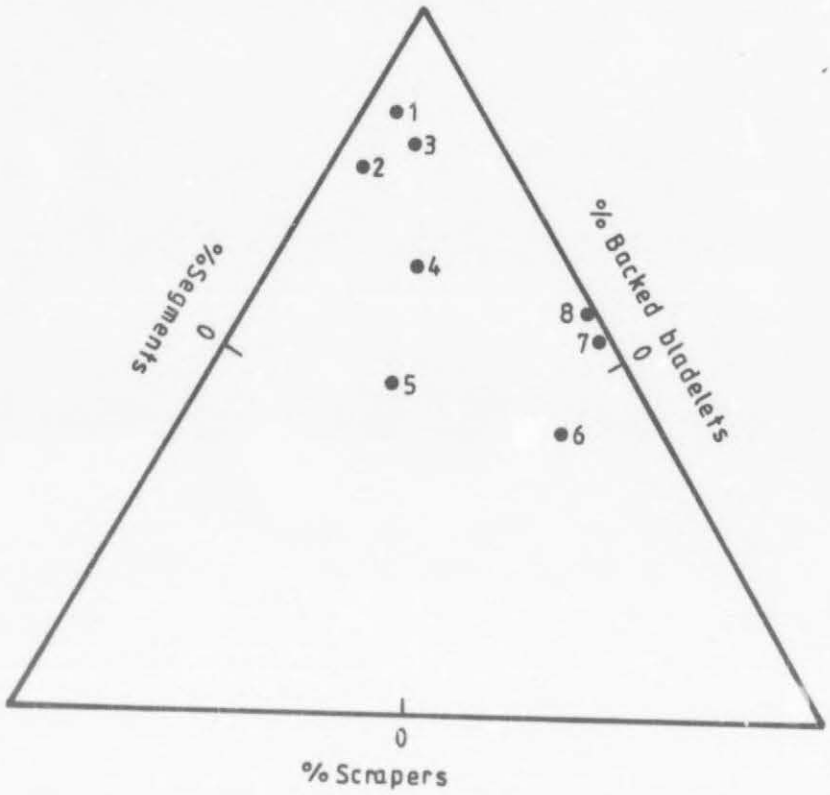


Figure 5.12. Edgehill: triangular graph showing the relative percentages of scrapers, segments and backed bladelets (numbers = units)

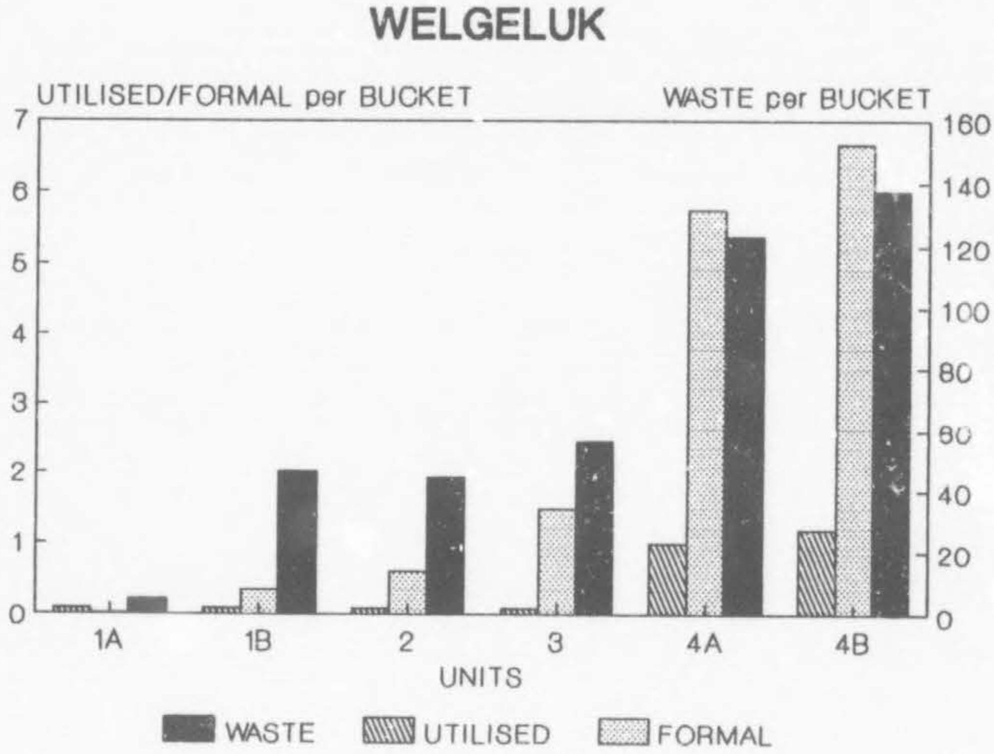


Figure 5.13. Welgeluk: total artefact densities for waste, utilised and formal classes

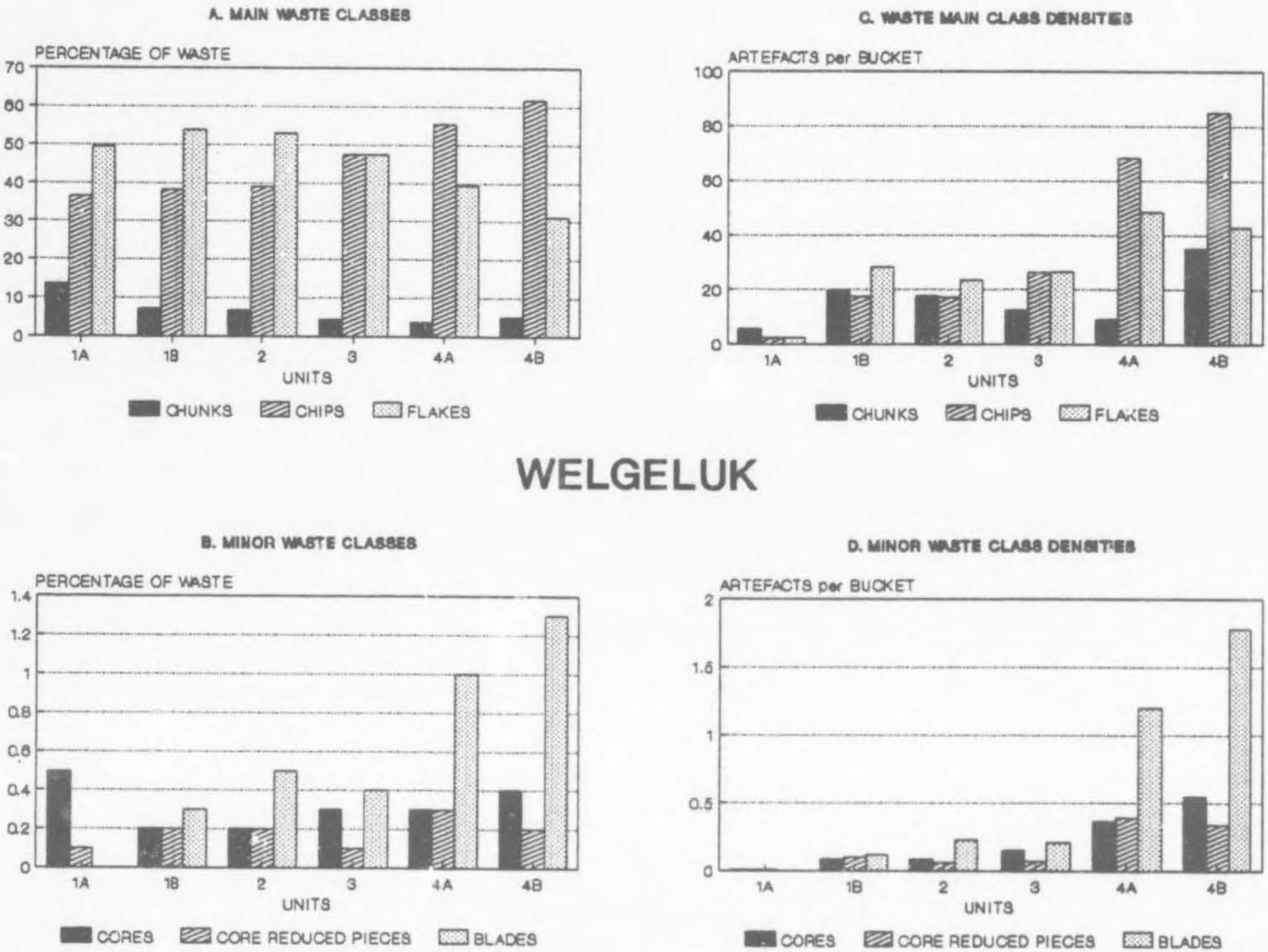


Figure 5.14. Welgeluk: percentages and densities of individual waste tool classes

Formal tools contribute just over 3% of the total assemblage (Table 5.12). Scrapers, as can be expected, dominate the formal tool assemblage contributing 64%, with 60% of this total coming from unit 4B alone. Thereafter, scraper gross frequencies show a steady decline but the percentage frequencies remain relatively stable (Table 5.12; Fig. 5.15a). The densities of scrapers, however, show that units 4A and 4B are again distinctive and are particularly high in these units (Fig. 5.15c). Densities are low in units 2 and 1B and drop to almost nil in 1A.

Backed bladelets contribute 13% of the total formal tool assemblage with 82% of them occurring in units 4A and 4B (Table 5.12). While they are still found in units 2 and 3, they experience a sharp decline in the pottery units. Segments are not common at Welgeluk and make up only 3,2% of the formal tool assemblage (Table 5.12). Most of the segments were recovered from 4B (87%) with few in the units above. Borers mirror segments in their distribution, being relatively high in 4B but low in the other units and entirely absent in 1A. Adzes are almost entirely restricted in distribution to 4B (76%) (Table 5.12; Fig. 5.15b,d) and are very low in frequency in the overlying deposits. Adzes are entirely absent from the pottery units 1A and 1B. Twenty eight kasouga flakes were recovered which make up 2,3% of the formal tool assemblage but are distributed only in units 3 and 4A (Table 5.12; Fig. 5.15b,d).

Tools showing some form of miscellaneous retouch make up 13,6% of the formal tool assemblage, of which 60% were found in 4B and 4A.

All formal tool density calculations show that units 4A and 4B are significantly higher than the younger units (Fig. 5.15c,d). Formal tool diversity is highest in unit 4B, and apart from three utilised and formal tools, the only lithic material in the upper pottery unit 1A is waste (Table 5.12; Figs 5.14 & 5.15).

METRICAL ANALYSIS

Edgehill

In order to maintain comparability with the analyses undertaken at Wilton and Melkhoutboom, a similar, although not as extensive, range of continuous and discontinuous measurements were made on the Edgehill sample. Comparing and contrasting these collections is prudent as changes observed in the scraper assemblages from Wilton and Melkhoutboom resemble the Edgehill sample and this is turn provides additional evaluation on the useful-

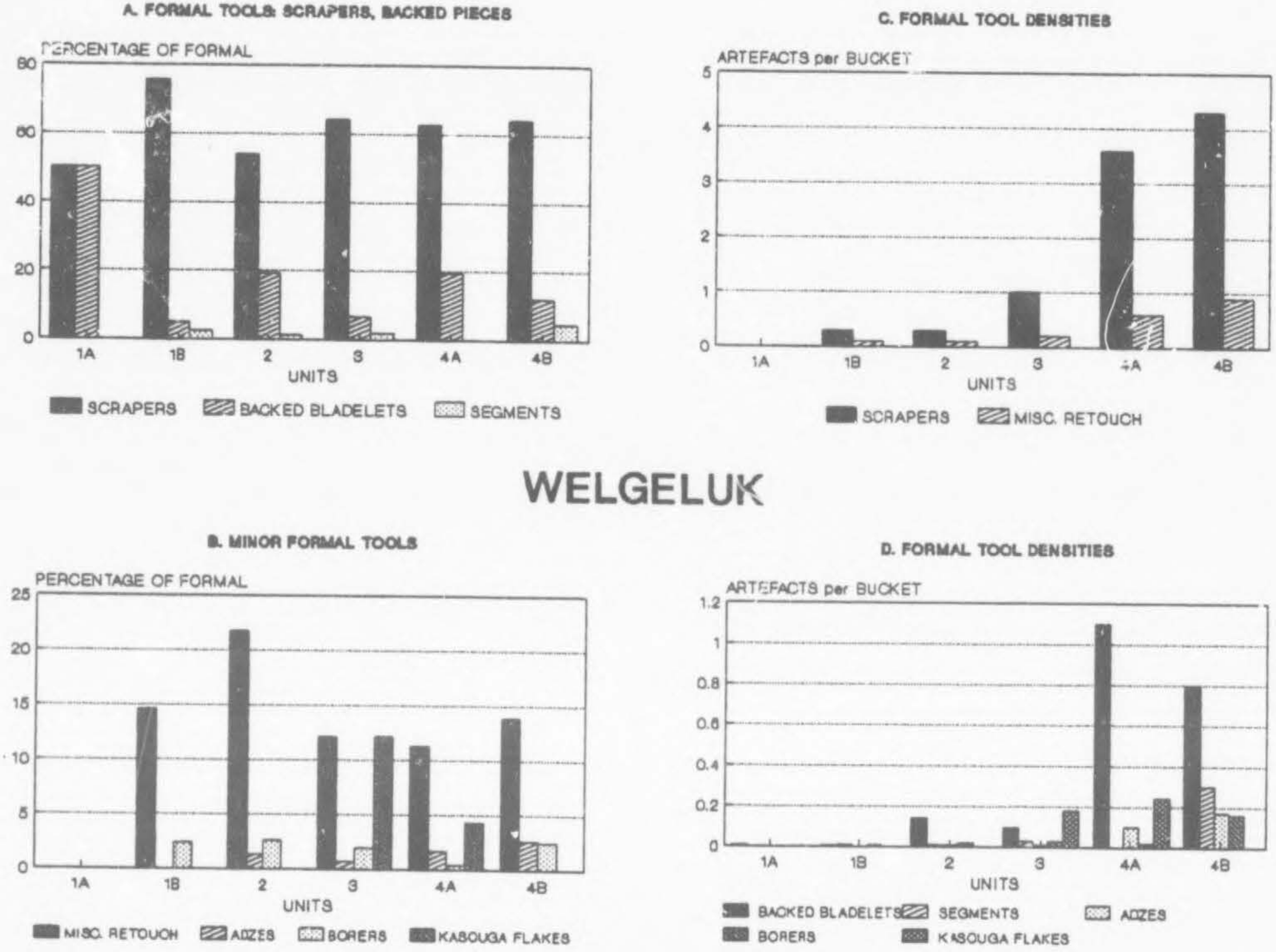


Figure 5.15. Welgeluk: percentages and densities of individual formal tool classes

ness of these metrical changes for interpretive purposes (Deacon, J. 1969, 1972, 1984, Deacon, H.J. 1976; Leslie-Brooker 1987). Specific interpretation, however, of the regional patterns which have been previously revealed and which this analysis confirms is not attempted. Comparison is used simply to show that the patterns are regional and as such back up the regional trends discerned in other data categories. In other words, all the data indicate a regional unity.

Scrapers. The Edgehill scraper sample was measured in seven ways; length, width, height, width/length ratio, plan form, position of retouch and the raw material from which the tool had been made. Summary statistics for these attributes are given in Table 5.13 and presented graphically in Figures 5.16 and 5.17. It is clear in these data that in all three primary measure-ments there is an increase in scraper size through time from unit 8 to unit 1 (just under 4 mm for length). This trend is somewhat disrupted in units 4 and 5. The ranges for scraper lengths and widths show that there is a marked increase in the size of scrapers in unit 1. The width/length ratio, which provides a summary index of shape (Fig. 5.16; Table 5.13) shows no clear trend. Scrapers are generally wider than they are long with markedly more square forms in unit 8.

In order to determine what role, if any, the change in raw material played in the length, width and height reductions in scrapers in the basal units, the mean lengths, widths, heights and width/length ratios were calculated seperately for silcrete and hornfels scrapers from units 6 down to 8, where both raw materials are present (Table 5.14). Although the samples are small, the results do tentatively show that the reduction in scraper size, especially from units 7 to 8, is more marked for silcrete scrapers than for scrapers made from hornfels. The lengths of scrapers made from hornfels actually increase from units 6 to 8, but again the small sample size warns that this result must be treated with caution. Overall, there is a size reduction in the widths and heights of hornfels scrapers. From this, however, it is possible to say that the scraper size changes observed from unit 6 to 8 are more marked for the silcrete scrapers than for those made from hornfels.

The distributions of plan forms and positions of retouch are shown in Figure 5.17. Plan forms are variable, but the positions of retouch do show some trends. When the end retouched scrapers are combined, it is clear that such forms dominate in units 1 and 8, and to a lesser extent, in unit 5. In all other units scrapers with side retouch are more common.

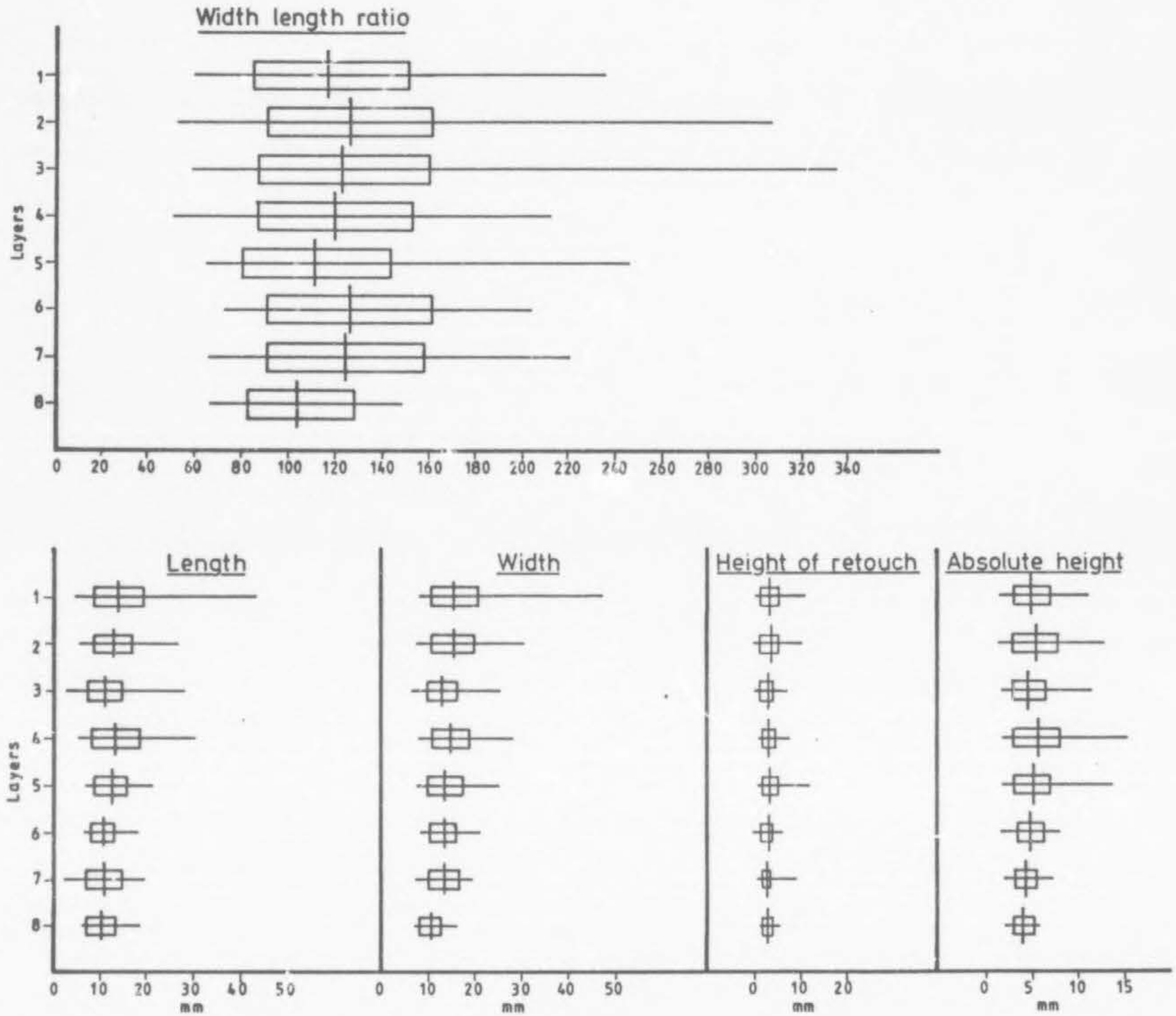


Figure 5.16. Edgehill: graphic summary of various scraper measurements (horizontal line = range, vertical line = mean, rectangle = standard deviation)

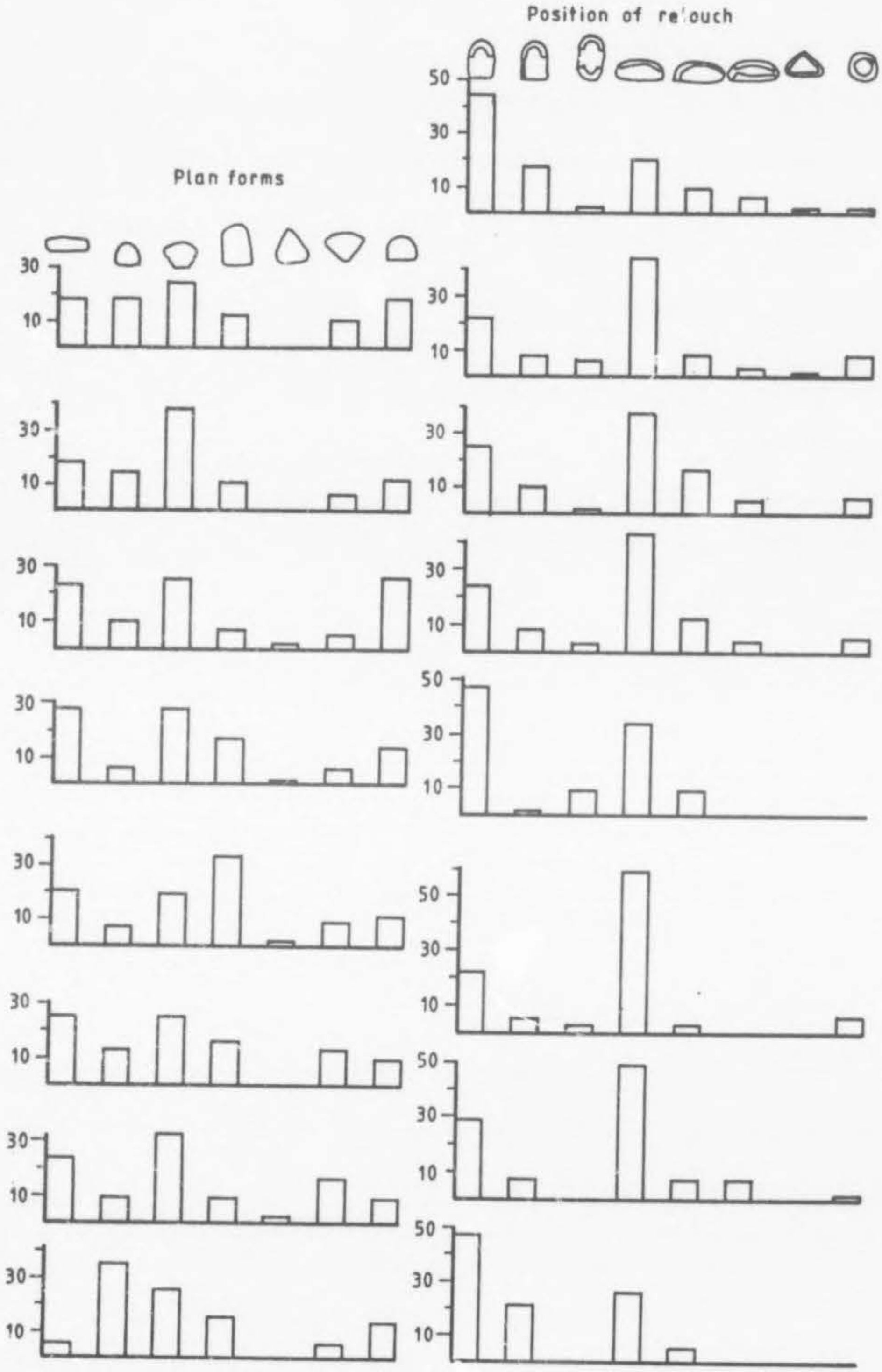


Figure 5.17. Edgehill: distributions of scraper plan forms and positions of retouch

Segments. Measurements made on segments include length, maximum width, height of the backing, the width/length ratio and the raw material from which the segment had been made. These data, shown in Figure 5.18 and Table 5.15, reveal segment length is variable through time. From unit 8 upwards, segment lengths increase, reaching a maximum in unit 5, then decrease through unit 3 and increase again up to unit 1. The same trends are also present in the segment widths and heights. It must be noted, however, that from unit 3 upwards the sample sizes are extremely small. The width/length ratios for segments show that in units 4, 5 and 6 segments are longer and thinner than those above and below.

In order to see what effect raw material has upon segment form, summary statistics are calculated for each raw material for the units 7 and 8 where both silcrete and hornfels segments occur together. The means for length, width and height are given in Table 5.16. In all dimensions it is clear that segments made from silcrete are smaller than those made from hornfels. However, even though segments made from silcrete are on average smaller than those made from hornfels, the size reduction noted for the combined raw materials for segments in units 7 and 8 is still present when the parameter of segment length is computed for each raw material separately. Whatever factor is posited for this size reduction, it was present in both raw materials.

Backed bladelets. Backed bladelets were additionally subdivided using the rationale and method outlined by Deacon (Deacon, H.J. 1976:141). The distribution of the backed bladelet sub-types is given in Table 5.17. All forms, except B, are present at Edgehill. It is clear that backed points (E, F and G) and segmented backed bladelets (H and I) dominate this assemblage. The sample is too small to infer changes in the frequency distribution of subclasses through the Edgehill units, although the prominence of unsegmented blanks (K) and proximal discards (L) in units 4, 5 and 6 is notable.

Although the major analysis of the backed bladelets was undertaken along the lines of Deacon (Deacon, H.J. 1976), the classification employed by Janette Deacon (1972) on the Wilton backed bladelets was also used to allow comparison with the discrete distribution of certain types through the Wilton sequence. Her typology for the Wilton backed bladelets is as follows:

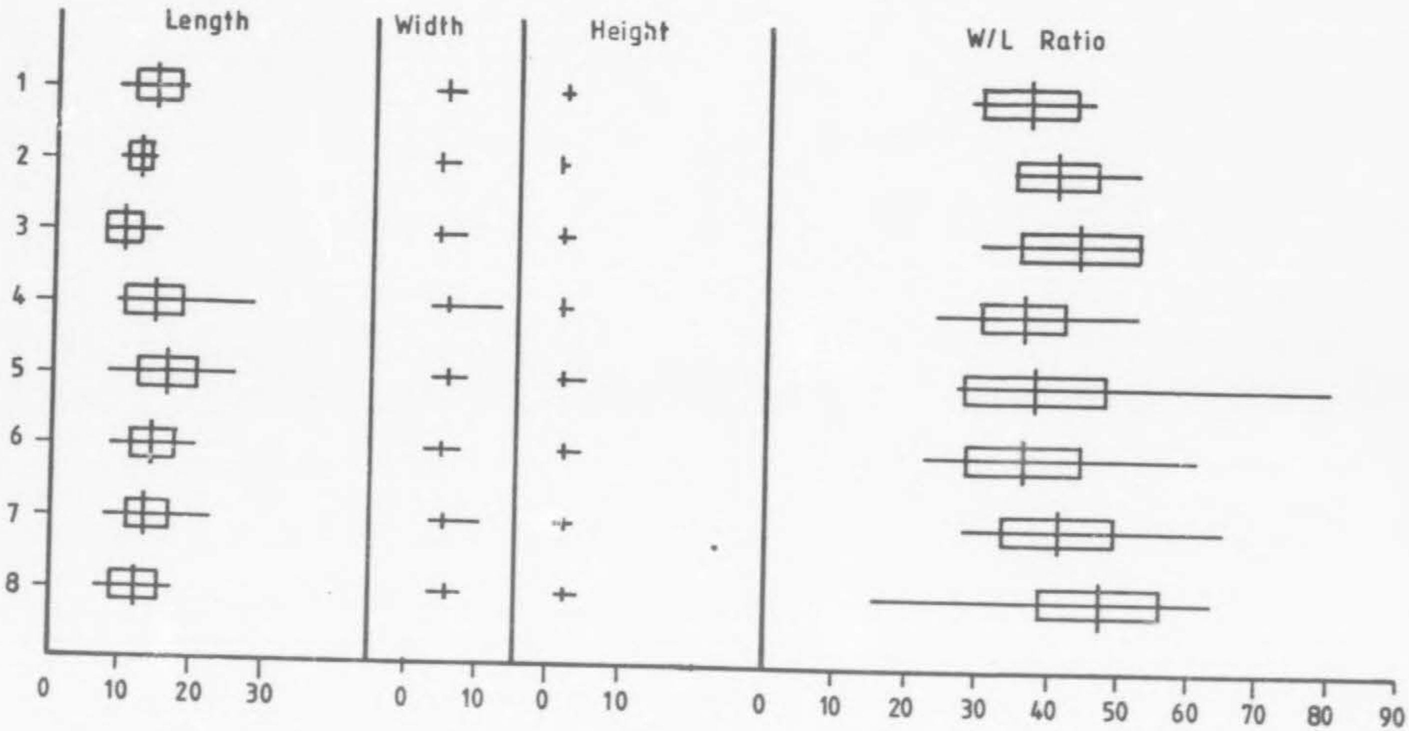


Figure 5.18. Edgehill: graphic summary of various segment measurements (horizontal line = range, vertical line = mean, rectangle = standard deviation)

Types

1. Backing along a portion of the tool (Table 5.17, type B).
2. Backing along the entire length of the tool (Table 5.17, type G).
3. Backing along the length of the tool and across one end. (Table 5.17, type F).
4. Backing along one end, but only along a portion of the tools length (not present at Edgehill).

At Wilton, types 1 and 2 account for 86% of the backed bladelet class, with type 1 contributing over 53% of this total. Type 1 tools (Table 5.17, class B) are not present at Edgehill. In the distribution of the Wilton class 1 and 2, class 1 is mostly distributed between units 2A, 3B, 3C and 3D, while class 2 pieces fall mainly within the lower units 3E, 3F, 3H and 4A. This distribution is not confirmed by the Edgehill sample.

Summary statistics for the Edgehill sub-classes E, F, G, H, and I are given in Table 5.18 for all units combined. Distal discards (E) are considerably shorter than backed points (F and G). Comparison of these measurements with those from Highlands (Deacon, H.J. 1976), shows that type F backed points are very similar, but that for types G, H and I, the Edgehill backed bladelets are much shorter, especially for the segmented backed bladelets H and I. The Edgehill classes H and I are metrically more comparable to the Wilton snapped backed bladelets.

Illustrations of a range of the Edgehill microlithic artefacts are given in Figs 5.19 through to 5.22.

Welgeluk

Scrapers. Scrapers are the only tool category with a high enough sample size for metrical analysis. Measurements for the one scraper in unit 1A are not presented (Table 5.19). Non-continuous attributes are given in Table 5.19. There is a trend towards smaller scrapers, both in length and width in the older basal units, but this is not easily discernible. The width/length ratios show that longer scrapers are the norm in 1B and 2, but that in all units below these, scrapers tend to be wider in form. It was found that significant numbers of scrapers can be interpreted as having been broken in use and not post-depositionally (Table 5.19). Percentage frequencies of broken scrapers indicate they tend to be present in relatively high numbers in units 3, 4A and 4B but lower in 2 and 1B.

Most scrapers are either divergent or parallel in plan morphology (Table 5.20: codes 3 and 4). Retouch position is generally towards the end of scrapers (codes 6, 7 and 8) while retouch

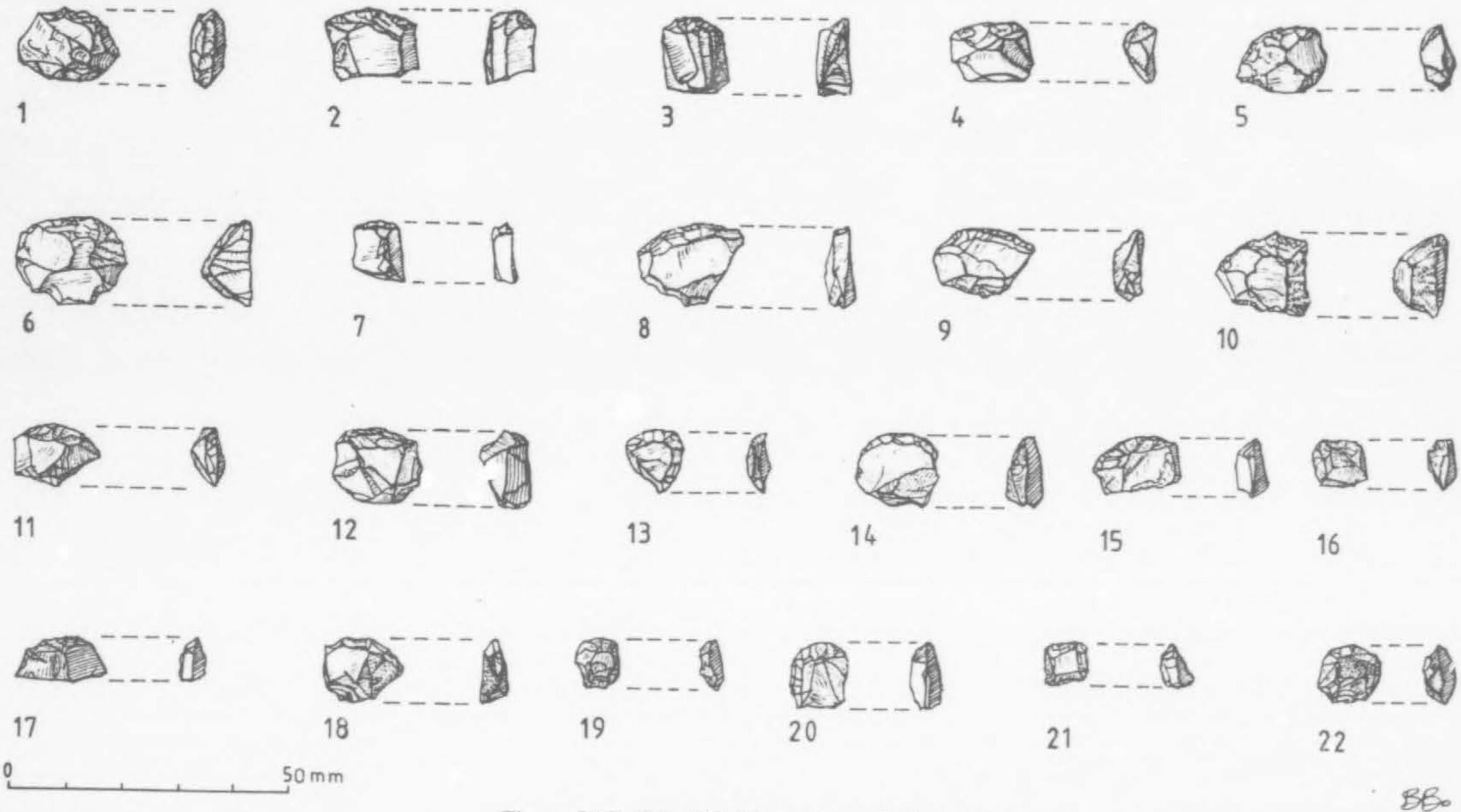


Figure 5.19. Edgehill: illustrations of selected scrapers

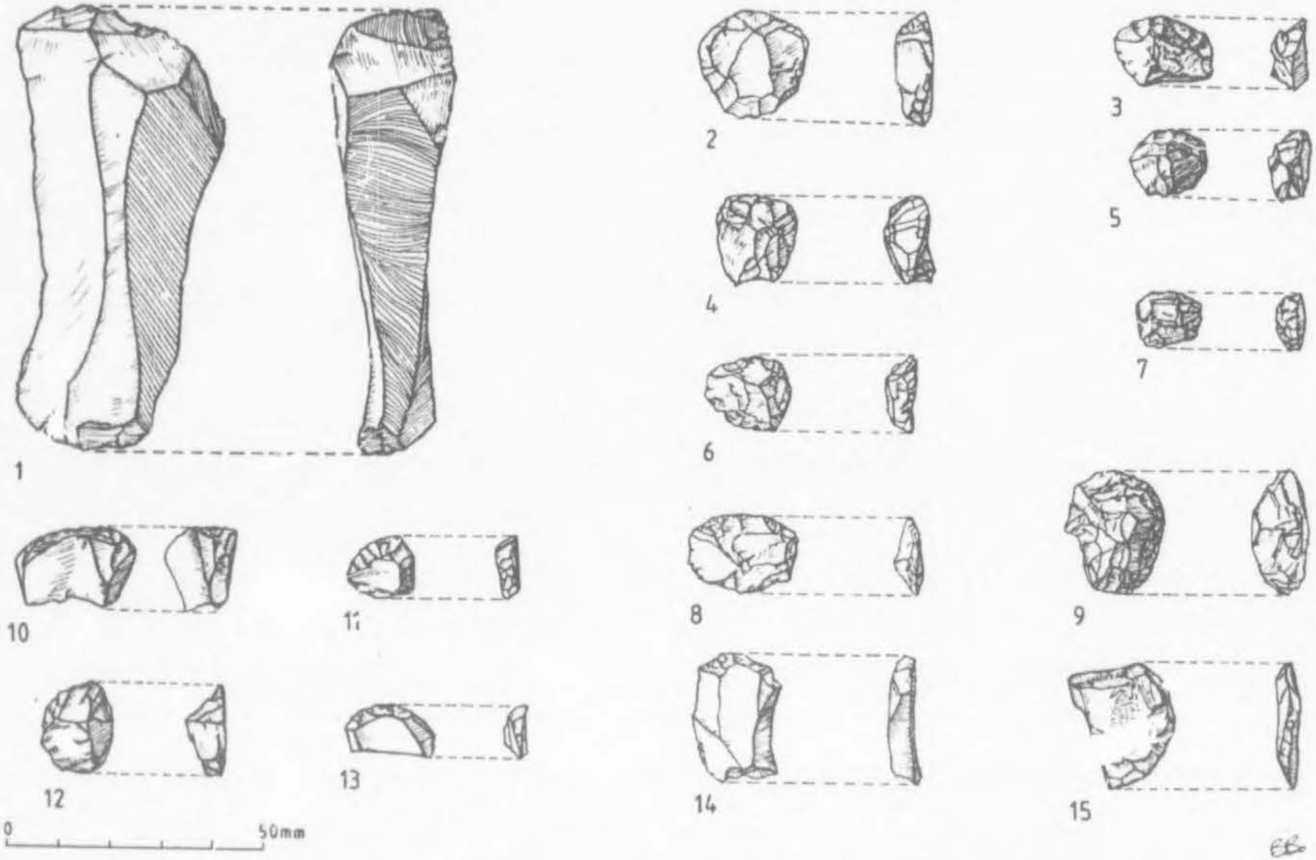


Figure 5.20. Edgehill: illustrations of selected scrapers (Nos 1 to 3 unit 5; Nos 4 to 10 unit 6; Nos 11 to 18 unit 7; Nos 19 to 22 unit 8; Nos 8, 9, 11 to 20 hornfels; No 22 chert; all others silcrete)

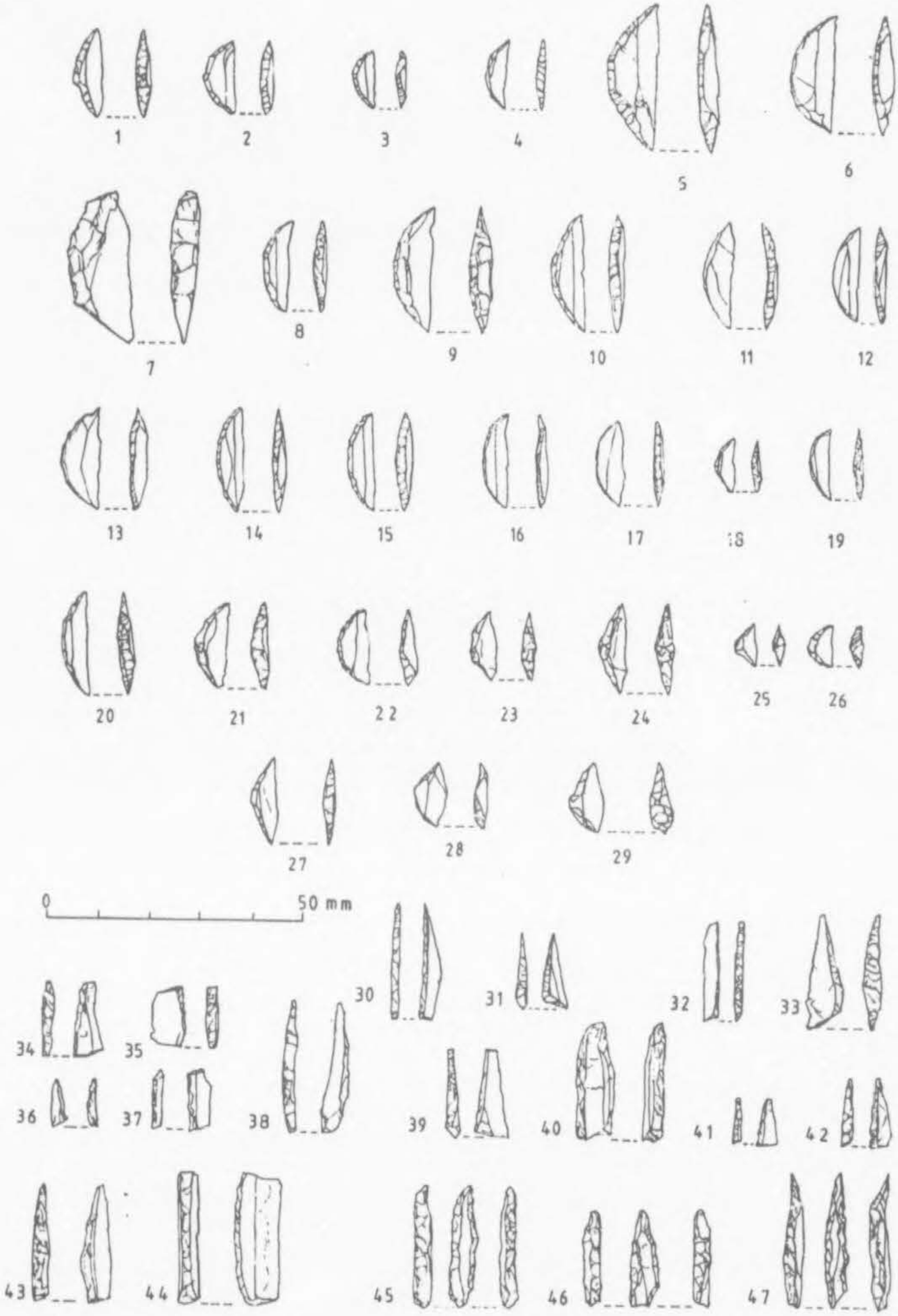


Figure 5.21. Edgehill: illustrations of selected segments (Nos 9 to 13 unit 5; Nos 14 to 20 unit 6; Nos 21 to 24 unit 7; nos 25 to 29 unit 8; Nos 30 to 37 unit 4; Nos 38 to 43 unit 5; Nos 44 to 47 unit 6; Nos 21 to 29 hornfels; all others silcrete)

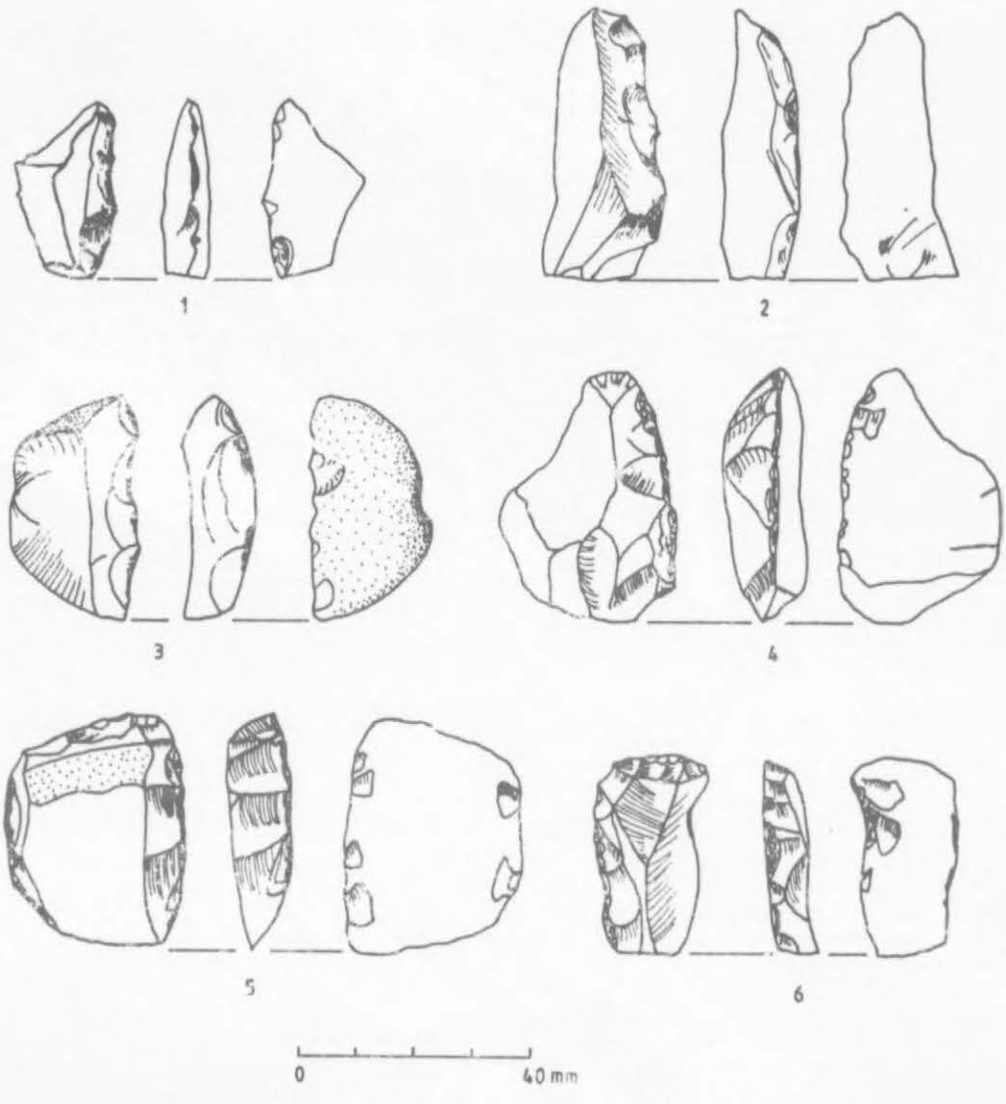


Figure 5.22. Edgehill: illustrations of selected adzes (Nos 1, 3 and 4 unit 1; No 2 unit 3; No 5 unit 4; all hornfels. No 6 is a silcrete scraper-adze from unit 4

along the longer sides of tools (side retouch codes 9, 10 and 11) are more prevalent in units 3, 4A and 4B, as one would expect from the width/length ratios already mentioned above. Most tools have working edges between 50 and 85 degrees (codes 14 and 15).

Backed bladelets. Most backed blades are present as truncated points or points which are terminated at the butt by a clean break (types F and G) (Table 5.21). Segments of backed bladelets which are terminated at both ends by a break are also common (type H).

Summary

Statistically tested scraper changes through time reveal patterns that have significance for behavioural interpretations. The time trends for scrapers at Wilton, Melkhoutboom and Uniondale are similar to those noted at Edgehill, where the sequences overlap. The correspondence is one of a gradual but regular increase in size from the base of Edgehill. The absolute values between samples from different sites are different but cannot realistically be related in any way to conscious behavioural differences and in this regard they could be seen as isochrestic.

OTHER LITHIC ARTEFACTS

Edgehill

Table 5.22 gives a list of other modified stone found at Edgehill. Of particular note are the twelve modified stones called edge abraded blocks. These were all recovered within 0,30 m of one another in unit 1. Morphologically, they are con-sistent, having been made from oblong sandstone blocks, of which two or more adjacent corners have been smoothed into a curve, with very little abrasion on intervening surfaces (Fig. 5.23). This wear pattern may have resulted from some material, possibly hide, being pulled backwards and forwards across these blocks, with the resulting friction having greatest effect upon the corners.

Upper and lower grindstones were extremely variable, ranging from multi-faceted types to single faceted flat pebbles with dimples and pecking on the ventral and dorsal surfaces (Fig. 5.24). All the lower grindstones had been made from the locally available Adelaide sandstone, but two upper grindstones from units 4 and 3 were made from Witteberg quartzite. Like silcrete, this material, or the tools themselves, were imported from the CFB to the south. Another small upper grindstone from unit 4 is made of dolerite. None of the lower grindstones were well developed. All of the lower grindstones and most of the upper grindstones are ochre stained.

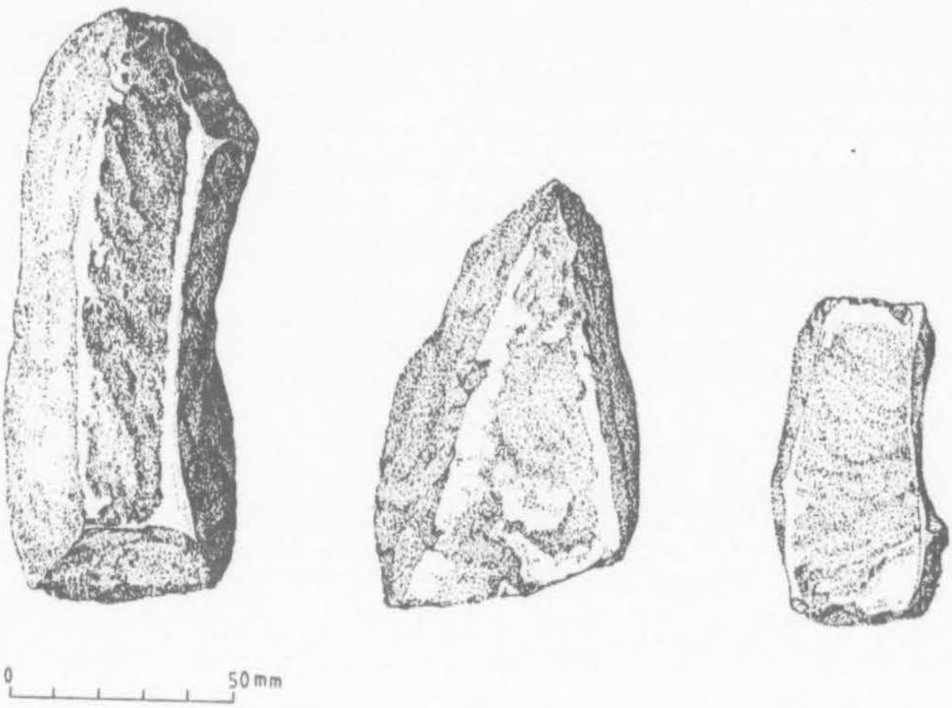


Figure 5.23. Edgehill: illustrations of edge-abraded blocks from unit 1

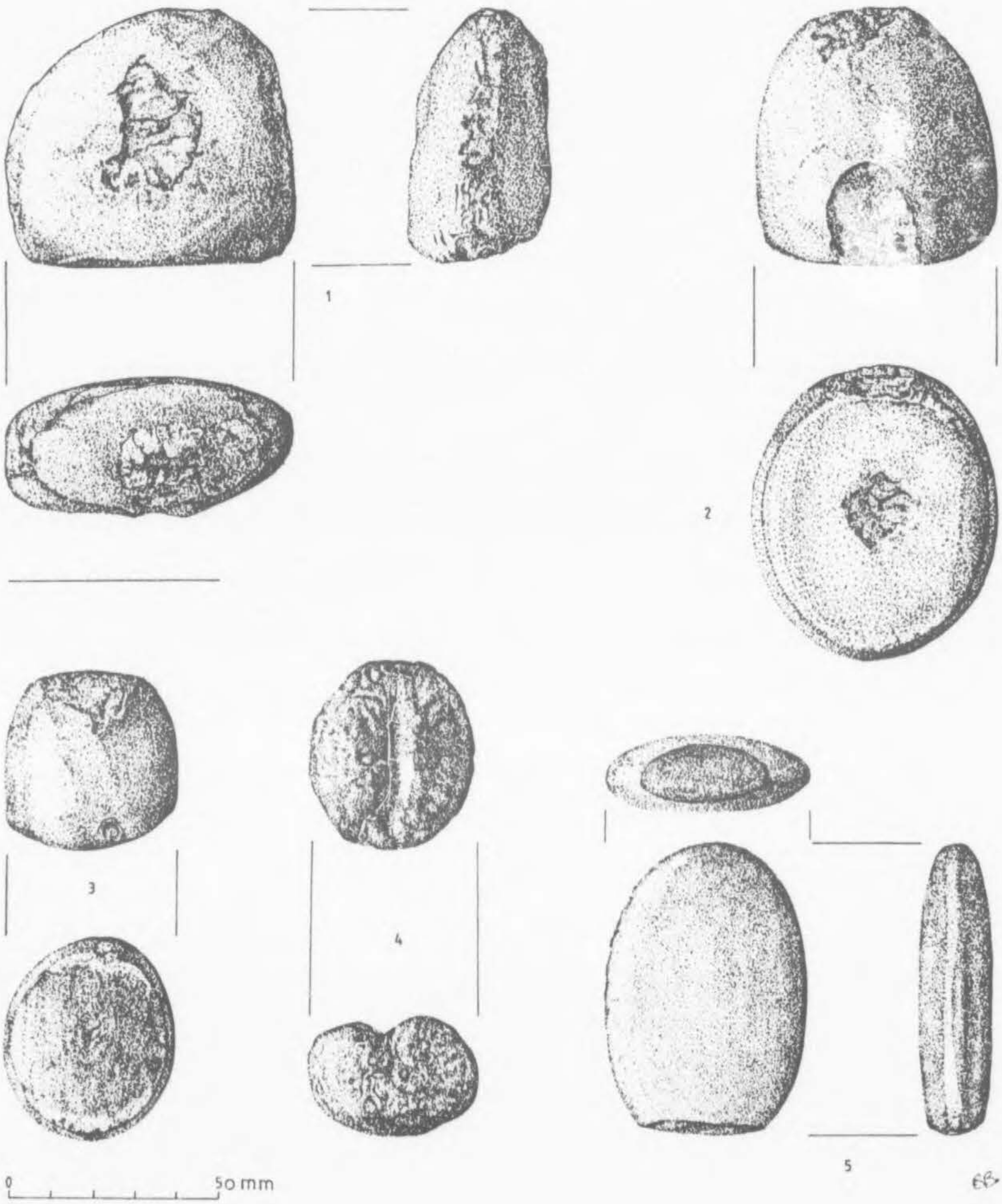


Figure 5.24. Edgehill: illustrations of upper grindstones and grooved stone (Nos 2, 3 and 4 unit 4; No 1 unit 3; No 5 unit 1)

Two types of 'ochre' were found. The first includes the usual soft red and yellow ochres which are locally available but may have been imported from the CFB. The second comes in the form of abundant limonitic nodules which are deep red in colour and occur as single cuboidal crystals or clusters of crystals. These limonitic nodules are extremely hard compared to the other ochres and would have required considerable effort to reduce them to a useable form. Significantly, more ochre and limonitic nodules were found in the pottery unit 1, with an increase in the middle of the sequence as well (units 4 & 5).

A single grooved stone made from Adelaide Sandstone was recovered from unit 4 (Fig. 5.24) and two other ground stone artefacts were found in unit 1. The first is a small hornfels pebble which was in the process of being drilled and pierced when lost or abandoned. The second, of hornfels, has all the appearances of a very small bored stone which has cracked while being made.

Welgeluk

An inventory of other recovered stone tools, modified stone and imported raw materials is given in Table 5.23. This list indicates the range and quantity of these items found concentrated in unit 4B in comparison to 4A above. One incomplete bored stone made from dolerite came from 4B (SSBS) which has marked abrasion and was also used as an upper grindstone (Fig. 5.25). Two silcrete flakes with carefully notched laterals in the form of 'saw teeth' were also recovered from 4B (SCL and SPIT 2)(Fig. 5.25). When the two ochre stained upper grindstones found with burial 2 are added to the fragments found in 4B, the frequency of this type seems to be relatively high in this basal unit. Ochre and charcoal stained rocks and flakes are also common in 4B (Table 5.23). In unit 2 (DBMS and LBS) two hornfels end scrapers are ochre stained all over, especially within the pockets and pits along the working edge. Ochre itself occurred in much higher amounts in 4B than in any other unit, as did the small cuboidal limonitic nodules, some of which were split and may also have provided colouring material. One calcite crystal was also located in 4B (CBAR).

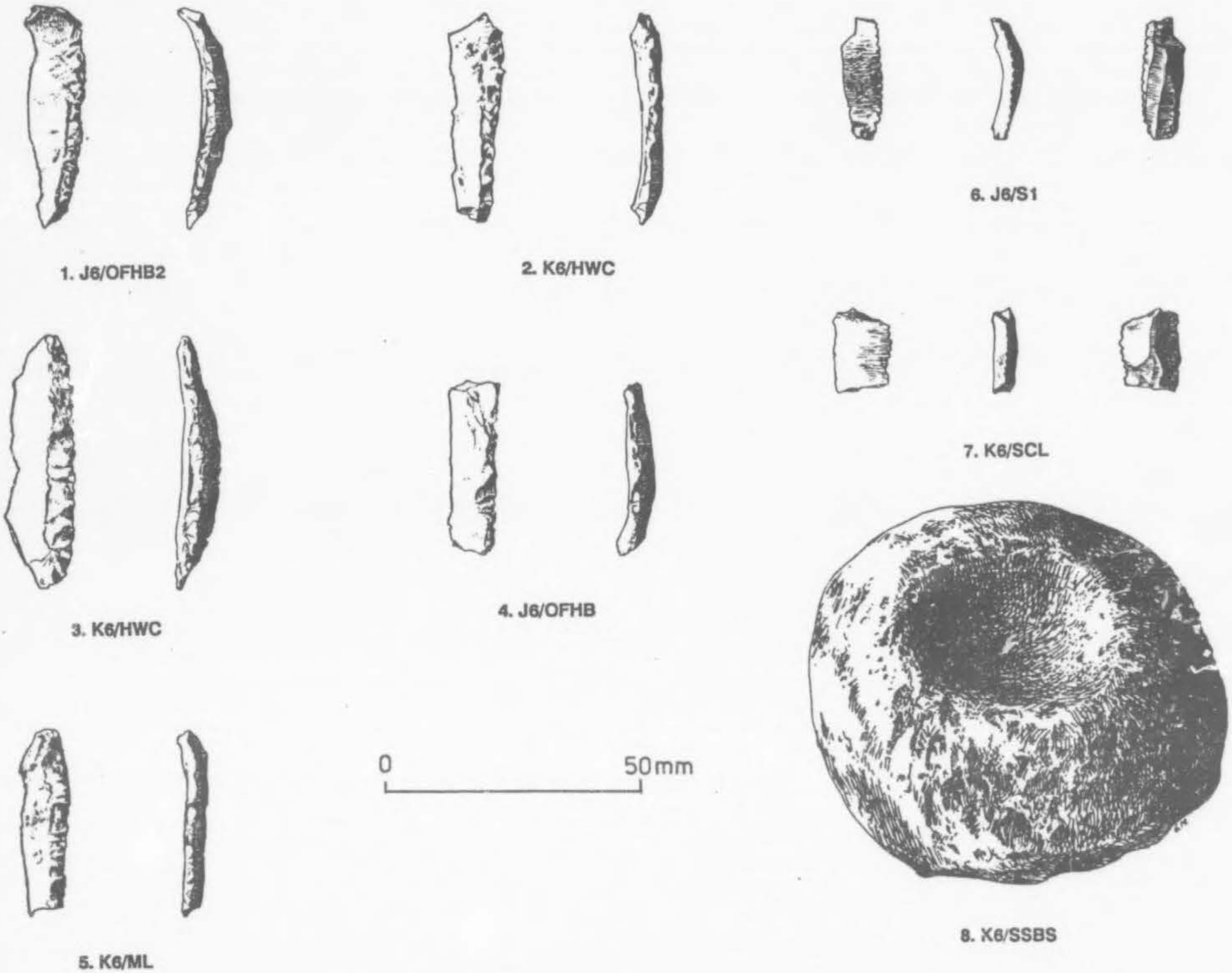


Figure 5.25. Welgeluk: illustrations of kasouga flakes, 'saw-edged' flakes and the bored stone

NON-LITHIC MATERIAL CULTURE

EDGEHILL

Worked bone

The list of worked bone and other modified bone is given in Table 5.24. Over 50% of the worked bone was recovered from unit 1, in contrast to units 4, 5 and 6 which had very little. The raw frequency dominance of unit 1 is slightly misleading because of the greater volume of excavated deposit and adjustments of these to densities gives a better idea of occurrence (Fig. 5.26). This indicates that the unit 1 and 2 densities are about two pieces per unit volume. Unit 7 shows the highest density at about three pieces per unit volume. Of interest is a comparison between the worked bone and stone tool densities (Fig. 5.26). In unit 4, which has the highest stone tool density, few worked bone artefacts were recovered, but as stone tool density decreases from unit 4 upwards, the density of bone tools increases. This contrasts with a comparison of bone and stone densities in the units below 4 in which both categories covary together. This direct correlation may be due simply to occupation intensities whereas the same explanation cannot be given for the inverse relationship from unit 4 and above, in which the relative importance of worked bone and stone tools varies independently from occupation intensity.

The rise in worked bone, especially bone points from unit 4, is of interest in the wider scale of the Later Stone Age. It has been pointed out that, particularly in the northern Cape, the frequency of bone points rises in the late Holocene in inverse relation to backed stone tools. A functional explanation has bone points becoming more important or favoured as hunting projectiles during this period (Humphreys 1979; Humphreys & Thackeray 1983; Deacon, J. 1984:314). This relationship is also apparent at Edgehill.

Over 50% of the worked bone pieces have been classified as either formal or informal bone points (Table 5.24). Formal points are those which can be readily identified with San arrow projectiles and which are solid lengths of bone which have been carved and smoothed in an even taper into a point and the butt smoothed across the section. Informal points, by definition, have a less standardised form than the projectiles. These may have been used as piercing tools in, for example, leather work, and thus the terms awls or needles may describe their function more specifically (Fig. 5.27). Of the 12 formal points found, only five were complete and the length measurements are given in Table 5.25. The smallest point was facetted rather than rounded with a series of grooved chevrons decorating the point just

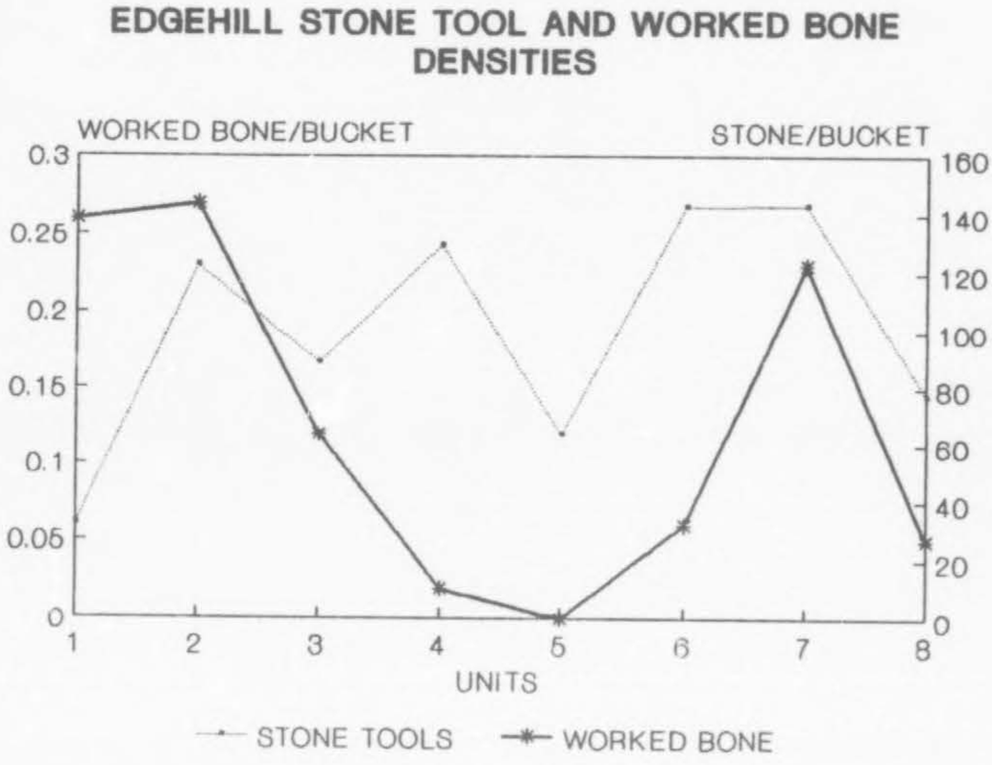


Figure 5.26. Edgehill: stone and bone tool densities

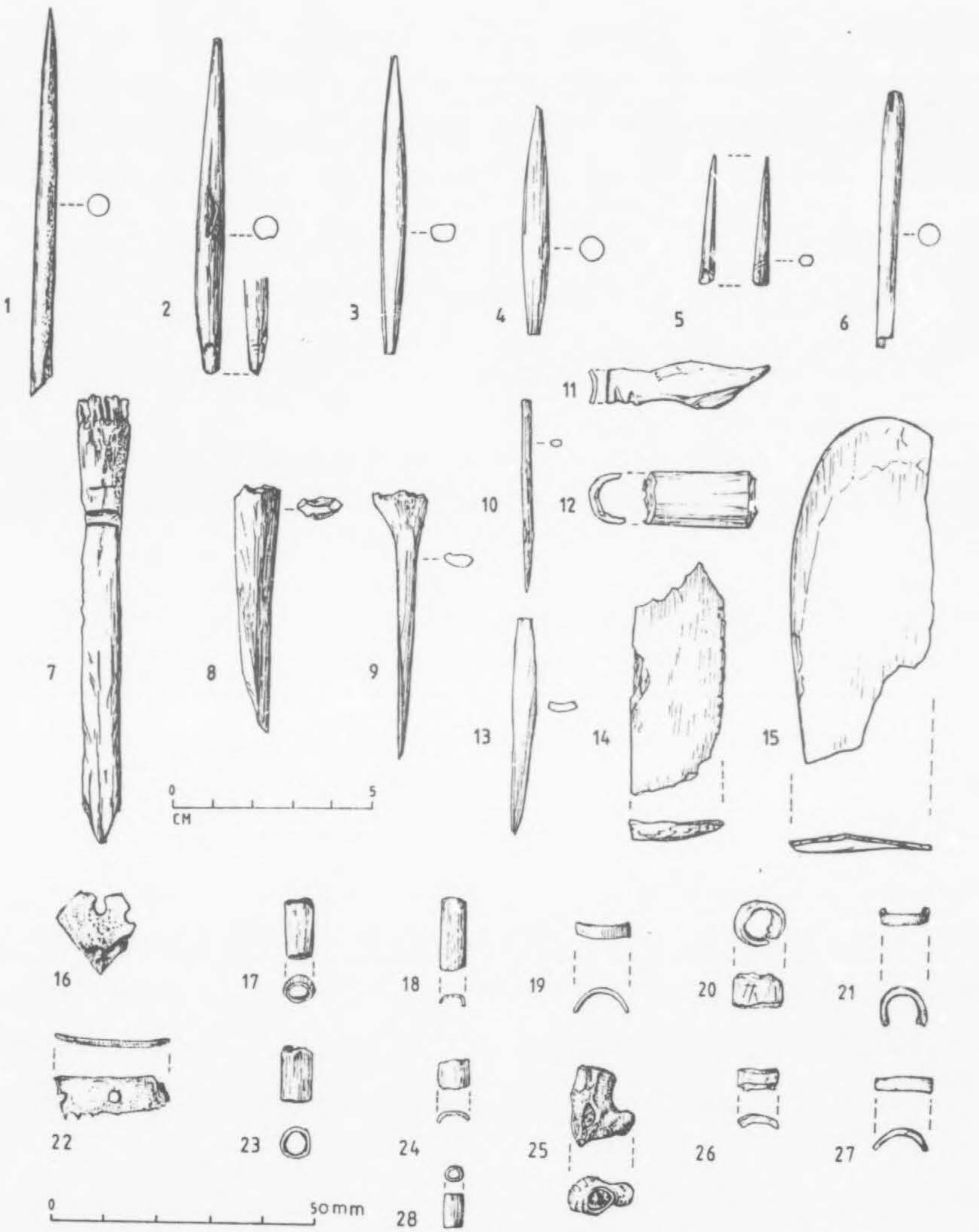


Figure 5.27. Edgehill: illustrations of worked bone (Nos 3, 4, 5, 77, 9, 11, 12, 14, 15, 21, 22, 23, 24, 25, 28, unit 1; Nos 8, 16, 18, 19, 20, 27 unit 2; Nos 17, 26 unit 3; Nos 2, 6 unit 6; Nos 1, 10 unit 7; No 15 is the ivory 'palette'; No 16 is the Myxus capensis opercle pendant; No 22 is the tortoise carapace pendant)

below the butt (Fig. 5.27 no. 5). Similar decorative treatment has been given to one of the points, or linkshaft butts, in the form of two parallel grooved lines.

Bone beads varied considerably in length and diameter between tubular shapes and other forms which would be best described as rings rather than beads (Fig. 5.27). The ringed and snapped shafts are probably incomplete bone beads while other ringed and snapped pieces such as a small portion of a guinea fowl-sized left proximal femur represent waste in the reduction process. This latter piece confirms the impression that most of the bone beads were made from bird bone shafts or hare phalanges. Several pieces of bone were abraded including two identified as the xiphiplastron segments of the fresh water turtle *Pelomedusa subrufa* and may have been used as containers of some kind.

The more interesting worked bone has been individually listed in Table 5.24 under miscellaneous finds. This includes an ivory 'palette' from unit 1, which in its complete form was ellipsoid in shape, measuring between 0,11 and 0,13 m in length and approximately 0,05 m in width (Fig. 5.27 no. 15). Laminations in the ivory are clearly visible and the original size of the palette indicates that the raw material must have come from an elephant tusk. The 'palette' is slightly ochre stained. The term 'palette' has an automatic association with ochre mixing and paint. Clark (1959:246), however, discusses a minimum of ten 'palettes' from Spitzkop shelter in the Zuurberg (Albany Museum Archaeology A1702) which are called "pubic aprons" or simply "ornaments". The term 'palette' is therefore a convenient rather than a functionally specific term. Only one of the Spitzkop 'palettes' is ochre stained and the striations on their surfaces have resulted from their manufacture rather than their use as a grinding surface. Several have been finished off with nicks around the circumference. The elaboration of these 'palettes', seems to be over and above that required of a grinding surface for ochre which can be carried out on any convenient slab or anvil. The function of these 'palettes' therefore remains unclear, and it is tentatively postulated that they 'functioned ' purely in a ritual context rather than for any particular task.

The circumferentially nicked 'palettes' from Spitzkop are similar to a large rib from a Bovid IV sized animal which has also been nicked along its edge (Fig. 5.27 no.14). Two other bones have been pierced and may have been pendants. One of these (unit 1) is made from a tortoise carapace segment while the other (unit 2) is made from the opercle bone of the fresh water mullet, *Myxus capensis* (Fig. 5.27 nos 16 & 22).

Shell ornaments

The frequencies of freshwater and marine shell and ostrich eggshell ornaments are given in Tables 5.26 & 5.27. Ostrich eggshell fragments are also included here, although it is realised that the eggs may have originally entered the shelter as food. In the raw frequencies there is a tendency for all ostrich eggshell categories to be better represented from unit 4 upwards. The pierced and smoothed pieces may have been used as pendants (Fig. 5.28 nos 21 & 22). Water bottle spouts are also represented, one of which is decorated with grooves at right angles to the aperture edge (Fig. 5.28 no. 19). One piece of ostrich eggshell from unit 1 is decorated (Fig. 5.28 no. 18) and may also have come from a water bottle.

Most of the shell from the Edgehill deposit is freshwater mussel, (*Unio caffer*). As already discussed, freshwater mussel provides a significant subsistence item from about 4000 BP. Some of these shells have also been modified. A number of the freshwater mussel valves have been modified through the piercing of an aperture at the umbo (Fig. 5.28 nos 1 to 6). These apertures are between 10 and 15 mm across and were made either through punching a hole through the umbo from the shell exterior or simply abrading the umbo away. These freshwater valves may have been strung together to make dancing rattles. Freshwater mussel once removed from the water rapidly becomes brittle but there are several pieces which appear to have retouched margins (Fig. 5.28 nos 7, 8 & 9).

Although Edgehill is located some 95 km from the coast, marine shell is relatively well represented. Unlike the ostrich eggshell and freshwater mussel, marine shell is obviously not food waste but was imported for decorative or tool purposes only. The small estuarine shell, *Nassarius kraussianus*, is the most common species recovered. Table 5.26 shows that in units 4, 5 and 6 these beads do not occur. This gap in their chronological distribution has been documented at a number of other inland rock shelters in the eastern Cape such as Wilton (Deacon, J. 1972), Melkhoutboom (Deacon, H.J. 1976), and The Havens Cave in the Cambria area (Binneman pers. comm.). The gap occurs generally between 7000 and 4000 years ago. The presence or absence of these beads provides a rough but consistent dating estimate. On the basis of the Edgehill radiocarbon dates, the disappearance of these beads in unit 6 appears to be somewhat later than at those sites noted above but their reappearance in unit 3 fits well with the date of their reappearance elsewhere.

H.J. Deacon (1976) suggests that the mechanism responsible for this widespread chronological gap in the distribution of these beads is the ca 1,5 m mid-Holocene marine transgression which presumably altered the morphology of the eastern Cape estuaries to

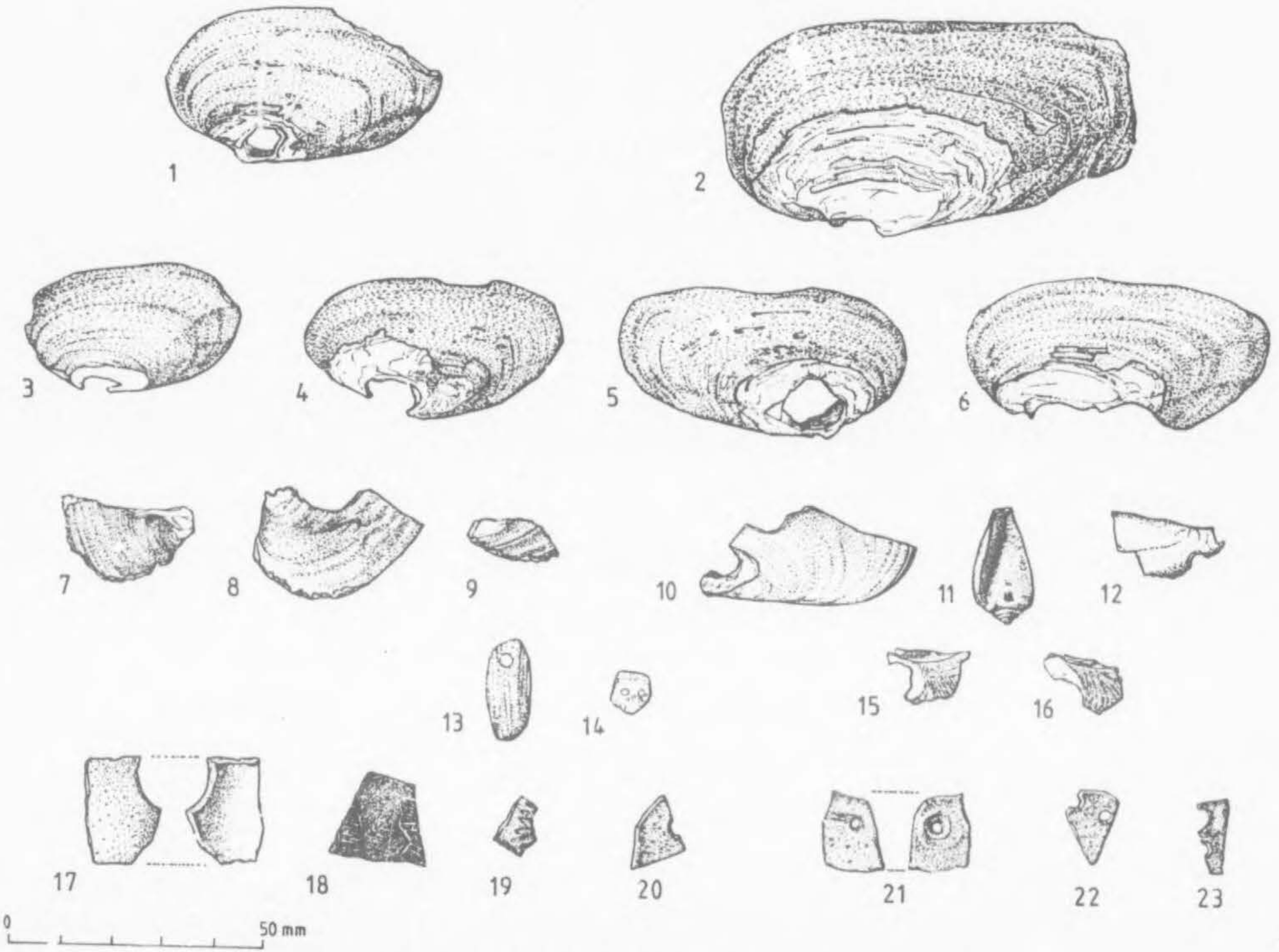


Figure 5.28. Edgehill: illustrations of worked shell (Nos 1 to 9 freahwater mussel unit 1; Nos 10, 15, 16 Donax unit 3; Nos 11,12 Conus pendants units 1 and 6; Nos 13, 14 Oxystele; ostrich eggshell water spouts nos 17, 18 units 1 and 2 respectively; Nos 18, 20, 23 unit 1; No 22 unit 2; No 21 unit 6)

such an extent that the sources were cut off or became unsuitable places for settlement. This transgression did not, however, affect the availability of the white sand mussel, *Donax serra*, because it is brought into Edgehill throughout the *Nassa* 'gap' (Table 5.26). At Melkhoutboom the incidence of *Donax serra* is particularly high in the levels in which *Nassa* is absent and perhaps reflects the increased importance of this item in the absence of *Nassa* beads.

At Edgehill most of the *Donax serra* remains are fragments with few whole valves, many of which are burnt. Of the six valves recovered, three have been abraded at the umbo to make pendants similar to those made from the freshwater mussel valves (Fig. 5.28 nos 10, 15 & 16). All three *Donax* 'pendants' were in close association in unit 3. Similarly pierced *Donax* valves have also been recorded from coastal shell middens near Alexandria. Two *Conus* sp. shells were also pierced, one on the upper part of the body whorl and the other just above the siphonal notch (Fig. 5.28 nos 11 & 12). Another pendant made from the body whorl of an *Oxystele* sp. was recovered from unit 3 and a small button from unit 6 has been made from a similar type of material (Fig. 5.28 nos 13 & 14).

Pottery

Description and discussion of the pottery is undertaken in Chapter Seven.

WELGELUK

Worked bone

The inventory of worked and modified bone is given in Table 5.28. Numbers are generally low and no time trends in individual types are discernible. The diversity and density of modified bone categories is highest in unit 4B. Decorated bone and ivory is restricted to the basal units 4A and 4B.

Shell ornaments

Ornaments made from shell are listed in Table 5.29. Also included in this list are ostrich eggshell pieces which probably were brought to the site initially as food.

Ostrich eggshell fragments and beads show variable frequencies throughout the deposit (Table 5.29; Fig. 5.29). Fragments are particularly high in 4B but drop markedly in 4A and 3, and are again relatively abundant in the upper three units. Whole and incomplete beads

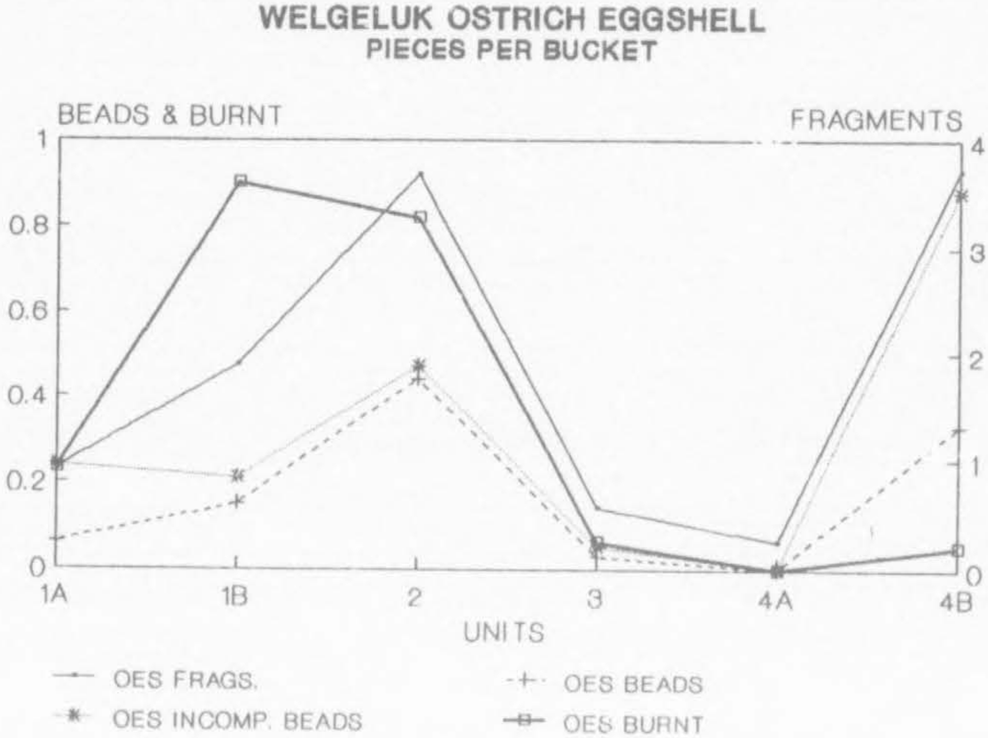


Figure 5.29. Welgeluk: distribution of ostrich eggshell beads and fragments

are also frequent in 4B but none are found in 4A and only occur again in the top three units in any numbers. Burnt ostrich eggshell fragments are only common in the upper three units and are almost absent from the bottom three units suggesting that the separation of burnt from unburnt fragments is significant. One possible interpretation for this distribution is that in the basal units ostrich eggshell were introduced primarily as raw material for bead manufacture as indicated by the greater numbers of whole and incomplete beads. The later occurrence of burnt eggshell may reflect the importance of ostrich eggs as a food source with the charring a result of their preparation. One piece of decorated ostrich eggshell was located in 4B while two pieces interpreted as pendant fragments came from 2 and 4A.

Freshwater mussel pendants (*Unio caffer*) are present in 1B, 2 and 3 but are absent from all other units.

The estuarine shell, *Nassarius kraussianus*, which is present in relatively high numbers in 1B and 2 but is low to absent in other units, is the most common marine shell. Other marine shell species are present in low numbers and there is a slight indication that they mirror the distribution of the *Nassarius* beads (Table 5.29).

Pottery

The description and discussion of the pottery is given in Chapter Seven.

Leather

One small fragment of leather was found in 1A (H1). This piece may come from the hem of a garment or bag as it is pierced at regular intervals along one edge.

Iron

Three pieces of iron were found all securely within the pottery units 1A and 1B. One is an unidentifiable scrap from 1B (BGOA). The other two pieces were recovered from 1A and consisted of one small iron bead (GBOL) and one iron button of European origin (H2).

COMPARISONS AND DISCUSSION

In this section aspects of the data described above are interpreted within the general themes of the thesis. Of prime importance is the question of boundaries. Consideration is given to the archaeological recognition of a boundary which focuses upon the appearance of a regional stylistic indicator and the conditions which brought it into being. Fundamental to the discussion concerning this boundary is its purpose in terms of within and across boundary economic and social strategies and the significance of these in the context of changing risk reduction strategies. More specifically, these are examined with reference to the site inventories and the model of aggregation and dispersal developed by Wadley (1987). Also included in this section will be an examination of the timing between the establishment of the boundary and the pace of subsistence intensification. It is on the basis of this comparison that changes in risk reduction strategies are characterised as moving from open networks to more exclusive and closed networks.

RAW MATERIAL AS STYLE

The nine raw materials which were used at Edgehill and Welgeluk are identical. In those parts of the sequences which chrono-logically overlap, silcrete is preferred. The resolution of the Welgeluk raw material data is better for the younger deposits, even though the percentage frequencies based on small samples make inferences, particularly for the formal tools, speculative. Nevertheless, there is a greater diversity of raw material in unit 4B at Welgeluk. The use of both silcretes and chalcedonies implies distant catchments in the CFB to the south as well as further to the west. It also seems that in the upper units, particularly 2 and 1B, raw material diversity again increases at the expense of silcrete, but this diversity, particularly the presence of more hornfels, implies increasing use of local raw materials.

The main difference between Edgehill and Welgeluk in the distribution of raw material through time, is that the large scale raw material change from hornfels to silcrete between 5000 and 6000 years ago is not present at Welgeluk (Fig. 5.30). In accounting for this we need look no further than the younger basal deposits at Welgeluk which show that LSA occupation of the site at ca 4500 BP only began after this raw material change had been completed.

This shift is of great interest. Not only did it occur at Edgehill, but was a widespread regional occurrence at the same time in the eastern extension of the CFB (Deacon, J 1972; Deacon H J. 1976; Leslie-Brooker 1987). At Uniondale, Wilton and Melkhoutboom, a shift in raw material from chalcedony to silcrete use also occured with greater use of chalcedonies between ca 5000 to 7500 BP. Although the changes in raw material types differ between the CFB sites (chalcedony to silcrete) and Edgehill (hornfels to silcrete), the important point is that firstly, the changeover is chronologically equivalent and secondly, that in all sites the trend is towards the homogenisation of raw material (Fig. 5.30).

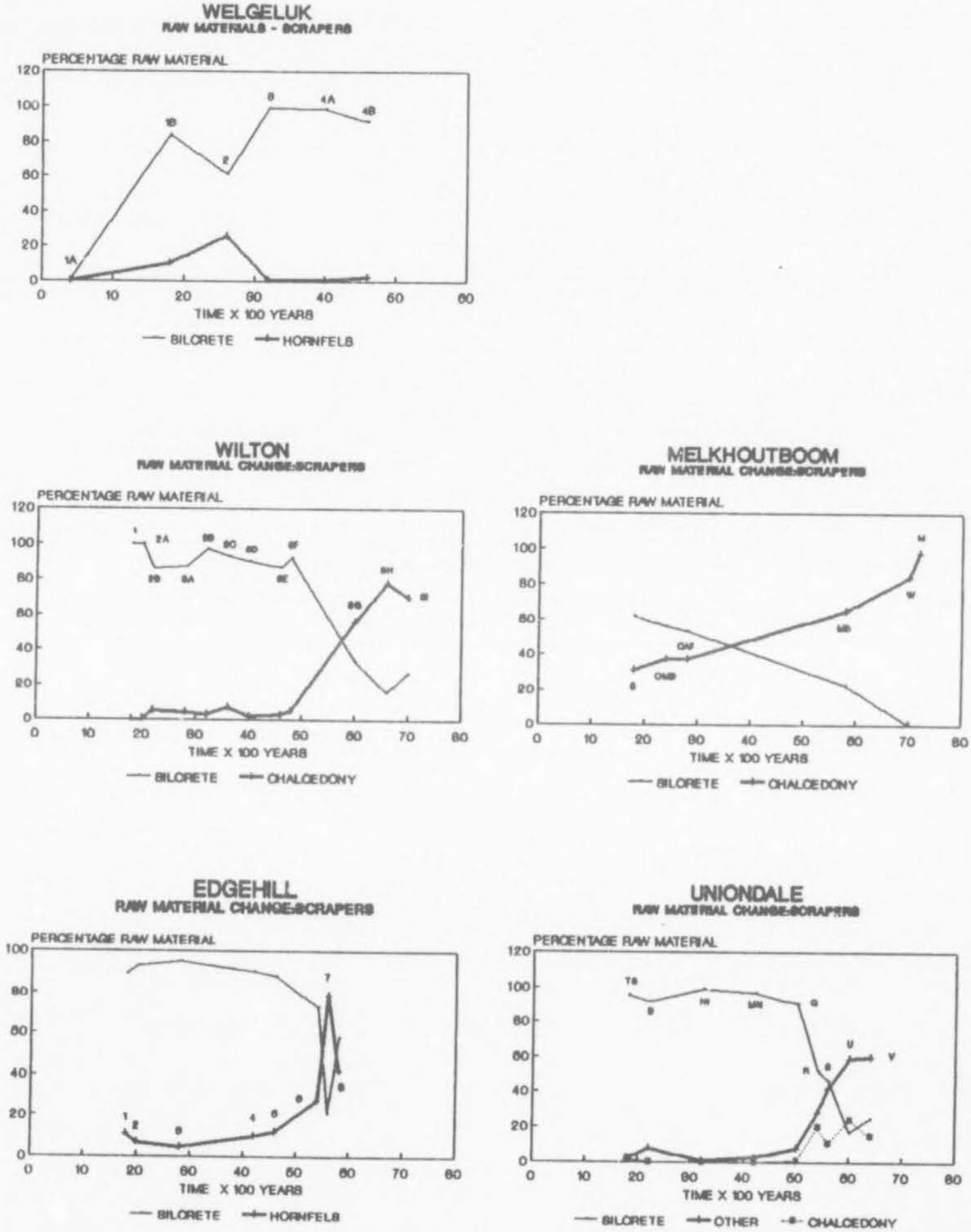


Figure 5.30. The raw material changeover at Edgehill, Welgeluk and the CFB sites (scrapers only)

H. J. Deacon (1976:64) points out the close similarity of the Marker, Wilton Base Marker and the Wedge units at Melkhoutboom with the 3G, 3H and 3I levels at Wilton which also have a near absence of silcrete. At Uniondale, the raw material shift corresponds closely with that already described for Edgehill; the use of hornfels diminishes considerably while silcrete comes to dominate the assemblages. At Melkhoutboom, the proximity of the site to the Zuurberg chalcedony sources contributes to the retention of chalcedony for tool manufacture, but even here there is a significant increase in silcrete use at the expense of chalcedony (Deacon, H.J. 1976:63). Overall, the general trend from about 5500 BP for sites in the eastern extension of the CFB is to use silcrete for the majority of formal stone tools.

All of these sequences indicate widespread raw material catchments within the Wilton prior to ca 5500 BP. At Edgehill, tools in the basal units are made of hornfels, silcretes and some chalcedony from the Zuurberg. At Uniondale, hornfels and chalcedony also indicate widespread lithic sources to both the north and west of the site. Thereafter, LSA raw material use narrows and focuses specifically on the silcrete deposits found on the Grahamstown Peneplain and Coastal Foreland. In the case of Edgehill and Melkhoutboom the move to use silcrete contradicts any notion of economic logic. There is nothing optimal or economically efficient about importing silcrete from 40 km away when the locally available hornfels and chalcedonies are equally good for the manufacture of LSA microliths. The same obviously applies to the use of silcretes at Welgeluk. As has been argued, there is nothing in the properties of hornfels which limits the manufacture of microliths. Why change? Contrary to Leslie-Brooker (1987:106), I see this raw material change having little, if anything, to do with the appearance of new artefact classes (segments) or changes in tool morphology. General typological and metrical analyses show that segments and small scrapers were made extensively from hornfels at Edgehill. Because of this, the regional shift to silcrete cannot easily be reduced to technological and functional explanations.

It might be argued that the average size of the hornfels river pebbles available to the LSA occupants of Edgehill was not large enough to produce the blanks required for the increasingly larger scrapers after the mid-Holocene. If so, it still would have been less costly to quarry hornfels locally rather than import silcrete from the Grahamstown Peneplain. Clearly, other factors completely outweigh the high cost of procuring silcrete in the decision making process. Consequently, the regional raw material trend is approached as an indicator of LSA hunter-gatherer territorial shifts (Deacon, J. 1972; Deacon, H.J. 1976; Hall, S. 1985; Leslie-Brooker 1987). The assumption that raw material frequencies, and changes in these, represent the geographic (territorial) catchments of LSA people is a useful starting point but can more fully inform if correlated with the wider archaeological picture. A fuller explanation can only be obtained when the process is modelled in conjunction with regional demographic and subsistence trends.

It was originally thought that the basal ca 5500 BP hornfels deposits at Edgehill correlated with local LSA groups tied predominantly to the riverine habitats. The mid-Holocene environment had not yet ameliorated sufficiently to permit LSA hunter-gatherers much opportunity to move away from them (Hall 1985:69; 1988a). Later Stone Age occupation was, as a consequence, tied in a linear fashion to the riverine fringe. As such the shift to silcrete use documented the expansion of hunter-gatherer catchments at right angles to the riverine environment with better later Holocene environments. This is now considered unlikely. As demonstrated, the raw material shift is regionally widespread in sites which are not specifically located within riverine habitats. Furthermore, although Edgehill is a riverine locality, the subsistence emphasis placed on riverine resources in the basal hornfels units is minimal. In addition, the initiation of LSA occupation at Welgeluk comes after the shift is complete, indicating continued intensification and settlement of the riverine fringe after the supposed amelioration.

The lack of any plausible explanation for the raw material shift in terms of economic expediency or technology directs discussion towards the exploration of this shift as a purely stylistic symbol. It is suggested that the shift towards silcrete records the appropriation of raw material in a purely stylistic way in order to signal social identity. Ethnohistorical sources relating to the northern Cape suggest that raw materials were used as markers of group identity. Bleek and Lloyd (in Deacon, J. 1986:151) recorded that arrowheads of the Flat Bushmen were made from metal, while those of the Grass Bushmen were made from white stone. In this case it is posited that the social identity broadcast by the use of silcrete corresponds to a geographic identity focused upon the eastern extension of the CFB and its immediate surrounds.

Raw material diversity in the ca 5500 BP sequences corresponds to relatively widespread and open communication channels which would have been facilitated through hxaro type arrangements. Economic and reproductive risk could thus be pooled in many different directions. The homogenisation of raw material after 5500 BP reflects the firming up of a risk pooling nexus. In this light, the raw material shift does not so much reflect territorial shifts but the increasing definition and formalisation of a social interaction sphere.

The basic purpose for physically expressing group identity is to facilitate and provide a predictable structure to both inter and intra-societal interaction (Schortman 1989). For the mid-Holocene, it is argued that the need for structure hinged upon an increasingly complex social landscape brought about by relative and absolute demographic shifts. Two demographic options are believed visible in this process (Hammel & Howell 1987). Firstly, prior and up to about 5500 BP (higher raw material heterogeneity), the occupation of Edgehill and perhaps even Welgeluk represents demographic fissioning during which no great pressure on space and resources is exerted. Population shifts can be accommodated through movement into unoccupied space. As space is filled, the fission option becomes less viable and competition becomes an obvious by-product. In order to protect group self-interest one response is for smaller groups to amalgamate and to become "...communicatively homogeneous" (Hamell & Howell 1987:148). The raw material shift correlates with this type of response.

Secondly, the cessation of fission alternatives and the increasing definition and congruence between people, resources and space gives rise to other options. In this study population limitation or decline are ruled out. Increasing use of sites and site numbers indicate that limitation and decline are not factors. The reason for this rests upon the relatively slow pace of the process which at no stage overshoots demographic/space and resource relationships in any radical way.

Accommodation and response to increasing spatial structure is supported by the process of intensification from about 4000 BP. In a way, the creation of boundaries literally 'paints' hunter-gatherers into a territorial 'corner' in which intensification has to come about. This process is widespread. Increasing stress cannot be dissipated by groups moving off elsewhere because the same scale of stress is regional. Rather than increasingly attempting to call in reciprocal ties, relative scarcity was accommodated by closing ranks and controlling access to outsiders. The !Ko, for example, live in less well watered areas where resource stress is more regional, in contrast to the local shortages which occur in the better watered !Kung territories to the north. The !Ko strategy for coping with shortage is to encourage territoriality because movement to distant kin is not viable in the face of the same scale of regional scarcity (Cashdan 1983).

The active manipulation of raw material as an expression of social identity is a symptom of an ever spiralling relationship between population, space and competition for that space, and the resources it contains. Clear and unambiguous methods of signalling identity and, therefore, rights of access and rights of denial were required (Hodder 1979). The isolation of raw material as style cannot be divorced from the wider regional context of interrelated demographic, economic and social shifts. In the specific case of Edgehill and Welgeluk we have to ask why raw material changed when it did, and if it signified a social boundary, to what was this identity being opposed?

One signal comes from the increasing LSA archaeological visibility to the north of Edgehill, at sites such as Highlands and Fairview (ca 4500 BP). This indicates that populations there had reached some equilibrium within environmental limits (Deacon, H.J. 1976; Robertshaw 1984) and that group fission into available space was [illegible] a viable option for releasing demographic pressure. Firmer socio-spatial identities [illegible] in response to these demographic processes further to the north in the Cape Midlands.

The suggestion that raw material use at Edgehill, Welgeluk and the CFB sites is stylistic requires further justification. In these instances raw material can be isolated as an 'adjunct' stylistic attribute in the sense outlined by Sackett (1982). There is nothing in the properties of either silcrete or hornfels which makes them less suitable for manufacturing the range of LSA tools. Raw material, in this case, *can* be isolated as *stylistic residue* and in this sense does represent emblemic or iconographic style (Wiessner 1983b). Furthermore, the widespread regional move towards silcrete use and the timing of this in relation to demographic and economic trends suggests that it is consciously invested with social identity. Also, the transport and use of the material at Edgehill and Welgeluk, 40 km outside the natural range of the material's occurrence, reinforces the idea that it is being actively manipulated.

The disjunct relationship between the silcrete source on the Grahamstown Peneplain and its use at Edgehill and Welgeluk raises the question of justifying the much higher cost of procuring silcrete and transporting it there. This is especially pertinent in the light of equally usable and locally available hornfels. Extravagance and high cost are normal in the context of stylistic displays. Rational economics and optimal behaviour appear to be secondary in the face of the social information stylistic behaviour seeks to impart. In Wiessner's words:

> .....there is little evidence in the anthropological literature that efficiency is an important consideration in identity displays. To the contrary, as can be seen in the ceremonial dress in many cultures or in the amount we spend on fashion in our culture, such displays are often extravagant, the resources and effort expended in stylistic displays being an index of ability and worth (Wiessner 1984:193).

The issue of efficiency and cost begs the question as to the mechanisms through which silcretes were transported to Edgehill and Welgeluk. Both lithic assemblages are complete in the range of formal and non-formal elements showing that tool manufacture took place at these sites. Therefore, silcrete must have been transported as quarried and perhaps preliminarily reduced nodules. Would these have been transported in a general round of subsistence activities or as special purpose trips (a round trip of about 80 km) and can one distinguish between these archaeologically?

Binford argues that "...procurement of raw materials is embedded in basic subsistence schedules. *Very rarely, and then only when things have gone wrong, does one go out into the environment for the express and exclusive purpose of obtaining raw materials for tools*" (Binford 1979:259; Binford's emphasis). More recently, Binford (Binford & Stone 1985:152) states "...one should not estimate procurement cost as if it was a direct cost incurred by an exclusive trip made to obtain materials". While these statements make general good sense, they do not make sense out of the data currently at hand. Even if subsistence trips to the silcrete sources were undertaken, it still provides no logical explanation as to why hunter-gatherers would transport materials 40 km when use of local hornfels would obviate transport of this additional burden.

At face value, LSA silcrete procurement at Edgehill and Welgeluk was not embedded in basic subsistence schedules because there is nothing in the subsistence mix which can be isolated as specifically originating in the CFB. While this is trivial and obvious it could be argued that more general seasonal scheduling would provide a limited silcrete supply. Of more importance to this argument, however, is the narrow and utilitarian definition of cost and benefit. Cost cannot be measured simply in terms of immediate payoffs. Cost also involves a social element which contributes to medium and longer term social and economic payoffs. The little time spent on the food quest by the !Kung is only part of the effort required to supply wider social needs. The daily balance is spent investing in social time which will be realised in the future.

To this end, ethnoarchaeological studies on more complex hunter-gatherers offer alternative perspectives. Lithic procurement by Australian Aborigines appears to have a variable set of controlling factors (Gould & Saggers 1985). Differing contexts, both utilitarian or those with more socio-and ideotechnic aspects influence raw material procurement. At James Range East exotic lithic material is imported because it has better edge holding properties than local materials while at Puntutjarpa exotic materials are acquired even though they have "...poorer edge holding properties than the local white chert, therefore a simple technological explanation could not account for the use of exotic stone at Puntutjarpa" (Gould & Saggers 1985:120). In this case, the important factor in lithic procurement was found to be the relationship between male orientated special purpose trips to known quarries which are important sacred sites associated with dream time tracks: "One of the outstanding attributes of the ethnographically known desert Aborigines was their willingness to make long trips for the primary purpose of visiting sacred sites and of meeting with members of the patrilineages controlling those sites" (Gould & Saggers 1985:122). I use this example not to draw a direct comparison but to point out that silcrete procurement at Edgehill and Welgeluk could be seen in purely social terms in keeping with its use as a stylistic marker. While its procurement may be immediately inefficient, longer term benefits would accrue from the social structure, its use as a group symbol providing balance to immediate costs.

Although it is speculative, an area of social identity can be defined which included the highlands of the eastern extension of the CFB at the core, the adjacent coastal forelands and coast to the south, and the subtropical fringe reaching down to the Great Fish River in the east, north and north-west. I suggest a regional plateau of silcrete use which defined a socio-spatial area which was actively instituted at about 5000 BP. The edges of the area will be marked by a sharp drop-off in the defining style attributes, "...that cannot be explained by normal distance decay fall off or by an environmental, functional adaptation" (Hodder 1979:452). This expected drop-off is best illustrated by examining a south-to-north raw material transect originating at Uniondale and ending at Fairview in the Winterberg.

As already discussed silcrete use at Edgehill and Welgeluk does not reflect local availability. There is no correspondence between the proposed social boundary and the distribution of raw material. On the basis of the 'plateau' suggestion, it is proposed that the drop-off in silcrete use occurred somewhere in the area of Edgehill and Welgeluk. This is hinted at in Figure 5.31. If Uniondale is taken as an approximate source point for silcrete, it is clear that the percentage raw material decay at Edgehill, some 40 km from the source, is minimal. The percentage use of silcrete at the source and on the proposed periphery was very similar. If this decay model is extended to Fairview, a further 50 km to the north of the source, the picture is very different had the decay lines been extended. Silcrete use at Uniondale and Edgehill in the ca 4000 to 4500 BP deposits ranged between 80 and 90% (chips and scrapers) while at Fairview silcrete is barely visible (1,2% for the whole assemblage; Robertshaw 1984:65). Silcrete in this case was actively manipulated beyond the limits of its natural availability to communicate social and spatial identity.

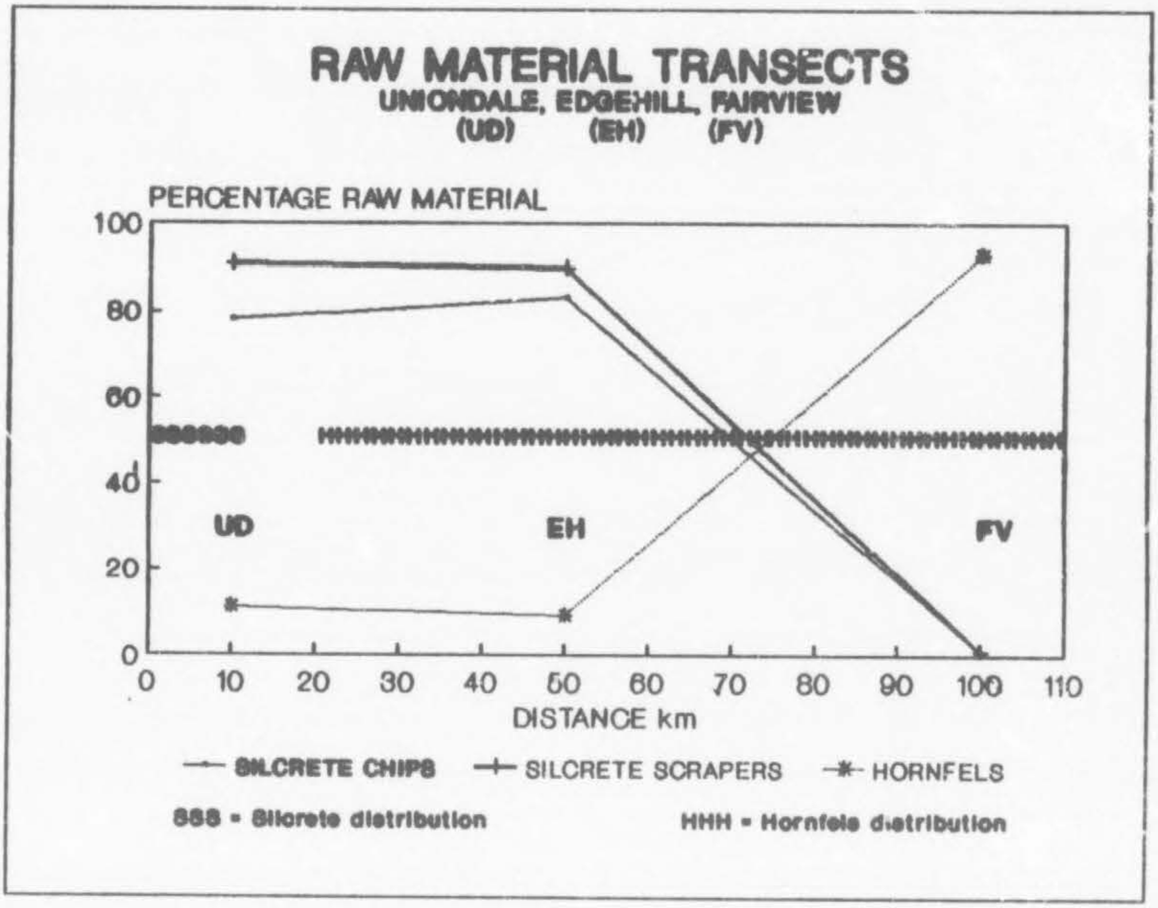


Figure 5.31. Raw material distribution along a south to north transect between Uniondale, Edgehill and Fairview

The manipulation of raw material as stylistic is inseparable and is closely correlated with the economic intensification outlined above. In terms of the general risk reduction theme the style area represented by the distribution of silcrete represents the nexus of risk pooling, which is considerably more structured and perhaps smaller in comparison to the deposits represented by the hornfels assemblage which is seen as a time of more expedient use of the landscape by pioneer populations.

The choice to use raw material as a symbol of social identity is extremely powerful when this attribute is combined with the social relations of production which are deeply imbued in the use of specific tool types. San arrows are exchanged among hunters as a function of the rules concerning meat distribution where even unsuccessful hunters participate equally (Wiessner 1977; Lee 1979). "Socially, politically, and economically, San arrows have greater import than any other single San artefact" (Wiessner 1983b:261; Wadley 1987). Artefacts which carry information concerning social strategy will be heavily invested in stylistically. In the current discussion arrows would also be important in the maintenance of boundaries because animals which escape after being shot may die still bearing the projectile of the hunter. Other San finding the animal can identify the affiliation of the arrow and determine the possibility of boundary transgression (Wiessner 1983b). If we assume that segments were used as projectile points the contrast between, and visibility of, segments made from silcrete and hornfels would function very well in identifying social affiliation and variations in social and economic relations of production.

The question of expedient versus curated tools is of interest when the combination of tool type and raw material is examined further. In all formal tool types, with the exception of adzes, silcrete is the dominant material used after the hypothesised establishment of the boundary. Tools, particularly segments, which actively carry information about social strategy carry the most amount of style. Adzes, though, continue to be made from hornfels pebbles. In this instance, the nature and form of the hornfels overrides the shift to use silcrete. We can speculate that the social importance of the tasks to which adzes were put are not of the same status or prestige and do not carry the same social weight as those using projectile points.

It is suggested by Mazel and Parkington (1981) that the increasing importance of adzes in the later Holocene reflects, through a linkage between woodworking and digging stick manufacture and maintenance, an increasing LSA subsistence emphasis on underground plant foods. Compared to hunting plant food collecting carries less social importance than hunting and this is reflected in the sharing of such resources only within nuclear family units

(Lee 1979). The technology involved in plant food related activities will, therefore, be more expedient. Thus locally available hornfels would be used. Silcrete scrapers used for hide dressing and clothes manufacture (Deacon & Deacon 1980) and silcrete backed bladelets and borers used perhaps for projectile points and bead manufacturing tools are all used for the manufacture of artefacts which carry more widespread social implications.

RAW MATERIAL, AGGREGATION AND DISPERSAL

The context of the raw material shift at Edgehill could also record changing use of the site and the immediate environs from that of a dispersal phase camp to that of an aggregation phase camp. During San aggregation phases larger groups of people require that social behaviour and convention be controlled and formal (Lee 1979; Wadley 1987). Social interaction during aggregation intensifies along with gift manufacture, gift giving and the establishment and maintenance of reciprocal *hxaro* type partners which this implies. Formal behaviour during aggregation results in a wider range of artefacts which carry information about social strategy (projectile points for hunting and ostrich eggshell beads for *hxaro* gifts) than in dispersal camps. Aggregation assemblages also have a high curation value (Wadley 1987). In contrast the expedient nature of material culture at dispersal, private phase camps, predicts that lithic raw material will be locally collected. This possibililty is touched upon in the discussion of adzes versus other tool types. Wadley (1987) has built raw material differences into her model of aggregation and dispersal for the Holocene LSA archaeology of the Magaliesberg in the Transvaal. At the dispersal site of Cave James, stone tools are made from local stone while tools from the aggregation site of Jubilee Shelter are manufactured from exotic raw materials. The precise relationship between aggregation and exotic raw material is not explicitly drawn but reference is made to a need for special purpose rock.

For the 5500 to 5000 BP basal units at Edgehill with local hornfels used, the Wadley model predicts an expedient technology, and, therefore, signifies the use of Edgehill as a dispersal camp at that time. Conversely, the importation of exotic silcretes would indicate a change to the use of the site as an aggregation camp. This suggestion for both the Edgehill and Welgeluk sequences has some utility. But while raw material change may be indirectly linked to dispersal/aggregation shifts, it is argued below that this correlation is best examined through changes in artefact types, both lithic and non-lithic, and their frequency occurrence and that the prime purpose of the raw material shift is for social identity purposes.

In fact, investigation of this raw material/aggregation-dispersal relationship in regard to the CFB sites raises a number of problems. At Uniondale, for example, the shift away from chalcedonies and hornfels to silcretes would, on the basis of the local versus exotic raw material connection, imply increasing use of the site as a dispersal camp, quite the opposite to the inference at Edgehill. The same would apply to Wilton, whereas at Melkhoutboom, the interpretation would logically be the same as for Edgehill. The same widespread event, therefore, would see some sites being used more as aggregation centres while at others the trend would be the reverse. The synchronic use of raw material as an additional attribute within the aggregation/dispersal model works for some sites in the Transvaal (Wadley 1987) but against a regional diachronic perspective provided by the eastern Cape sites the case is less plausible.

In summary, it is postulated that a regional trend towards silcrete use in the eastern extension of the CFB and its immediate surrounds can be isolated as an 'adjunct' stylistic attribute which carries information about developing LSA social affiliation in this area from about 5000 years ago. It is suggested that this shift signifies a predictable structure for both inter-and intra-group interaction, an interaction which becomes increasingly difficult as the regional social geography becomes more complex. The interpretation of raw material as signalling the development of social identity cannot be isolated from the broader trends visible in settlement, the implied demographic shifts related to these as well as the process of intensification.

TOOL FREQUENCIES THROUGH TIME

Chronologically, Edgehill, Wilton, Melkhoutboom and Uniondale overlap only over the last 5500 to 6000 years. As has already been elaborated upon in Chapter Three, the terminal Pleistocene and early Holocene tool assemblages referrable to the Robberg and Albany are not present at Edgehill. However, where the sites do overlap, the assemblages and changes in the frequency of tool types at Edgehill and Welgeluk bear a close resemblance to the changes noted at Wilton (Deacon, J. 1972), Melkhoutboom (Deacon, H.J. 1976) and at Uniondale (Leslie-Brooker 1987). This applies equally to the range of tool types, and their distribution through time.

Differences in the inventories between Edgehill and Welgeluk can also, for the most part, be accounted for by the different chronological emphases at the two sites. Rather than repeat a comparison of the similarities in the lithic assemblages only the differences and points salient to the themes are discussed here (see Leslie-Brooker 1987 for an excellent exhaustive discussion of regional assemblage similarity).

Segment frequencies: functional considerations

Examination of segment occurrence shows that at Edgehill and the CFB sites there is a distinct chronological emphasis on segment manufacture in the mid Holocene. This has led Deacon to regard segments as "...a time controlled feature or a temporal type" occurring in higher frequencies between 7000 and 3000 BP (Deacon, J. 1974:17). Without the chronological control provided by Edgehill and the CFB sites, the low segment numbers at Welgeluk are anomalous, given the occurrence of the site in the same habitat as Edgehill, where segment frequencies are extremely high. Segment numbers are low at Welgeluk because the time period during which segments were favoured is missing. Where the sites do differ significantly is in the frequency of certain types. Most significant is the high frequency of segments at Edgehill between units 8 (ca 6000 BP) and 4 (ca 4300 BP). Here the percentage contribution of segments to the formal tool class goes as high as 42%. At Welgeluk the equivalent figure for segments only reaches just under 5%, while at Wilton, Melkhoutboom and Uniondale the figures are 15,1% (3F), 17,89% (R) and 19,8% (MB) respectively. Figures 5.32 and 5.33 graphically demonstrate the different percentages in relation to the other hafted tools in various CFB assemblages.

Backed bladelet occurrence at Edgehill is out of step with segments, and the impression gained is that as segment frequency declines after the mid-Holocene, backed bladelet frequency increases (Figs 5.32 & 5.33). This trend is demonstrated on a wider spatial scale by Janette Deacon (1982:383). The pattern is also similar at Melkhoutboom although very low sample size makes this inference difficult (Deacon, H.J. 1976:196). At Uniondale, the temporal distribution of segments and backed bladelets roughly mirror each other (Leslie-Brooker 1987:110). Adzes at Edgehill are absent in units 7 and 8 but show a clear increase in frequency above these. At Welgeluk adzes occur throughout, but are significantly absent in the pottery units 1A and 1B. At Melkhoutboom the presence of adzes from MB upwards is temporally identical to their distribution at Edgehill but at Uniondale adzes occur throughout the Holocene.

Generally the distribution of tool types at Edgehill, Welgeluk and the CFB sites is very similar, but as already mentioned the frequency occurrence of segments at Edgehill is much higher than segment occurrence in the equivalent time at the CFB sites. (Figs 5.32 & 5.33). Relative to scrapers, segments account for between 30 and 55% between units 5 and 8 at Edgehill, compared to less than 30% at the other CFB sites in the equivalently dated deposits.

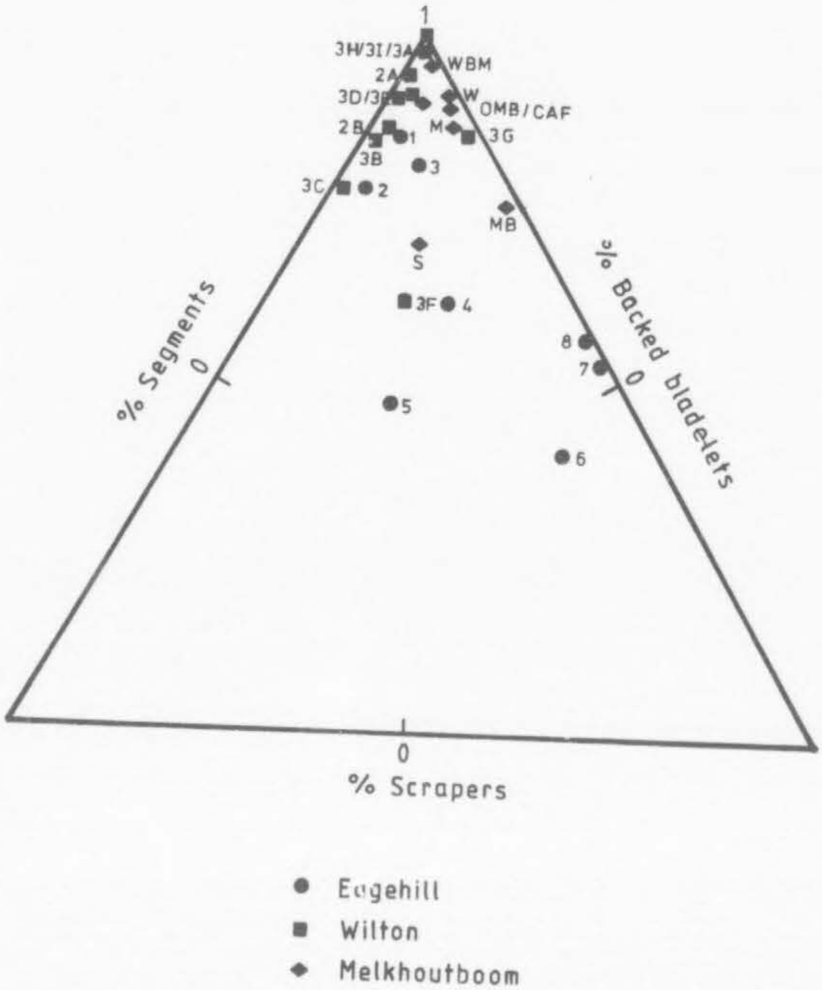


Figure 5.32. Triangular graph of relative scraper, segment and backed- bladelet frequencies at Edgehill, Wilton and Melkhoutboom

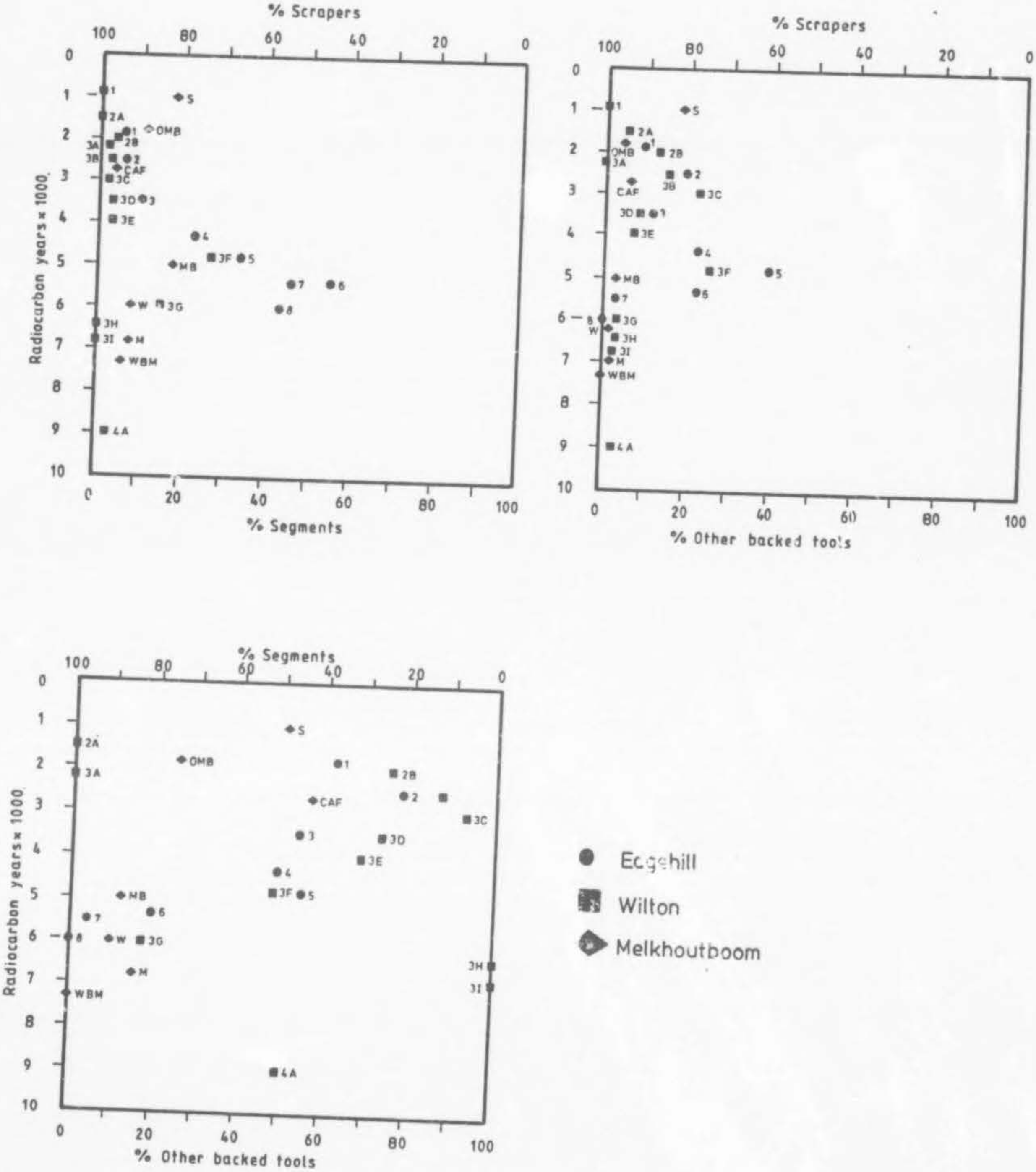


Figure 5.33. Comparisons of scraper and backed tool relative frequencies from Edgehill, Wilton and Melkhoutboom

Differences in the frequency occurrence of segments between the CFB sites and Edgehill introduces considerations of both activity and/or ethnicity differences. Functionally, an established interpretation of segments, as well as backed bladelets, sees them as equivalent to projectile points (Clark 1959; Deacon, H.J. 1976) and consequently closely associated with bow and arrow hunting (Wadley 1987). I now discuss various perspectives on the subject and conclude that segments may well have been used as projectiles but that this does not discount their use in other tasks.

At Edgehill the simple expectation that high segment numbers should correlate with larger amounts of bovid bone is met. At Welgeluk, however, the relatively large amount of bovid bone in unit 4B does not correlate with high segment frequencies. The absence of segments at Welgeluk can in part be explained by the younger time range of the deposits. The segment/bone correlation at Edgehill suggests some circumstantial evidence for a greater emphasis on hunting in the 4300 to 5500 BP units. Edgehill is occupied at least one thousand years before Welgeluk and although the sites are only 7 km apart the differences in habitats may have influenced the decision to use Edgehill before Welgeluk. The high segment frequencies and bone density, a lack of emphasis on riverine resources, low tool diversity, and the use of local hornfels for their manufacture indicates a more specific task orientated occupation which may have been geared specifically to the open habitats to the north of the site. The proximity of the site to the more open savanna habitats to the north may have been more suited to the strategies of the initial pioneer LSA occupants, than the closed habitat surrounding Welgeluk.

At Edgehill, the combination of open grassland interspersed with bush clumps would allow a clear shot as well as provide cover for stalking prey. The ease of bow and arrow hunting at Welgeluk, however, may have been much reduced because of its location in dense Subtropical Thicket. Circumstantially, the vegetation coupled with the territorial browsers it supports argues for a greater emphasis on traps and snares rather than bow hunting. This scenario can be further embellished if one adds to this the possibility of more open habitats in the mid-Holocene coincident in age to the segment rich Edgehill units.

When other attributes and factors concerning segments are examined, the functional interpretation of these tools as projectile points is enhanced. For example, at Uniondale metrical analysis of segments tends to demonstrate the presence of near identical pairs (Leslie-Brooker 1987:164-8). With the added presence and position of mastic stains (Deacon, H.J. 1976), these attributes combine to confirm the original observation by Clark

(1959) that segments were hafted as a pair, back to back, to produce a composite projectile point.

However, microwear trace examination on some of the Edgehill hornfels segments, as well as chalcedony segments from Zimbabwe (Albany Museum Collection) indicates variable micro-damage more in keeping with segments used as small and delicate cutting tools ('penknives') (Binneman pers. comm.; see also Odell 1988:335). This damage is concentrated at both ends of the segment points and is in the form of striations which run obliquely to the point and the unretouched edge. The action of running a blade through a sheet of paper is analogous to the use implied by this analysis. The amount of developed damage appears to exceed that which would result from a one-off? contact as a projectile with the body of an animal. An admittedly crude simulation of 'hunting' with arrows tipped with triangular paired segments, demonstrated the extremely poor penetrating power of this combination compared to a bone point projectile (Binneman pers. comm.). This evidence does not discount the use of segments as projectiles but suggests that the tool could have been used for a number of different tasks. A more detailed analysis of the ratios between scrapers and backed tools and the incidence of large mammal bone led Leslie-Brooker (1987:271) to conclude that there is no necessary correspondence between segments and hunting.

Given the potential functional diversity of tasks to which segments could be applied does not necessarily render the correlation between relatively high bone frequency and high segment numbers at Edgehill entirely spurious. If segments were used as small knives then, along with scrapers, they could have formed a tool set used for leather preparation and clothes manufacture (Deacon & Deacon 1980). The correlation still holds but is less direct.

<u>Segment frequencies: social considerations and aggregation and dispersal</u>

A number of possibilities involving different activity emphases has been suggested to explain the higher segment frequencies at Edgehill compared to the other CFB sites. While activity difference can be argued it is not convincing. Employing a social context, it becomes fruitful to examine the high frequency of segments and frequency changes in other tools and ornaments as further social markers in a boundary context and particularly as indicators for changing site use between aggregation and dispersal camps. I now discuss Wadley's (1987) model of aggregation and dispersal and the archaeological predictions based upon the presence of segments. I compare it with the data from Edgehill and conclude that high segment frequencies at Edgehill are a residue from expedient occupations and that segments were not curated.

The ethnographic work done by Wiessner (1983b) has shown the importance of San arrows for signalling affiliation at the level of the band nexus and how arrows are manipulated for boundary definition. Hodder (1979) has also demonstrated that in the Baringo district of western Kenya, material culture patterning in border areas between tribes varies in response to, among other things, popula ion densit [illegible] In borders where population density is low, cultural differences between tribes [illegible]vely low. Where high population densities create competition for resources betw[illegible]entical economies...material culture dichotomies are clearly expressed" (Hodder 1979:447). The high segment frequencies at Edgehill may be an ethnic marker but this suggestion is highly speculative in the absence of any chronologically comparable assemblages to the north, the presumed area in which a target population would have lived. Fairview, in the Winterberg, has only two segments (Robertshaw 1984:64), but the comparison is spurious given that the the age of the site is more comparable with Welgeluk and therefore low segment frequencies are expected.

It must also be considered that the higher frequency of segments at Edgehill compared to the CFB sites is the result of different seasonal emphases. One can cite the ethnography here about how different San groups emphasise bow and arrow hunting at different times of the year in response to environmental conditions, such as the availability of suitable poisons (Barnard 1979). This also raises interrelated issues concerning appropriate behaviour during aggregation and dispersal and the artefactual predictions and expectations generated by these (Wadley 1987, 1989).

Wadley (1987) has developed a model for the archaeological identification of aggregation versus dispersal sites. During dispersal (an informal 'private' phase of San life during which households consist of small nuclear families: Silberbauer 1981; Wadley 1987), men pay little attention to hunting with bow and arrow, will snare game and even transgress traditional division of labour norms by gathering plant foods. In the formal phase of aggregation, the above behaviour is reversed. Low population in dispersal groups reduces social tensions and the need for embedding social rules through ritual is low. Also, gift manufacture and gift giving is infrequent because people are out of touch with reciprocating partners. In aggregation camps, populations are high, ritual intensity increases and the manufacture of gifts for exchange with *hxaro* partners also increases.

The archaeological recognition of dispersal camps rests upon the identification of expedient assemblages comprising low frequencies of tools and ornaments such as arrows and ostrich eggshell beads which underpin social relations. Raw materials will tend to be local. Wadley isolates several factors to account for such expedient assemblages. Firstly, and of particular importance here is that pioneer populations tend to be expediently (dispersal) orientated. Secondly, an emphasis on territoriality reduces the level of hxaro type gifts. Thirdly, expedient assemblages may also indicate that the region was not used for aggregation camps. In contrast, curated assemblages theoretically correlate with the use of a region as an aggregation area, implying that resource shortages and the associated stress is local and can be relieved through group movement to other territories so that aggregation episodes are either relatively long and frequent or both (Wadley 1989:49).

Another key to Wadley's model is the ethnographic extrapolation of the social and ritual importance of San arrow and bow hunting during San aggregation phases and the material manifestation of this through the presence of segments. In other words, at aggregation sites artefacts closely associated with San social relations of production will be found in higher frequencies. In Wiessner's words, "Socially, politically, and economically, San arrows have greater import than any other single San artefact." (Wiessner 1983b:261). On the other hand, the informality of social convention during dispersal phases will create assemblages of a more expedient nature, in which the frequency of artefacts, such as projectile points and ostrich eggshell beads, will be low. During this private phase the formality of materially expressing social relationships is relaxed.

Wadley (1987), therefore identifies segments specifically as projectile points. Relatively high segment frequencies at Jubilee Shelter in contrast to their low to negligible occurrence at Cave James support the identification of aggregation and dispersal sites. In light of Wadley's model and on the basis of the high segment frequencies in the initial Edgehill occupations between 5500 and 6000 BP through to ca 4300 BP, this phase can be interpreted as an aggregation phase. Furthermore, all the CFB sites during this period have to be similarly identified as having been aggregation camps and that after the mid-Holocene all sites would increasingly have been used for dispersal camps.

This diachronic dimension touches on a further aspect of Wadley's model. This is the identification of the mid-Holocene segment rich 'classic' Wilton as a period of environmental stress and low population density with high *hxaro* type gift giving and exchange. This is due to the need to establish and maintain intergroup contacts in order to maintain access to subsistence and reproductive resources.

The correlation between the high segment frequencies at Edgehill and aggregation can, however, be seriously questioned. This is particularly so when the broader assemblages in the initial hornfels units are considered. As mentioned above, the use of local hornfels would be more in keeping with an expedient dispersal phase camp. Also, the diversity of tool technology is low and the subsistence evidence points to a rather specialised concentration on large mammals with negligible interest in riverine resources. The hornfels units, and to a certain degree the segment rich units at Edgehill for the first 1000 years of its occupation, are more in keeping with the expedient occupations of pioneer populations.

More fundamental is the question why, if segments are curated tools, they were discarded in such high numbers at Edgehill. High discard is more in keeping with an expedient technology. On this basis, one could argue that a decrease in segments after the mid-Holocene documents a trend towards an increasingly curated assemblage as more factors intervene, complicating discard and rates of discard.

Furthermore, a curated technology or curated tool carries stylistic messages and invokes appropriate behaviour as it relates to social relationships and social production i.e. San arrows and hunting as symbols of social, religious and political strategies (Wadley 1987). The more social and stylistic message an artefact carries usually correlates with a greater time investment in the manufacture of that artefact. This equation however, does not apply to projectiles. In the case of segments time invested in manufacture is low (Binneman pers. comm.) and San arrows equally have "...a short manufacture time relative to other San artefacts, and yet (are) rich in style" (Wiessner 1983b:26O). Although projectiles can be heavily invested in social relationships and social strategies, they need not necessarily be heavily curated. In the context of Edgehill, high segment frequencies provide no simple index of aggregation. This is particularly so when the ca 4500 BP occupations at Welgeluk are compared to the older hornfels units at Edgehill and those which are younger at both sites and the CFB sites.

POPULATION INCREASE AND AGGREGATION INTENSITY

If the first 1000 years at Edgehill can be characterised as having expedient, dispersal phase type occupations, in contrast the first occupation in unit 4B at Welgeluk provides all the criteria for an aggregation occupation. What criteria are used to identify unit 4B at Welgeluk as an aggregation phase?

Already noted has been the relatively high bone mass in both basal units 4A and especially in 4B. This can be correlated with increased hunting and its significance is highlighted by the radical reduction in bone weight after unit 4A. Ostrich eggshell beads, incomplete beads and fragments are very high in 4B in marked contrast to units 4A and 3 above. The only decorated ostrich eggshell comes from 4B. Bead manufacture indicates gift giving and also *hxaro* type exchanges. Bone beads and bone bead roughouts as well as decorated bone, ivory and carved ivory all occur in 4B and 4A. Ochre and limonitic nodule densities are very high in 4B in contrast to the units above. These materials, along with the relatively high numbers of ochre stained slabs and pieces can be correlated with ritual activity as could the one calcite crystal recovered from 4B which, in keeping with Wadley's criteria could be part of a shaman's ritual kit. Stone tool diversity is high in 4B and includes the only bored stone recovered as well as two silcrete blades which have been retouched into finely serrated edges, hence the name 'saw edged flakes'. Above all, the distinctiveness of unit 4B's material culture is complemented by the presence of the burial complex.

The material culture of unit 4B at Welgeluk is in sharp contrast to that in the units above. It appears that aggregation occurred only for a relatively short time. A number of different interpretations can be made for this, the first and most obvious being that Welgeluk was no longer used for aggregation purposes because the centre moved elsewhere. The levels above unit 4B can be interpreted as dispersal phase occupations. Resolution of the data from Edgehill reveals that this site does not qualify as an aggregation site and, in fact, little similar evidence of the kind from unit 4B at Welgeluk is present in any part of the Edgehill sequence. If the marked drop off in aggregation type material after unit 4B at Welgeluk does mark a shift in a regional aggregation centre, then it is not possible to identify the site or sites at this stage.

A second interpretation considers a combination of other data from Welgeluk and Edgehill and the regional picture allowed with the other CFB sites. It is clear from Figure 5.34 that at Welgeluk the intensification trends noted above rapidly rise after ca 4000 BP (unit 4A). The same is seen at Edgehill. It is the timing of this process which is the key, coming, as it does, immediately after the strong signals for aggregation ceased. This subsistence trend is interpreted as an index of decreased mobility, higher population levels and site occupation at any time of the year, or, more specifically, occupations which remain for increasingly longer periods into the winter months. Furthermore, there is enough evidence to infer that this subsistence trend is a regional process.

On the basis of this, traditional risk management strategies tied to the social process of aggregation and dispersal become less viable because there is no longer sufficient regional heterogeneity between people and resources to allow group relocation. Resource or population gradients which would encourage mobility no longer exist. A social boundary such as the one argued for here becomes increasingly firmer suggesting that territoriality and

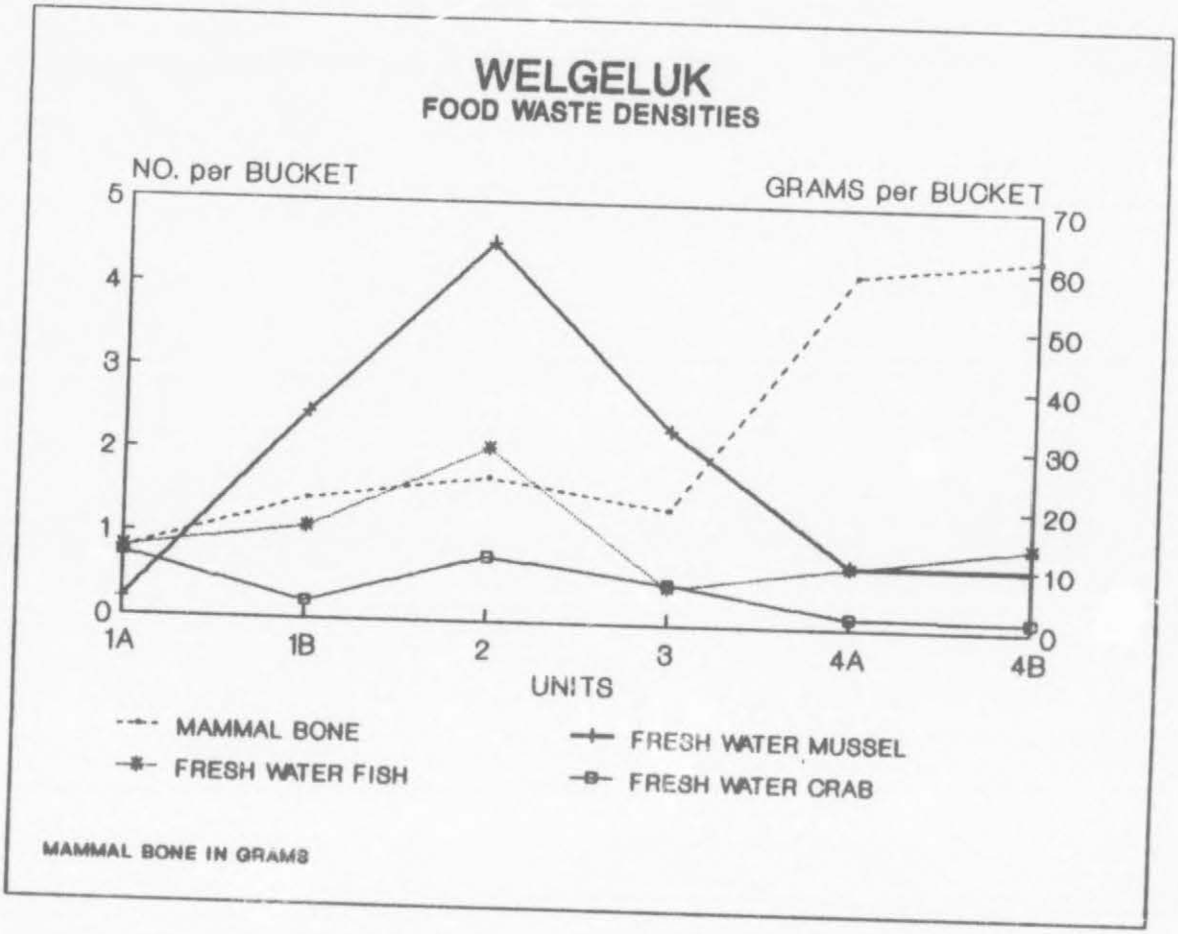


Figure 5.34. Welgeluk: a comparison of food waste densities

group closure become emphasised. The !Ko encourage territoriality because of a uniform regional scarcity (Cashdan 1983) and it is argued that the same principle operated in the eastern extension of the CFB. Scarcity is a relative concept and resources become critical or restricted only in relation to the number of people using them. In the eastern Cape the more benign and productive habitats allowed scarcity to be felt at higher population densities.

Reference to scarcity and the social response to it implies that LSA groups were under stress. This is explicit in both Wadley's (1987, 1989) synchronic aggregation/dispersal model as well as its articulation diachronically. In these instances stress is ecological and fluctuating intensities of *hxaro* type gifts, and especially artefacts which are associated with ritual activities, are seen as the material manifestations of social strategies employed to cope with ecological stress. In Laughlin and d'Aquili's (1979:303) words, "...ecological stress is defined perceptually and cognitively in terms of social disharmony, and their incidence has the effect of increasing, rather than decreasing, social cohesion and collective action -in large measure through the medium of ritual".

The character of unit 4B at Welgeluk, as well as that from the mid-Holocene Wilton assemblages in the CFB sites, with "...increased numbers of formal, standardised tools, arrows and beads, jewellery, art, bonework and leatherwork" (Wadley 1989:49), is seen as an indication of stress between 9000 and 4500 BP. At this time drier and warmer conditions depopulated the southern African interior and LSA immigrations into the CFB and Cape coastal regions are believed to have required intensive reciprocity and ritual in order to establish new alliances and networks. Implicit in this are low population levels requiring more intensive networking to ensure suitable mates and social succour.

While I agree that the mid-Holocene Wilton assemblages point towards ecological and social stress, I maintain that what is seen in the CFB and Cape coastal regions is a response to too many people and the increasingly complex social geography this brought about, and not too few. Unlike the interior, the Cape coastal areas were relatively intensively settled, and increasingly so through the Holocene. The main argument used to support this is the timing of the intensification trend which follows immediately after the aggregation/ritual intensity of the mid-Holocene wanes. I suggest that the mid-Holocene assemblages demonstrate a marked decline in fissioning opportunities for increased population levels commensurate with an increased potential for inter-group conflict. Consequently, widespread co-operation and risk pooling networks begin to lose their rationale.

The mid-Holocene Wilton artefact/*hxaro*/aggregation/ritual nexus can just as easily be seen as attempts to balance contradictory interests based upon a desire to maintain open reciprocity on the one hand and the need to "...limit external ties in order to husband resources" on the other (Gilman 1984:122). Although widespread co-operation must still have been desired and needed, the artefactual intensity of the mid-Holocene is, I believe, a symptom that the "...basis for it had become more problematical" (Gilman 1984:122).

The decline in ornamentation after the mid-Holocene does not necessarily indicate that stress is reduced. If stress declined, intensification would not have taken place. I argue that the immediate response after the mid-Holocene was to channel this stress into intensification and that this action indicates increasingly closed circles of mutual aid and alliance. Hitchcock (1982:251-52) observes this in his Nata River studies in Botswana. As competition for residential and logistical space increases, "...networks become more restricted and there is a shift from generalized to balanced reciprocity". In other words, in order to reduce conflicting territorial or resource interests, groups "...contract their effective-use territory by producing more from less land" (Brown 1985:208).

Theoretically, the mid-and late-Holocene sequence in the CFB and coastal regions is one in which the isomorphic fit "...between social and cognitive models and the environment" (Laughlin & d'Aquili 1979:307-8) increasingly fails and a new strategy, which allocates risk to intensification arises.

This interpretation seems most suited to the Holocene LSA record in the southern Cape and in the eastern extension of the CFB and immediate surroundings where hunter-gatherer population densities arguably far exceeded any elsewhere in the sub-continent. However, I also believe that what occurs here is not necessarily contradicted by LSA sequences elsewhere. For example, Wadley (1987) identifies Jubilee Shelter as an aggregation site through-out its Holocene occupation and Cave James as a dispersal site. The marked drop in *hxaro*-type material at about 4000 BP between unit 4A and those units above at Welgeluk is not seen at Jubilee Shelter. This suggests that inclusive, wide ranging risk re-duction strategies, premised on low population densities and relatively high mobility, continue in the later Holocene. The quantity of LSA sites and the intensity of their occupation in the eastern extension of the CFB and the southern Cape indicate consistently high and increasing LSA Holocene populations (Deacon & Thackeray 1984; Deacon & Deacon 1986; Hall & Binneman 1987). Intensification is a risk reducing strategy which is a response to this more complex social geography.

The same complexity, relating to population density, simply was not permitted by environments elsewhere and, consequently, relatively open *hxaro* networks of the type implied at Jubilee Shelter and Cave James could and had to be maintained. The frequency of artefacts associated with aggregation and dispersal, *hxaro* and ritual remains relatively steady, even in the late Holocene. In the even more marginal contexts of the San ethnography, the above would be even more applicable.

This interpretation requires that artefact patterns from 4000 BP at Welgeluk, Edgehill and the CFB sites be seen not so much as dispersal phase camps but rather, that the archaeological distinction between aggregation and dispersal becomes progressively blurred through time as mobility reduces and the social strategies associated with it change. This would correlate with a reduced emphasis on residential mobility with groups increasingly emphasising their identity with specific places. After 4000 BP aggregation need not have been tied to specific seasons or undertaken repeatedly at set sites. Although speculative, the location of the silcrete sources on the Grahamstown Peneplain, from which regional social identity was derived, may have conferred upon the eastern extension of the CFB the status of a general aggregation area. It cannot be ruled out that coastal sites also functioned in such a way but this is outside the scope of this enquiry.

Although the questionable quality of material from CFB sites excavated by Hewitt makes it of limited value, when examined in conjunction with the systematically collected data from Wilton, Melkhoutboom and Uniondale, it indicates no clear distinctions after the mid-Holocene between those with curated and expedient assemblages. At Hellsport a recent re-analysis, suggests a mid-to later Holocene date (pers. observation). Many OES beads, quartz and calcite crystals, worked bone and worked or unworked marine shell, particularly the sand mussel *Donax serra*, and many shale 'palette' pieces were recovered. The collection also comprises an ochre cache. Associated with this is an ochre stained *Turbo* 'dish' and *Turbo* pendants of the same kind as recovered at Melkhoutboom (Deacon, H.J. 1976:52 ff.), and some fine bone points.

At Welcome Woods, where stratigraphic control is better, those layers deemed to date from the mid-Holocene preserve a similar range of items (pers. observation). The same can be suggested tentatively for Governors Kop, Middelkop Cave and Kritzingers Cave (pers. observation). Analysis of this material lends support to the possibility that after the mid-Holocene there is little to separate sites on the basis of curated versus expedient material. There is a general commonality in character for all these sites in the eastern extension of the CFB and the immediate surroundings. Most, if not all, these sites are also burial centres.

This commonality is further emphasised with a number of shared stylistic indicators. Leslie-Brooker (1987:147) has suggested that kasouga flakes are an isochrestic variant of woodworking tools (adzes) and that their distribution as a stylistic marker has social correlates. It is perhaps no coincidence that they are prominent in the sequences at Edgehill and Uniondale over the last 4000 years and that their distribution roughly mirrors that of the silcrete plateau.

Some of the burial grave goods at Welgeluk, such as small bovid metapodials and warthog tusks, appear to be inclusions which are specific only to that complex. However, small bovid metapodials and warthog tusks are prominent inclusions in the Middelkop burials as well, suggesting that these items are part of a regional style and symbolic tradition. Edge nicked *Turbo* pendants and shale 'palettes' may also be specific regional stylistic markers. The unique bone 'points' from Uniondale may have been markers at a smaller social scale (Leslie-Brooker 1987). All this variability may illustrate the suggestion that relatively high population densities in core areas give rise to distinctive material cultural expressions (Hamell & Howell 1987).

SUMMARY

Aspects of raw material variability and tool frequencies suggest that site distinctions in terms of curated/expedient and aggregation/dispersal criteria are not readily made after the mid-Holocene. Traditional risk pooling strategies based, in part, around aggregation and dispersal were much reduced relative to that in the mid-Holocene. Fundamental to this interpretation is that population and group density in this area were relatively high, both facilitating and forcing alternative strategies. I suggest that Edgehill and Welgeluk record a sequence of events which, based upon and linked through both artefactual and subsistence data, exemplifies a more widespread regional pattern. This pattern, for the pre-contact sequence, is summarised in four general stages.

STAGE 1

A period up to about 5000 BP during which population fission is permitted through available space and the increasing hetero-geneity of the landscape to the north of the CFB which comple-ments patch strategies. Specifically, the occupation of Edgehill is an index of this process. Social networks are widespread and open as represented through raw material diversity. Generally, the initial assemblages at Edgehill are characterised as expedient, emphasising the pioneer character of the population.

STAGE 2

Fissioning opportunities were low and the corresponding increasingly complex social geography requires a more predictable social structure to space. A territorial response is actively constituted. Silcrete is manipulated from about 5000 BP as adjunct style to facilitate this and provides a predictable basis for intra-(within the style area) and inter-(across the boundary of the style area) interaction. The eastern extension of the CFB may be seen as the core of this style area, with the inland sites of Edgehill and Welgeluk falling on the periphery.

STAGE 3

Population increase (Welgeluk occupied from about 4500 BP) coupled with greater competition for residential space firms boundaries and the basis for widespread alliance and interaction becomes problematical. The isomorphism between social and economic models and reality begins to break down and attempts to maintain congruence are made through an intensification of ritual, gift-giving and traditional aggregation and dispersal strategies.

STAGE 4

Throughout this period mobility options were even more restricted and the basis of risk reduction through mobility is no longer viable. The social stress created through the contradiction between increasing sedentism and impeded mobility is mediated by expansion of the niche breadth and intensification of resources, a process which picks up pace from about 4000 BP. During this period tokens of alliance and interaction reduce and the distinction between sites with curated versus expedient assemblages breaks down. It is suggested that throughout this sequence of events groups identify strongly with specific places on the landscape.

Aspects of the interpretations given above now allow for the examination of the role of Holocene LSA burial as a reflection of economic and social structure.

Table 5.1. Edgehill: frequencies and percentage frequencies of raw materials used in the waste, utilised and formal tool classes

			UNITS								
CLASS	MATERIAL		1	2	3	4	5	6	7	8	Total
TOTAL WASTE	Quartz	f	236	748	1025	157	39	252	887	582	3926
		%	5.2	14.2	23.7	3.4	0.7	4.1	16.1	19.5	10.0
	Sandstone	f	2697	1650	1336	1117	2122	2014	1583	1571	14090
		%	38.7	31.3	30.9	24.3	35.9	32.4	28.7	52.7	33.4
	Silcrete	f	1629	2155	1441	2851	3234	3367	847	211	15735
		%	35.7	40.9	33.3	61.9	54.7	54.1	15.4	7.1	39.9
	Hornfels	f	917	716	522	475	429	542	2099	564	6264
		%	20.1	13.6	12.1	10.3	7.3	8.7	38.1	18.9	15.9
	Chalcedony	f	0	1	0	0	0	2	8	14	25
		%	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.5	0.1
	Chert	f	16	0	4	5	78	12	63	33	211
		%	0.4	0.0	0.1	0.1	1.3	0.2	1.1	1.1	0.5
	Quartzite	f	0	0	0	0	9	30	25	5	69
		%	0.0	0.0	0.0	0.0	0.2	0.5	0.5	0.2	0.2
	Total	f	5495	5270	4328	4605	5911	6219	5512	2980	40320
	Waste as % of total		11.6	13.4	11.0	11.7	15.0	15.8	14.0	7.6	95.1
	Waste/bucket		32.3	122.6	89.2	129.7	63.9	143.0	143.2	77.4	
TOTAL UTILISED	Quartz	f	3	5	2	4	0	3	0	1	18
		%	3.7	7.9	13.3	13.8	0.0	6.1	0.0	9.1	5.9
	Sandstone	f	1	3	2	0	0	4	1	4	15
		%	1.2	4.8	13.3	0.0	0.0	8.2	4.0	36.4	5.0
	Silcrete	f	55	46	9	18	28	39	5	0	199
		%	65.9	73.0	60.0	62.1	96.6	81.6	20.0	0.0	66.0
	Hornfels	f	24	6	2	7	1	2	19	9	70
		%	29.3	9.5	13.3	24.1	3.4	4.1	76.0	54.5	22.1
	Chert	f	0	3	0	0	0	0	0	0	3
		%	0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	Total	f	83	62	15	29	29	48	25	14	305
	utilised as % of total		27.1	20.8	5.0	9.6	9.6	16.2	8.3	3.6	0.7
	Utilised/bucket		0.6	1.5	C.3	0.8	0.3	1.1	0.6	0.3	
TOTAL FORMAL	Quartz	f	6	9	6	11	4	3	0	2	41
		%	2.0	3.3	2.9	3.9	1.7	1.5	0.0	2.4	2.4
	Sandstone	f	14	1	2	7	2	1	0	4	32
		%	5.0	0.4	1.0	2.5	0.9	0.5	0.0	4.8	1.9
	Silcrete	f	244	235	182	235	206	172	41	35	1350
		%	81.4	87.1	87.6	86.4	90.5	86.5	24.7	44.0	79.0
	Hornfels	f	33	24	17	20	14	22	113	37	277
		%	11.3	9.2	8.1	7.2	6.5	11.0	73.3	44.0	16.1
	Chert	f	1	0	1	0	1	1	3	4	11
		%	0.3	0.0	0.5	0.0	0.4	0.5	2.1	4.8	0.6
	Total	f	298	269	208	269	227	199	157	82	1709
	Formal as % of total		17.5	15.8	12.2	16.2	13.4	11.6	8.5	4.9	4.2
	Formal/bucket		2.1	6.3	4.3	7.9	2.5	4.6	3.8	2.2	

Table 5.2. Edgehill: frequencies and percentage frequencies of raw materials used in the waste tool types

CLASS	MATERIAL		1	2	3	4	5	6	7	8	Total
			UNITS								
CHIPS	Quartz	f	42	155	275	30	12	131	324	176	1145
		%	12.6	26.6	44.3	5.9	1.1	9.4	30.8	30.4	18.7
	Sandstone	f	122	73	122	29	241	364	221	264	1436
		%	36.5	12.5	19.6	5.7	22.9	26.2	21.0	45.6	23.5
	Silcrete	f	141	268	146	422	692	807	168	39	2683
		%	42.2	46.0	23.5	83.2	65.8	58.1	16.0	6.7	13.0
	Hornfels	f	29	86	78	26	65	85	324	84	797
		%	8.7	14.8	12.6	5.1	8.1	6.1	30.8	14.5	43.9
	Chert	f	0	0	0	0	21	1	16	15	53
		%	0.0	0.0	0.0	0.0	2.0	0.1	1.5	2.6	0.9
	Quartzite	f	0	0	0	0	0	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	Total	f	334	582	621	507	1051	1388	1053	579	6115
Chips as	% of waste		0.8	1.4	1.5	1.3	2.6	3.4	2.6	1.4	15.2
	Chips/bucket		2.4	13.5	12.8	14.3	11.4	31.9	27.4	15.0	
CHUNKS	Quartz	f	70	129	198	26	7	25	85	198	738
		%	5.4	15.8	29.9	4.4	1.1	4.3	20.1	41.2	13.4
	Sandstone	f	930	350	267	245	300	354	190	206	2842
		%	71.7	42.7	40.3	41.8	46.2	60.6	45.0	42.8	51.7
	Silcrete	f	127	164	120	186	284	163	40	21	1105
		%	9.8	20.0	18.1	31.7	43.8	27.9	9.5	4.4	20.1
	Hornfels	f	170	176	78	127	55	39	102	50	797
		%	13.1	21.5	11.8	21.7	8.5	6.7	24.2	10.4	14.5
	Chalcedony	f	0	0	0	0	0	0	2	0	2
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
	Chert	f	0	0	0	2	3	0	3	3	11
		%	0.0	0.0	0.0	0.3	0.5	0.0	0.7	0.6	0.2
	Quartzite	f	0	0	0	0	0	3	0	3	6
		%	0.0	0.0	0.0	0.0	0.0	0.5	0	0.6	0.1
	Total	f	1297	819	663	586	649	584	422	481	5501
Chunks as	% of waste		3.2	2.0	1.6	1.5	1.6	1.4	1.0	1.2	13.6
	Chunks/bucket		9.2	19.0	13.7	16.5	7.0	13.4	11.0	12.5	
CORES	Quartz	f	0	0	3	0	0	0	0	1	4
		%	0.0	0.0	5.3	0.0	0.0	0.0	0.0	5.0	0.2
	Sandstone	f	10	4	9	10	10	6	13	4	66
		%	11.2	6.9	15.8	14.9	10.5	10.2	25.0	20.0	13.3
	Silcrete	f	58	46	40	50	81	43	9	4	331
		%	65.2	79.3	70.2	74.6	85.3	72.9	17.3	20.0	66.6
	Hornfels	f	20	8	5	7	4	10	28	11	93
		%	22.4	13.8	8.8	10.4	4.2	16.9	53.8	55.0	18.7
	Chert	f	1	0	0	0	0	0	1	0	2
		%	1.1	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.4
	Quartzite	f	0	0	0	0	0	0	1	0	1
		%	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.2
	Total	f	89	58	57	67	95	59	52	20	497
Cores as	% of waste		0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	1.2
	Cores/bucket		0.6	1.3	1.2	1.9	1.0	1.4	1.4	0.5	

Table 5.2. Continued

CLASS	MATERIAL		1	2	3	4	5	6	7	8	Total
FLAKES	Quartz	f	124	464	549	101	20	94	478	207	2037
		%	3.3	12.3	18.4	3.0	0.5	2.3	12.1	10.9	7.3
	Sandstone	f	1625	1216	937	829	1569	1288	1156	1095	9715
		%	43.9	32.2	31.6	24.5	38.4	31.0	29.2	57.8	34.8
	Silcrete	f	1259	1653	1118	2136	2149	2328	628	145	11416
		%	34.0	43.8	37.7	63.2	52.6	56.0	15.9	7.7	40.9
	Hornfels	f	682	443	359	310	282	407	1627	417	4527
		%	18.4	11.7	12.1	9.2	6.9	9.8	41.1	22.0	16.2
	Chalcedony	f	0	1	0	0	0	2	6	14	23
		%	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.7	0.1
	Chert	f	15	0	4	2	54	11	43	15	144
		%	0.4	0.0	0.1	0.1	1.3	0.3	1.0	0.8	0.5
	Quartzite	f	0	0	0	0	9	27	24	1	61
		%	0.0	0.0	0.0	0.0	0.2	0.6	0.6	0.1	0.2
	Total	f	3705	3777	2967	3378	4083	4157	3962	1894	27923
Flakes as	% of waste		9.2	9.4	7.4	8.4	10.1	10.3	9.8	4.7	69.3
	Flakes/bucket		26.2	87.8	61.2	95.2	44.1	95.6	102.9	49.2	
BLADES	Quartz	f	0	0	0	0	0	2	0	0	2
		%	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.7
	Sandstone	f	10	7	1	4	2	2	3	2	31
		%	14.3	20.6	5.0	6.0	6.1	6.5	13.0	33.3	10.9
	Silcrete	f	44	24	17	57	28	26	2	2	200
		%	62.9	70.6	85.0	85.1	84.8	83.9	8.7	33.3	70.4
	Hornfels	f	16	3	2	5	3	1	18	2	50
		%	22.9	8.8	10.0	7.5	9.1	3.2	78.3	33.3	17.6
	Chert	f	0	0	0	1	0	0	0	0	1
		%	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.4
	Total	f	70	34	20	67	33	31	23	6	284
Blades as	% of waste		0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.7
	Blades/bucket		0.5	0.8	0.4	1.9	0.4	0.7	0.6	0.2	
	Total	f	5495	5270	4328	4605	5911	6219	5512	2980	40320
waste as	% of total		11.6	13.4	11	11.7	15	15.8	14	7.6	95.1
	Waste/bucket		32.3	122.6	89.2	129.7	63.9	143	143.2	77.4	

Table 5.3. Edgehill: frequencies and percentage frequencies of raw materials used in the utilised tool types

			UNITS								
CLASS	MATERIAL		1	2	3	4	5	6	7	8	Total
OUTILS ECAILLES	Quartz	f	3	3	1	4	0	2	0	1	14
		%	7.3	25.0	14.3	57.1	0.0	50.0	0.0	20.0	
	Sandstone	f	1	0	1	0	0	0	0	2	3
		%	2.4	0.0	14.3	0.0	0.0	0.0	0.0	20.0	
	Silcrete	f	20	4	3	0	1	1	0	2	31
		%	48.8	33.3	42.9	0.0	100.0	25.0	0.0	40.0	
	Hornfels	f	17	3	2	3	0	1	1	1	28
		%	41.5	25.0	28.6	42.9	0.0	25.0	100.0	20.0	
	Chert	f	0	2	0	0	0	0	0	0	2
		%	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	
	Total	f	41	12	7	7	1	4	1	5	78
Outils as %	of m' retouch		13.4	3.9	2.3	2.3	0.3	1.3	0.3	0.4	25.6
	Outils/bucket		0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.1	
UTILISED FLAKES	Quartz	f	0	1	1	0	0	0	0	0	2
		%	0.0	2.0	12.5	0.0	0.0	0.0	0.0	0.0	1.0
	Sandstone	f	0	2	1	0	0	3	1	2	9
		%	0.0	4.1	12.5	0.0	0.0	8.6	4.3	33.3	4.3
	Silcrete	f	29	42	6	18	27	31	5	2	160
		%	80.6	85.8	75.0	81.8	96.4	88.6	21.7	33.3	77.3
	Hornfels	f	7	3	0	4	1	1	17	2	35
		%	19.4	6.1	0.0	18.2	3.6	2.8	74.0	33.3	16.9
	Chert	f	0	1	0	0	0	0	0	0	1
		%	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	Total	f	36	49	8	22	28	35	23	6	207
U'flakes as	% of m'retouch		11.8	16.1	2.6	7.2	9.2	11.5	7.5	2.0	67.9
	flakes/bucket		0.3	1.1	0.2	0.6	0.3	0.8	0.6	0.2	
UTILISED BLADES	Sandstone	f	0	1	0	0	0	1	0	0	2
		%	0.0	100.0	0.0	0.0	0.0	11.1	0.0	0.0	10.0
	Silcrete	f	6	0	0	0	0	8	0	0	14
		%	100.0	0.0	0.0	0.0	0.0	88.9	0.0	0.0	70.0
	Hornfels	f	0	0	0	0	0	0	1	3	4
		%	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	20.0
	Total	f	6	1	0	0	0	9	1	3	20
U'blades as	% of m'retouch		2.0	0.3	0.0	0.0	0.0	3.0	0.3	1.0	6.6
Utilised	blades/bucket		0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	

Table 5.4. Edgehill: frequencies and percentage frequencies of raw materials used in the formal tool types

			UNITS							
CLASS	MATERIAL		1	2	3	4	5	6	7	8	Total
SCRAPERS	Quartz	f	2	5	4	0	0	0	0	0	11
		%	1.1	3.0	3.1	0.0	0.0	0.0	0.0	0.0	1.3
	Sandstone	f	7	1	0	3	2	1	0	3	17
		%	4.0	0.6	0.0	2.3	2.7	1.8	0.0	6.5	2.0
	Silcrete	f	158	157	125	118	67	43	15	27	710
		%	89.3	93.5	95.4	90.1	89.3	76.8	21.1	58.7	83.0
	Hornfels	f	10	5	2	10	6	11	54	16	114
		%	5.6	3.0	1.5	7.6	8.0	19.6	76.1	34.8	13.3
	Chert	f	0	0	0	0	0	1	2	0	3
		%	0.0	0.0	0.0	0.0	0.0	1.8	2.8	0.0	0.4
	Total	f	177	168	131	131	75	56	71	46	855
Scrapers as % of formal			12.8	12.1	9.4	9.4	5.4	4.0	5.1	3.3	61.6
Scrapers/bucket			1.3	3.9	2.7	3.7	0.8	1.3	1.8	1.2	
BACKED BLADELETS	Quartz	f	2	0	0	0	0	0	0	0	2
		%	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
	Silcrete	f	14	30	12	38	48	16	0	0	158
		%	77.8	85.7	100.0	100.0	94.1	94.1	0.0	0.0	91.3
	Hornfels	f	1	5	0	0	2	1	2	0	11
		%	5.6	14.3	0.0	0.0	3.9	5.9	100.0	0.0	6.4
	Chert	f	1	0	0	0	1	0	0	0	2
		%	5.6	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.2
	Total	f	18	35	12	38	51	17	2	0	173
B'bladelets as % of formal			1.3	2.5	0.9	2.7	3.7	1.2	0.1	0.0	12.5
Backed bladelets/bucket			0.1	0.8	0.2	1.1	0.6	0.4	0.1	0.0	
SEGMENTS	Quartz	f	0	0	0	1	0	1	0	2	4
		%	0.0	0.0	0.0	3.1	0.0	1.4	0.0	5.7	1.5
	Sandstone	f	1	0	1	0	0	0	0	0	2
		%	9.1	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.7
	Silcrete	f	9	11	13	30	35	66	21	10	195
		%	81.8	100.0	92.9	93.8	87.5	93.0	34.4	28.6	70.9
	Hornfels	f	1	0	0	1	5	4	39	19	69
		%	9.1	0.0	0.0	3.1	12.5	5.6	63.9	54.3	25.1
	Chert	f	0	0	0	0	0	0	1	4	5
		%	0.0	0.0	0.0	0.0	0.0	0.0	1.7	11.4	1.8
	Total	f	11	11	14	32	40	71	61	35	275
Segments as % of formal			0.8	0.8	1.0	2.3	2.9	5.1	4.4	2.5	19.8
segments/bucket			0.1	0.3	0.3	0.9	0.4	1.6	1.6	0.9	
ADZES	Sandstone	f	0	0	1	4	0	1	0	0	6
		%	0.0	0.0	7.1	28.6	0.0	33.3	0.0	0.0	10.2
	Silcrete	f	4	4	0	6	1	0	0	0	15
		%	40.0	30.8	0.0	42.8	33.3	0.0	0.0	0.0	25.4
	Hornfels	f	6	9	12	4	2	2	0	0	35
		%	60.0	69.2	85.8	28.6	66.6	66.6	0.0	0.0	62.7
	Chert	f	0	0	1	0	0	0	0	0	1
		%	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	1.7
	Total	f	10	13	14	14	3	3	0	0	57
Adzes as % of formal			0.7	0.9	1.0	1.0	0.2	0.2	0.0	0.0	4.3
Adzes/bucket			0.1	0.3	0.3	0.4	0.1	0.1	0.0	0.0	

Table 5.4. Continued

CLASS	MATERIAL		1	2	3	4	5	6	7	8	Total
SCRAPER	Silcrete	f	0	0	0	5	0	0	0	0	5
ADZES		%	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
	Total	f	0	0	0	5	0	0	0	0	5
S'adzes as % of formal			0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.4
Scraper adzes/bucket			0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	
BORERS	Silcrete	f	1	3	1	1	4	1	0	0	11
		%	100.0	75.0	100.0	100.0	100.0	100.0	0.0	0.0	91.7
	Hornfels	f	0	1	0	0	0	0	0	0	1
		%	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	8.3
	Total	f	1	4	1	1	4	1	0	0	12
Borers as % of formal			0.1	0.3	0.1	0.1	0.3	0.1	0	0	0.9
Borers/bucket			0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	
KASOUGA	Quartz	f	0	1	0	0	0	0	0	0	1
FLAKES		%	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
	Silcrete	f	5	1	0	0	0	0	0	0	6
		%	83.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
	Hornfels	f	1	0	0	0	0	0	0	0	1
		%	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
	Total	f	6	2	0	0	0	0	0	0	8
K' flakes as % of waste			0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Kasouga flakes/bucket			0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
MISC.	Quartz	f	1	0	0	0	0	0	0	0	1
RETOUCH		%	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Sandstone	f	7	0	0	0	0	0	0	1	7
		%	5.6	0.0	0.0	0.0	0.0	0.0	0.0	100.0	2.2
	Silcrete	f	54	31	33	43	54	47	11	0	273
		%	72.0	86.0	92.0	90.0	100.0	92.0	48.0	0.0	84.0
	Hornfels	f	15	5	3	5	0	4	12	0	44
		%	20.0	14.0	8.0	10.0	0.0	8.0	52.0	0.0	13.5
	Total	f	75	36	36	48	54	51	23	1	325
M'retouch as % of formal			5.4	2.6	2.6	3.5	3.9	3.7	1.7	3.3	23.4
Misc. retouch/bucket			0.5	0.8	0.7	1.4	0.6	1.2	0.6	0.1	

Table 5.5. Welgeluk: frequencies and percentage frequencies of raw materials used in the waste, utilised and formal tool classes

CLASS	MATERIAL		1A	1B	2	3	4A	4B	Total
TOTAL WASTE	Quartz	f	2	23	10	2	11	1795	1843
		%	0.2	0.5	0.2	0.1	0.2	12.1	5.1
	Sandstone	f	732	4427	3857	4311	2244	4183	19754
		%	87.4	86.1	80.7	77.9	45.0	28.1	54.6
	Silcrete	f	42	209	212	879	2224	7526	11092
		%	5.0	4.1	4.4	15.9	44.6	50.6	30.7
	Shale	f	53	414	551	310	499	990	2817
		%	6.3	8.0	11.5	5.6	10.0	6.6	7.8
	Chalcedony	f	0	5	0	1	2	160	168
		%	0.0	0.1	0.0	0.1	0.1	1.1	0.5
	Chert	f	6	64	151	24	[illegible]	190	440
		%	0.7	1.2	3.2	0.4	0.1	1.2	1.2
	Other	f	2	0	0	2	0	36	40
		%	0.2	0.0	0.0	0.1	0.0	0.2	0.1
	Total	f	837	5142	4781	5529	4985	14880	36154
Waste as % of grand total			99.6	98.9	97.[illegible]	97.0	95.0	93.6	95.7
TOTAL UTIL.	Quartz	f	0	0	0	0	0	11	11
		%	0.0	0.0	0.0	0.0	0.0	7.5	4.8
	Sandstone	f	1	4	6	0	4	8	23
		%	100.0	28.6	28.6	0.0	13.3	5.5	9.9
	Silcrete	f	0	6	7	0	19	122	154
		%	0.0	42.8	33.3	0.0	63.3	83.6	66.7
	Shale	f	0	3	4	18	7	2	34
		%	0.0	21.4	19.0	94.7	23.3	1.4	14.7
	Chalcedony	f	0	1	0	1	0	0	2
		%	0.0	7.1	0.0	5.3	0.0	0.0	0.9
	Chert	f	0	0	4	0	0	3	7
		%	0.0	0.0	19.0	0.0	0.0	2.1	3.0
	Total	f	1	14	21	19	30	146	231
Util. as % of grand total			0.4	6.0	9.1	8.2	13.0	63.2	0.6
TOTAL FORMAL TOOLS	Quartz	f	0	0	1	0	0	7	8
		%	0.0	0.0	1.5	0.0	0.0	0.9	0.6
	Sandstone	f	0	4	14	0	2	11	31
		%	0.0	10.0	21.2	0.0	1.5	1.5	2.5
	Silcrete	f	0	29	25	145	224	655	1078
		%	0.0	72.5	37.9	97.3	96.1	90.0	88.5
	Shale	f	0	5	18	2	6	37	68
		%	0.0	12.5	27.2	1.3	2.6	5.0	5.6
	Chalcedony	f	0	1	0	1	1	12	15
		%	0.0	2.5	0.0	0.6	0.4	1.6	1.2
	Chert	f	2	1	8	1	0	6	18
		%	100.0	2.5	12.1	0.6	0.0	0.8	1.4
	Total	f	2	40	66	149	233	728	1218
formal as % of grand total			0.1	3.3	5.4	12.2	19.1	59.7	3.2
TOTAL TOOLS			840	5196	4868	5697	5248	15754	37603

Table 5.6. Welgeluk: frequencies and percentage frequencies of raw materials used in the utilised tool types

CLASS	MATERIAL		UNITS 1A	1B	2	3	4A	4B	Total
OUTILS ECAILLES	Quartz	f	0	0	0	0	0	11	11
		%	0.0	0.0	0.0	0.0	0.0	52.4	28.2
	Sandstone	f	0	1	0	0	0	2	3
		%	0.0	14.2	0.0	0.0	0.0	9.5	7.7
	Silcrete	f	0	2	0	0	2	6	10
		%	0.0	28.6	0.0	0.0	28.6	28.6	25.6
	Shale	f	0	3	3	0	5	0	11
		%	0.0	42.8	75.0	0.0	71.4	0.0	28.2
	Chalcedony	f	0	1	0	0	0	0	1
		%	0.0	14.2	0.0	0.0	0.0	0.0	2.6
	Chert	f	0	0	1	0	0	2	3
		%	0.0	0.0	25.0	0.0	0.0	9.5	7.7
	Total	f	0	7	4	0	7	21	39
	% of CRP		0.0	17.9	10.2	0.0	17.9	53.8	16.9
	CRP / bucket		0.00	0.06	0.03	0.00	0.17	0.19	---
UTIL. FLAKES	Sandstone	f	1	2	5	0	4	6	18
		%	100.0	33.3	33.3	0.0	22.2	6.7	12.5
	Silcrete	f	0	4	7	0	13	81	105
		%	0.0	66.6	46.7	0.0	72.2	90.0	73.0
	Shale	f	0	0	1	15	1	2	19
		%	0.0	0.0	6.6	93.7	5.6	2.2	13.2
	Chalcedony	f	0	0	0	1	0	0	1
		%	0.0	0.0	0.0	6.3	0.0	0.0	0.6
	Chert	f	0	0	2	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.6
	Total	f	1	6	15	16	18	90	144
	% of util flakes		0.6	4.7	10.4	11.1	12.5	62.5	62.3
	util flakes/bucket		0.01	0.05	0.14	0.16	0.44	0.82	---
UTIL. BLADES	Sandstone	f	0	1	1	0	0	0	2
		%	0.0	100.0	50.0	0.0	0.0	0.0	4.3
	Silcrete	f	0	0	0	0	4	35	39
		%	0.0	0.0	0.0	0.0	80.0	100.0	84.8
	Shale	f	0	0	0	3	1	0	4
		%	0.0	0.0	0.0	100.0	20.0	0.0	8.7
	Chert	f	0	0	1	0	0	0	1
		%	0.0	0.0	50.0	0.0	0.0	0.0	2.2
	Total	f	0	1	2	3	5	35	46
	% of util blades		0.0	2.2	4.3	6.5	10.7	76.1	20.0
	util blades/bucket		0.00	0.01	0.01	0.03	0.12	0.32	---

Table 5.7. Welgeluk: frequencies and percentage frequencies of raw materials used in the waste tool types

CLASS	MATERIAL		UNITS 1A	1B	2	3	4A	4B	Total
CHIPS	Quartz	f	2	18	10	0	10	1628	1668
		%	0.6	0.9	0.5	0.0	0.4	17.5	8.9
	Sandstone	f	224	1543	1366	1921	1015	1681	7750
		%	73.3	78.6	73.2	73.3	36.7	18.1	41.2
	Silcrete	f	38	148	164	542	1445	570	2907
		%	12.4	7.5	8.8	20.6	52.3	6.1	15.5
	Shale	f	37	215	255	145	292	5135	6079
		%	12.1	10.9	13.7	5.5	10.5	55.4	32.3
	Chalcedony	f	0	4	0	1	0	106	111
		%	0.0	0.2	0.0	0.1	0.0	1.1	0.6
	Chert	f	3	36	71	11	1	119	241
		%	0.9	1.8	3.8	0.4	0.1	1.3	1.3
	Other	f	2	0	0	2	0	34	38
		%	0.6	0.0	0.0	0.1	0.0	0.3	0.2
	Total	f	306	1964	1866	2622	2763	9273	18794
	% of chips		36.6	38.2	39.0	47.4	55.4	61.8	52.0
	chips/bucket		2.5	17.4	17.2	26.3	68.2	85.0	---
CHUNKS	Quartz	f	0	5	0	2	0	109	116
		%	0.0	1.3	0.0	0.8	0.0	16.5	6.1
	Sandstone	f	112	344	300	195	106	217	1274
		%	99.1	93.5	90.0	82.6	59.9	32.9	67.5
	Silcrete	f	1	10	2	38	62	287	400
		%	0.9	2.7	0.6	16.1	35.0	43.5	21.2
	Shale	f	0	2	18	1	7	21	49
		%	0.0	0.5	5.4	0.4	3.9	3.2	2.6
	Chalcedony	f	0	0	0	0	1	14	15
		%	0.0	0.0	0.0	0.0	0.6	2.1	0.8
	Chert	f	0	6	13	0	1	9	29
		%	0.0	1.6	3.9	0.0	0.6	1.4	1.5
	Other	f	0	0	0	0	0	2	2
		%	0.0	0.0	0.0	0.0	0.0	0.3	0.1
	Total	f	113	368	333	236	177	659	1886
	% of chunks		6.0	19.5	17.6	12.5	9.4	35.0	5.5
	chunks/bucket		0.7	3.3	3.1	.2.4	4.4	6	---
CORES	Quartz	f	0	0	0	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	1.7	0.9
	Sandstone	f	1	3	7	5	5	8	29
		%	50.0	27.3	70.0	31.2	33.3	13.3	25.4
	Silcrete	f	1	3	0	10	8	46	68
		%	50.0	27.3	0.0	62.5	53.3	76.6	59.6
	Shale	f	0	5	3	1	2	1	12
		%	0.0	45.5	30.0	6.2	13.3	1.7	10.5
	Chalcedony	f	0	0	0	0	0	2	2
		%	0.0	0.0	0.0	0.0	0.0	3.3	1.7
	Chert	f	0	0	0	0	0	2	2
		%	0.0	0.0	0.0	0.0	0.0	3.3	1.7
	Other	f	0	0	0	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	f	2	11	10	16	15	60	114
	% of cores		1.7	9.6	8.8	14.0	13.1	52.6	0.3
	cores/bucket		0.01	0.09	0.09	0.16	0.37	0.55	---

Table 5.7. Continued

CLASS	MATERIAL		1A	1B	2	3	4A	4B	Total
FLAKES	Quartz	f	0	0	0	0	1	58	59
		%	0.0	0.0	0.0	0.0	0.1	1.2	0.4
	Sandstone	f	395	2527	2166	2183	1104	2269	10644
		%	95.0	91.1	85.3	83.0	56.2	48.6	71.0
	Silcrete	f	2	40	42	274	663	1849	2870
		%	0.5	1.4	1.7	10.4	33.7	39.7	19.1
	Shale	f	14	186	265	159	193	393	1210
		%	3.4	6.7	10.4	6.0	9.8	6.4	8.0
	Chalcedony	f	0	1	0	0	1	34	36
		%	0.0	0.1	0.0	0.0	0.1	0.7	0.2
	Chert	f	3	20	67	13	3	55	161
		%	0.7	0.7	2.6	0.5	0.2	1.2	1.1
	Other	f	2	0	0	0	0	5	7
		%	0.5	0.0	0.0	0.0	0.0	0.1	0.05
	Total	f	416	2774	2540	2629	1965	4663	14987
	% of flakes		2.8	18.5	16.9	17.5	13.1	31.1	39.7
	flakes/bucket		2.5	28.3	23.5	26.4	48.5	42.8	---
BLADES	Quartz	f	0	0	0	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sandstone	f	0	10	18	7	14	8	57
		%	0.0	71.4	72.0	33.3	28.6	4.3	18.8
	Silcrete	f	0	1	1	11	30	176	219
		%	0.0	7.1	4.0	52.3	61.2	94.6	72.3
	Shale	f	0	1	6	3	5	4	19
		%	0.0	7.1	24.0	14.3	10.2	2.1	6.3
	Chalcedony	f	0	0	0	0	0	3	3
		%	0.0	0.0	0.0	0.0	0.0	1.6	1.0
	Chert	f	0	2	0	0	0	3	5
		%	0.0	14.3	0.0	0.0	0.0	1.6	16.5
	Other	f	0	0	0	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	f	0	14	25	21	49	194	303
	% of blades		0.0	4.6	8.2	6.9	16.2	64.0	0.8
	blades/bucket		0	0.12	0.23	0.21	1.20	1.78	---
CORE REDUCED PIECES	Quartz	f	0	0	0	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sandstone	f	0	0	0	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Silcrete	f	0	7	3	6	16	33	65
		%	0.0	58.3	42.8	85.7	100.0	89.2	79.2
	Shale	f	1	5	4	1	0	1	12
		%	100.0	41.7	57.2	14.3	0.0	2.7	14.6
	Chalcedony	f	0	0	0	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	2.7	1.2
	Chert	f	0	0	0	0	0	2	2
		%	0.0	0.0	0.0	0.0	0.0	5.4	2.4
	Other	f	0	0	0	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	f	1	12	7	7	16	37	82
	% of CRP		1.2	14.6	8.5	8.5	19.5	45.1	0.2
	CRP/bucket		0.01	0.10	0.06	0.07	0.39	0.34	---

Table 5.8. Welgeluk: frequencies and percentage frequencies of raw materials used in the formal tool types

CLASS	MATERIAL		1A	1B	2	3	4A	4B	Total
			UNITS						
SCRAPERS	Quartz	f	0	0	1	0	0	6	7
		%	0.0	0.0	3.2	0.0	0.0	1.3	0.9
	Sandstone	f	0	1	1	0	0	7	9
		%	0.0	3.2	3.2	0.0	0.0	1.5	1.1
	Silcrete	f	0	26	19	95	144	430	714
		%	0.0	83.9	61.3	99.0	98.6	91.9	92.5
	Shale	f	0	3	8	1	1	11	24
		%	0.0	9.7	25.8	1.0	0.7	2.4	3.1
	Chalcedony	f	0	1	0	0	1	9	11
		%	0.0	3.2	0.0	0.0	0.7	1.9	1.4
	Chert	f	1	0	1	0	0	5	7
		%	100.0	0.0	6.4	0.0	0.0	1.1	0.9
	Other	f	0	0	1	0	0	0	1
		%	0.0	0.0	6.4	0.0	0.0	0.0	0.1
	Total	f	1	31	31	96	146	468	773
	% of scrapers		0.1	4.0	4.0	12.4	18.9	60.5	62.8
	scrapers/bucket		0.01	0.3	0.3	1.0	3.6	4.3	---
BACKED BLADELETS	Sandstone	f	0	0	6	0	0	0	6
		%	0.0	0.0	40.0	0.0	0.0	0.0	3.7
	Silcrete	f	0	0	2	9	45	87	143
		%	0.0	0.0	13.3	9.0	100.0	98.9	88.8
	Shale	f	0	1	2	0	0	0	3
		%	0.0	50.0	13.3	0.0	0.0	0.0	1.9
	Chalcedony	f	0	0	0	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	1.1	0.6
	Chert	f	1	1	5	1	0	0	8
		%	100.0	50.0	33.3	10.0	0.0	0.0	5.0
	Total	f	1	2	15	10	45	88	161
	% of backed b'lets		0.6	1.2	9.3	6.2	28	54.6	13.0
	backed b'lets/bucket		0.01	0.01	0.14	0.1	1.1	0.8	---
SEGMENTS	Silcrete	f	0	0	0	2	0	31	33
		%	0.0	0.0	0.0	66.6	0.0	93.9	84.6
	Shale	f	0	1	1	0	0	2	4
		%	0.0	100.0	100.0	0.0	0.0	6.1	10.2
	Chalcedony	f	0	0	0	1	0	1	2
		%	0.0	0.0	0.0	33.3	0.0	3.0	5.1
	Total	f	0	1	1	3	0	34	39
	% of segments		0.0	2.6	2.6	8.8	0.0	87.2	3.2
	segments/bucket		0.0	0.01	0.01	0.03	0.0	0.3	---
BORERS	Quartz	f	0	0	0	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	5.6	4.0
	Sandstone	f	0	1	0	0	0	0	1
		%	0.0	100.0	0.0	0.0	0.0	0.0	4.0
	Silcrete	f	0	0	0	3	1	15	19
		%	0.0	0.0	0.0	100.0	100.0	83.3	76.0
	Shale	f	0	0	2	0	0	2	4
		%	0.0	0.0	100.0	0.0	0.0	11.1	16.0
	Total	f	0	1	2	3	1	18	25
	% of borers		0.0	4.0	8.0	12.0	4.0	72.0	2.0
	borers/bucket		0.00	0.01	0.02	0.03	0.02	0.16	---

Table 5.8. Continued

CLASS	MATERIAL		1A	1B	2	3	4A	4B	Total
ADZES	Silcrete	f	0	0	0	0	1	1	2
		%	0.0	0.0	0.0	0.0	25.0	5.3	8.0
	Shale	f	0	0	1	1	3	18	23
		%	0.0	0.0	100.0	100.0	75.0	94.7	92.0
	Total	f	0	0	1	1	4	19	25
	% of adzes		0.0	0.0	4.0	4.0	16.0	76.0	2.0
	adzes/bucket		0.00	0.00	0.01	0.01	0.10	0.17	---
KASOUGA FLAKES	Sandstone	f	0	0	0	0	1	0	1
		%	0.0	0.0	0.0	0.0	10.0	0.0	3.6
	Silcrete	f	0	0	0	18	9	0	27
		%	0.0	0.0	0.0	100.0	90.0	0.0	96.4
	Total	f	0	0	0	18	10	0	28
% of kasouga flakes			0.0	0.0	0.0	64.3	35.7	0.0	2.3
kasouga flake/bucket			0.00	0.00	0.00	0.18	0.24	0.00	---
MISCEL. RETOUCH	Sandstone	f	0	2	7	0	1	4	14
		%	0.0	33.3	53.8	0.0	3.8	4.0	8.3
	Silcrete	f	0	3	4	18	23	91	139
		%	0.0	50.0	30.7	100.0	88.5	91.0	82.7
	Shale	f	0	0	4	0	2	4	10
		%	0.0	0.0	30.7	0.0	7.6	4.0	5.9
	Chalcedony	f	0	0	0	0	0	1	1
		%	0.0	0.0	0.0	0.0	0.0	1.0	0.6
	Chert	f	0	1	2	0	0	1	4
		%	0.0	16.6	15.3	0.0	0.0	1.0	2.3
	Total	f	0	6	13	18	26	101	168
% of misc. retouch			0.0	3.6	7.7	10.7	15.4	60.1	13.6
misc. retouch/bucket			0.0	0.1	0.1	0.2	0.6	0.9	---

Table 5.9. Edgehill: stone tool inventory

UNITS	1		2		3		4		5		6		7		8				
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%			% total
WASTE																	f waste	% waste	
Chunks	1297	23.6	819	15.5	663	15.3	586	12.7	649	10.9	584	9.4	422	7.6	481	16.1	5501	13.6	13.0
Chips	334	6.1	582	11.1	621	14.3	507	11.0	1051	17.8	1388	22.3	1053	19.1	579	19.4	6115	15.2	14.4
Cores	89	1.6	58	1.1	57	1.3	67	1.5	95	1.6	59	0.9	52	0.9	20	0.7	497	1.2	1.2
Flakes	3705	67.4	3777	71.6	2967	68.5	3378	73.3	4083	69.1	4157	66.8	3962	71.9	1894	63.5	27923	69.2	65.9
Blades	70	1.3	34	0.6	20	0.5	67	1.4	33	0.5	31	0.5	23	0.4	6	0.2	284	0.7	0.7
Total f	5495	100.0	5270	99.9	4328	99.9	4605	99.9	5911	99.9	6219	99.9	5512	99.9	2980	99.9	40320	99.9	95.2
UTILISED																	f util.	% util.	
Pieces esquilles	41	49.3	12	19.4	7	46.6	7	24.1	1	3.4	4	8.3	1	4.0	5	35.7	78	25.6	0.2
Utilised flakes	36	43.3	49	79.0	8	53.4	22	75.9	28	96.6	35	72.9	23	92.0	6	42.8	207	67.9	0.5
Utilised blades	6	7.3	1	1.6	0	0.0	0	0.0	0	0.0	9	18.8	1	4.0	3	21.4	20	6.5	0.1
Total f	83	99.9	62	100.0	15	100.0	29	100.0	29	100.0	48	100.0	25	100.0	14	99.9	305	100.0	0.8
FORMAL																	f formal	% formal	
Scrapers	177	59.4	168	62.4	131	63.0	131	48.7	75	33.0	56	28.1	71	45.2	46	56.1	855	50.0	2.0
Backed bladelets	18	6.0	35	13.0	12	5.8	38	14.1	51	22.5	17	8.5	2	1.3	0	0.0	173	10.1	0.4
Segments	11	3.7	11	4.1	14	6.7	32	12.0	40	17.6	71	35.7	61	38.9	35	42.7	275	16.1	0.6
Adzes	10	3.3	13	4.8	14	6.7	14	5.2	3	1.3	3	1.5	0	0.0	0	0.0	57	3.3	0.1
Scraper adzes	0	0.0	0	0.0	0	0.0	5	1.8	0	0.0	0	0.0	0	0.0	0	0.0	5	0.3	0.1
Borers	1	0.3	4	1.5	1	0.5	1	0.4	4	1.8	1	0.5	0	0.0	0	0.0	12	0.7	0.1
Kasouga flakes	6	2.0	2	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	8	0.6	0.1
Misc. retouch	75	25.2	36	13.3	36	17.3	48	17.8	54	23.8	51	25.7	23	14.6	1	1.2	324	18.9	0.7
Total f	298	99.9	269	100.1	208	100.0	269	100.0	227	100.0	199	100.0	157	100.0	82	100.0	1709	100.0	4.2
GRAND TOTALS	5876		5601		4551		4903		6167		6466		5694		3076		42334		100.1

Table 5.10. Edgehill: densities of each stone tool type expressed as artefacts per bucket

UNITS	1	2	3	4	5	6	7	8
WASTE								
Chips/bucket	2.4	13.5	12.8	14.3	11.4	31.9	27.4	15.0
Chunks/bucket	9.2	19.0	13.7	16.5	7.0	13.4	11.0	12.5
Cores/bucket	0.6	1.3	1.2	1.9	1.0	1.4	1.4	0.5
Flakes/bucket	26.2	87.8	61.2	95.2	44.1	95.6	102.9	49.2
Blades/bucket	0.5	0.8	0.4	1.9	0.4	0.7	0.6	0.2
Waste/bucket	32.3	122.6	89.2	129.7	63.9	143	143.2	77.4
UTILISED								
Outils/bucket	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.1
flakes/bucket	0.3	1.1	0.2	0.6	0.3	0.8	0.6	0.2
Utilised blades/bucket	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1
Utilised/bucket	0.6	1.5	0.3	0.8	0.3	1.1	0.6	0.3
FORMAL								
Scrapers/bucket	1.3	3.9	2.7	3.7	0.8	1.3	1.8	1.2
Backed bladelets/bucket	0.1	0.8	0.2	1.1	0.6	0.4	0.1	0.0
segments/bucket	0.1	0.3	0.3	0.9	0.4	1.6	1.6	0.9
Adzes/bucket	0.1	0.3	0.3	0.4	0.1	0.1	0.0	0.0
Scraper adzes/bucket	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Borers/bucket	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Kasouga flakes/bucket	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Misc. retouch/bucket	0.5	0.8	0.7	1.4	0.6	1.2	0.6	0.1
Formal/bucket	2.1	6.3	4.3	7.9	2.5	4.6	3.8	2.2

Table 5.11. Edgehill: the relative percentages of scrapers, backed bladelets and segments

Units	n	Scrapers	Backed bladelets	Segments
1	207	86	9	5
2	159	77	18	5
3	215	81	10	9
4	209	63	18	19
5	166	46	30	24
6	147	40	12	48
7	134	53	1	46
8	81	57	0	43

Table 5.12. Welgeluk: stone tool inventory

UNITS	1A		1B		2		3		4A		4B				
	f	%	f	%	f	%	f	%	f	%	f	%			% total
WASTE													f waste	% waste	
Chunks	113	13.5	368	7.2	332	6.9	236	4.3	177	3.6	786	5.2	2012	5.5	5.3
Chips	306	36.6	1964	38.2	1866	39.0	2622	47.4	2763	55.4	9273	61.8	18794	52.0	49.8
Cores	3	0.5	11	0.2	10	0.2	16	0.3	15	0.3	61	0.4	116	0.3	0.3
Core red. pieces	1	0.1	12	0.2	7	0.2	7	0.1	16	0.3	36	0.2	79	0.2	0.2
Flakes	414	49.4	2774	53.9	2540	53.1	2629	47.5	1965	39.4	4722	31.0	14984	41.2	40.7
Blades	0	0.0	14	0.3	25	0.5	21	0.4	49	1.0	194	1.3	303	0.8	0.
Total f	837	100.1	5143	100.0	4780	99.9	5531	100.0	4985	100.0	15012	99.9	36288	100.0	96.1
UTILISED													f util.	% util.	
Pieces esquilles	0	0.0	7	50.0	4	19.0	0	0.0	7	23.3	21	14.4	39	16.9	0.1
Utilised flakes	1	100.0	6	42.9	15	71.4	16	84.2	18	60.0	90	61.6	146	63.2	0.4
Utilised blades	0	0.0	1	7.1	2	9.5	3	15.8	5	16.7	35	24.0	46	19.9	0.1
Total f	1	100.0	14	100.0	21	99.9	19	100.0	30	100.0	146	100.0	231	100.0	0.6
FORMAL													f formal	% formal	
Scrapers	1	50.0	31	75.6	42	53.8	96	64.4	146	62.9	468	64.3	784	63.7	2.0
Backed bladelets	1	50.0	2	4.9	15	19.3	10	6.7	45	19.4	88	12.1	161	13.0	0.4
Segments	0	0.0	1	2.4	1	1.3	3	2.0	0	0.0	34	4.7	39	3.2	0.1
Adzes	0	0.0	0	0.0	1	1.3	1	0.7	4	1.7	19	2.6	25	2.1	0.1
Borers	0	0.0	1	2.4	2	2.6	3	2.0	1	0.4	18	2.5	25	2.1	0.1
Kasouga flakes	0	0.0	0	0.0	0	0.0	18	12.1	10	4.3	0	0.0	28	2.3	0.1
Misc. retouch	0	0.0	6	14.6	17	21.8	18	12.1	26	11.2	101	13.9	168	13.6	0.4
		100.0	41	99.9	78	100.1	149	100.0	232	99.9	728	100.1	1230	100.0	3.2
GRAND TOTALS	840		5198		4880		5699		5247		15886		37750		99.0

Table 5.13. Edgehill: scraper summary statistics

Length

Unit	n	Range	$\bar{x}$	s
1	125	5,1-43,5	14,15	5,07
2	87	6,0-30,9	13,11	4,16
3	100	3,0-28,4	11,40	3,70
4	95	6,2-30,5	13,84	5,37
5	70	7,5-21,5	13,05	3,50
6	31	7,0-18,6	11,27	2,66
7	45	2,7-20,0	11,47	3,62
8	22	6,5-19,0	10,74	3,19

Width

Unit	n	Range	$\bar{x}$	s
1	125	8,4-47,6	16,08	5,17
2	87	8,0-30,9	15,89	4,52
3	100	7,0-25,5	13,62	3,21
4	95	8,5-28,3	15,45	4,35
5	70	8,0-25,3	14,09	3,79
6	31	8,7-21,3	13,76	2,90
7	45	7,7-19,8	13,98	3,56
8	22	7,4-16,3	10,92	2,46

Height

Unit	n	Range	$\bar{x}$	s
1	125	1,9-11,3	5,29	1,90
2	87	1,7-12,9	5,60	2,56
3	100	2,0-11,5	4,87	1,80
4	95	2,1-15,3	5,75	2,57
5	70	2,2-13,7	5,32	1,92
6	31	2,0- 8,1	5,05	1,50
7	45	2,5- 7,3	4,66	1,24
8	22	2,4- 5,9	4,37	1,13

Width/length ratio

Unit	n	Range	$\bar{x}$	s
1	125	60,2-235,1	117,67	33,01
2	87	52,6-307,5	126,25	34,56
3	100	59,8-335,5	123,61	36,50
4	95	51,6-213,5	120,27	32,51
5	70	65,0-246,7	112,20	31,96
6	31	73,9-204,2	126,41	35,27
7	45	66,2-220,1	124,70	34,17
8	22	67,3-148,3	105,32	22,43

Table 5.14. Edgehill: summary statistics for silcrete and hornfels scrapers from units 6, 7 and 8

Silcrete scrapers | **Hornfels scrapers**

Length

Silcrete: Unit	$\bar{x}$	s	n	Hornfels: Unit	$\bar{x}$	s	n
6	11,1	2,3	21	6	11,7	3,36	8
7	11,1	3,02	8	7	11,8	3,53	33
8	9,5	1,92	11	8	12,4	3,74	7

Width

Silcrete: Unit	$\bar{x}$	s	n	Hornfels: Unit	$\bar{x}$	s	n
6	13,9	2,42	21	6	13,3	2,66	8
7	11,4	1,97	8	7	14,4	3,60	33
8	10,9	2,79	11	8	10,8	2,57	7

Height

Silcrete: Unit	$\bar{x}$	s	n	Hornfels: Unit	$\bar{x}$	s	n
6	5,6	1,44	21	6	3,8	1,04	8
7	5,0	1,55	8	7	4,6	1,20	33
8	4,7	0,91	11	8	3,6	1,15	7

Width/length ratio

Silcrete: Unit	$\bar{x}$	s	n	Hornfels: Unit	$\bar{x}$	s	n
6	129,00	32,40	21	6	125,20	34,00	8
7	103,00	15,95	8	7	130,00	36,22	33
8	115,00	17,21	11	8	92,20	26,93	7

Total
Hornfels scrapers

n	$L\bar{x}$	$W\bar{x}$	Hx
48	11,84	13,77	4,29

Total
Silcrete scrapers

n	$L\bar{x}$	$W\bar{x}$	Hx
40	10,10	11,75	4,98

Table 5.15. Edgehill: segment summary statistics

Length

Unit	n	Range	$\bar{x}$	s
1	11	9,2-18,3	14,85	3,10
2	7	9,3-14,4	12,18	1,80
3	7	7,3-15,1	10,22	2,77
4	31	9,5-28,2	14,71	3,98
5	35	8,1-25,9	16,66	4,25
6	50	8,7-20,8	14,63	3,31
7	50	8,0-22,9	13,88	3,00
8	29	6,9-17,6	12,31	3,31

Width

Unit	n	Range	$\bar{x}$	s
1	12	3,9-7,7	5,51	1,04
2	7	3,8-6,9	4,98	1,09
3	13	3,4-8,3	4,98	1,28
4	37	3,4-13,5	5,73	2,00
5	47	3,9-8,5	6,10	1,16
6	74	2,9-7,4	5,14	0,92
7	66	3,7-10,4	5,76	1,33
8	34	3,8-7,8	5,90	1,13

Height

Unit	n	Range	$\bar{x}$	s
1	12	1,4-3,0	2,11	0,51
2	7	1,3-2,3	1,78	0,33
3	13	1,3-3,4	2,12	0,62
4	37	1,4-3,5	2,15	0,73
5	47	1,4-4,9	2,26	0,68
6	74	1,3-4,2	2,24	0,60
7	66	1,1-3,8	2,47	0,71
8	34	1,3-4,3	2,85	0,87

Width/length ratio

Unit	n	Range	$\bar{x}$	s
1	11	28,84-46,08	37,21	6,74
2	7	35,20-52,69	41,03	5,76
3	7	30,51-52,12	44,32	8,54
4	31	24,13-52,82	36,68	5,87
5	33	27,37-80,36	38,28	10,07
6	50	22,97-61,21	36,52	8,12
7	50	28,48-64,93	41,70	8,09
8	30	15,43-63,29	47,33	8,73

Table 5.16. Edgehill: summary staistics for silcrete and hornfels segments from units 7 and 8

Silcrete segments length				Hornfels segments length			
Unit	$\bar{x}$	s	n	Unit	$\bar{x}$	s	n
7	12.65	2.85	17	7	14.71	2.85	29
8	10.58	2.68	6	8	13.01	3.18	19

Table 5.17. Edgehill: distribution of backed bladelet types

	Type												
Unit	A	B	C	D	E	F	G	H	I	J	K	L	Total
1	2				2	1	2	4	1	1			13
2						2	7	8	1	2	1		21
3					1	4	3	4					12
4	3		1	1	4	10	1	6	7		4	6	43
5					5	12	5	11	4	4	4	5	50
6					1	2	4	1		1	1	2	12
7						1	1						2
8													0
Total	5	0	1	1	13	32	23	34	13	8	10	13	153

Table 5.18. Edgehill: summary statistics for backed bladelet types E, F, G, H and I combined for all units

Type E

	$\bar{x}$	s	range	n
Length	10,49	1,74	8,25-14,0	13
Width	3,92	0,83	3,00- 6,0	13
Height	1,10	0,31	0,50- 1,55	13

Type F

	$\bar{x}$	s	range	n
Length	16,89	4,94	11,0-23,95	32
Width	5,31	1,68	3,0- 9,26	32
Height	1,65	0,83	0,8- 2,65	32

Type G

	$\bar{x}$	s	range	n
Length	14,97	3,26	8,2-19,5	23
Width	4,69	0,96	3,4-6,5	23
Height	1,68	0,76	0,3-3,16	23

Type H

	$\bar{x}$	s	range	n
Length	9,77	3,27	3,0-17,45	34
Width	5,06	1,34	2,7- 9,25	34
Height	1,29	0,61	0,3- 3,25	34

Type I

	$\bar{x}$	s	range	n
Length	12,42	3,14	7,0-18,00	13
Width	5,44	1,14	3,4- 7,30	13
Height	1,29	0,45	0,5- 2,1	13

Table 5.19. Welgeluk: scraper summary statistics

Unit	mean	s. dev.	
1B: n=23			
width	12,01	3,79	broken scrapers =8
length	13,46	5,65	25,8%
height	4,13	1,73	
w/l ratio	95,78	22,40	
2 : n=34			
width	17.05	5,66	broken scrapers =8
length	18,80	11,43	19,0%
height	5,78	2,15	
w/l ratio	97,86	36,52	
3 : n=63			
width	16,88	3,90	broken scrapers =33
length	13,52	3,49	34,3%
height	5,52	1,75	
w/l ratio	128,04	24,95	
4A: n=93			
width	17,56	3,97	broken scrapers =53
length	15,25	3,83	36,3%
height	6,17	1,80	
w/l ratio	119,38	29,83	
4B: n=325			
width	13,50	3,80	broken scrapers =143
length	11,26	3,67	30,5%
height	4,65	1,62	
w/l ratio	128,06	39,10	

Table 5.20. Welgeluk: non-continuous scraper variables

	% RAW MATERIALS					PLAN MORPHOLOGY					RETOUCH POSITION						ANGLE OF RETOUCH				
						CODES															
Units	silcrete	hornfels	c.stone	quartz	other	* 1	2	3	4	5 *	6	7	8	9	10	11 *	12	13	14	15	16
1B	83,9	9,7	3,2	0,0	3,2	0,0	17,3	52,1	26,0	4,3	60,0	30,0	10,0	0,0	0,0	0,0	0,0	18,1	63,6	18,1	0,0
2	61,3	25,8	3,2	3,2	6,4	11,7	2,9	32,3	38,2	14,7	47,0	32,3	2,9	8,8	8,8	0,0	0,0	2,9	67,6	17,6	11,7
3	99,0	1,0	0,0	0,0	0,0	19,0	1,6	47,6	23,8	7,9	8,2	49,9	11,4	18,0	13,1	0,0	0,0	1,6	64,5	25,8	8,1
4A	98,6	0,7	0,0	0,0	0,7	22,5	4,3	45,1	24,7	3,2	21,9	36,2	12,1	13,1	12,1	4,4	0,0	1,1	58,2	38,4	2,2
4B	91,0	2,4	1,5	1,3	3,0	21,4	6,8	37,5	30,1	4,0	20,3	32,6	7,8	15,3	15,0	8,7	0,3	3,7	66,4	25,3	4,1

Table 5.21. Welgeluk: distribution of backed bladelet types

Unit	1A	1B	2	3	4A	4B
TYPE						
A	--	--	--	--	1	--
B	--	--	--	--	--	7
C	--	--	--	2	1	4
D	--	--	--	1	2	2
E	--	--	3	--	2	7
F	--	--	3	2	13	13
G	--	2	5	2	6	16
H	--	--	3	--	14	17
I	--	--	--	1	6	8
J	1	--	--	--	3	4
K	--	--	--	--	--	1
L	--	--	2	1	3	9
TOTAL	1	2	16	9	51	88

Table 5.22. Edgehill: inventory of miscellaneous worked stone

Units	Ochre	Limonitic nodules	Ochre stained slabs	Ochred palette	Edge abraded blocks	Misc. abraded	Flaked anvils
1	168	325	1	0	12	6	0
2	32	113	1	0	0	0	1
3	73	115	2	0	0	2	0
4	70	123	3	0	0	0	0
5	38	261	3	0	0	0	0
6	37	190	1	1	0	0	0
7	57	136	1	0	0	0	1
8	40	67	0	0	0	0	1
Total	515	1328	12	1	12	8	3

Table 5.23. Welgeluk: inventory of miscellaneous worked stone

UNITS	1A	1B	2	3	4A	4B	Burial cairn	Unit 4B Burial 2	Burial 4
Ochre (grams)	76,5	5,6	38,4	27,3	9,5	215,2	151,5	528,0	14,5
Limonitic nodules ()=split	23(7)	73(33)	73(30)	89(23)	61(3)	194(15)	-	-	-
Calcite crystals	-	-	-	-	-	1	-	-	-
Bored stones	-	-	-	-	-	1	-	-	-
Saw edged flakes	-	-	-	-	-	2	-	-	-
Upper grindstones ()=fragments	-	(1)	(3)	1(1)	-	(2)	-	2	-
Lower grinstones ()=fragments	-	2	(1)	(1)	-	-	-	-	-
Edge abraded block	1	-	-	-	-	-	-	-	-
Slabs (ochre stained)	1(1)	(1)	(1)	2(3)	-	(4)	(3)	-	-
Other ochre stained pieces	-	10	10	11	-	21	-	-	-
Charcoal stained pieces	1	-	-	-	-	27	-	-	-
Anvils	1	2	-	1	-	-	-	-	-
Heavy edge flaked pieces	1	-	6	1	-	2	-	-	-
Abraded pebbles ()=ochred	-	2	-	-	-	(2)	-	-	-
Other abraded pieces	4	4	7	1	-	2	-	-	-
Pecked river pebbles	2	2	-	1	1	1	-	-	-

Table 5.24. Edgehill: inventory of worked and modified bone

Unit	Formal bone points	Informal bone points	Linkshafts	Point/ linkshaft butts	Bone beads	Incomp. bone beads	Ringed & snapped shafts	Misc. abraded	Total
1	8	10	0	2	5	0	2	4	31
2	0	4	0	0	4	1	0	0	9
3	1	2	0	0	1	1	0	0	5
4	0	0	0	1	0	0	0	0	1
5	0	0	0	0	0	0	0	0	0
6	1	1	1	0	0	0	0	0	3
7	2	4	0	2	1	0	0	0	9
8	0	0	1	1	0	0	0	0	2
Total	12	21	2	6	11	2	2	4	60

Other miscellaneous worked bone

Unit 1. a. Ivory `palette´.
b. Nicked Bovid IV rib.
c. Tortoise carapace pendant.
d. Bovid I distal metapodial shaft. Grooved across the shaft.
e. Grooved bone lozenge.
f. Left proximal bird femur (guinea fowl size), ringed and snapped below head.
g. Carved and abraded Bovid IV tooth fragment.

Unit 2. a. Pendant made from an opercle bone of a fresh water mullet (*Myxus capensis*).
b. Distal hare phalange and shaft. Ringed and snapped.
c. Grooved tube of solid bone.

Unit 3. a. Roughly carved bone shaft. Ringed and snapped at one end.

Table 5.25. Edgehill: bone bead and bone point dimmensions (mm)

Beads			*	Points	
Units	length	diameter	*	Units	lengt
1	10,9	5,95		1	74
1	7,8	4,8		1	35
1	13,7	5,4		1	60
1	6,85	7,2		6	87
1	3,37	11,25		7	121
2	6,8	10,6			
2	15,25	5,1			
2	3,55	12,2			
2	3,55	12,9			
3	12,15	6,2			
7	12,4	indet.			

Table 5.26. Edgehill: Inventory of freshwater and marine shell ornaments and artefacts (numbers in brackets equal fragments of an individual)

	UNITS								
	1	2	3	4	5	6	7	8	Total
<u>Unio</u> pendants	20	1	0	0	0	0	0	0	21
<u>Unio</u> retouched	11	1	0	0	0	0	0	0	12
<u>Nassa</u> beads	63	6	4	0	0	0	6	1	80
<u>Donax</u> valves	2(7)	0(10)	1(9)	0(16)	0(2)	0(3)	0(1)	0	3(48)
<u>Donax</u> pendants	0	0	3	0	0	0	0	0	3
<u>Conus</u> sp. pendants	1(3)	0	0	0(2)	0	1(1)	0	0	2(6)
<u>Oxystele</u> sp. pendant	0	0	1	0	0	0	0	0	1
<u>Oxystele</u> sp. button	0	0	0	0	0	1	0	0	1
<u>Patella miniata</u>	1	0	0	0	0	0	0	0	1
<u>Gastrana matodoa</u>	1	0	0	0	0	0	0	0	1
<u>Perna perna</u>	1	0	0	0	0	0	0	0	1
<u>Oxystele</u> sp.	0	0	0(1)	0(1)	0	0(1)	0	0	0(3)
<u>Cypraea</u> sp.	1	0	0	0	0	0	0	0	1
<u>Patella</u> sp.	0(1)	0	0	0	0	0(1)	0	0	0(2)
<u>indeterminate</u>	1	0	0	0	0	1	1	0	3
Totals	102(11)	8(10)	9(10)	0(19)	0(2)	3(6)	7(1)	1	130(59)

Table 5.27. Edgehill: inventory of ostrich eggshell

	Units								
	1	2	3	4	5	6	7	8	Total
Fragments	252	20	109	109	40	62	55	21	668
Beads	17	1	4	8	4	8	11	2	55
Incomplete beads	7	2	18	14	1	4	14	5	65
Water spouts	1	1	0	0	0	0	0	0	2
Decorated	1	0	0	0	0	0	0	0	1
Pendants?	3	1	0	0	0	1	0	0	5
Totals	281	25	131	131	45	75	80	28	796

Table 5.28. Welgeluk: inventory of worked and modified bone

Units	1A	1B	2	3	4A	4B
Bone point ()=broken	-	-	(1)	-	-	(2)
Point or link-shaft	-	1	-	-	-	-
Point or link-shaft butt	-	1	-	-	-	-
Ringed and snapped 'points'	-	-	-	1	-	3
Linkshaft or point roughout	-	-	-	-	-	2
Informal awls/points ()=broken	-	-	-	1	1	1(1)
Bone beads ()=broken	(1)	-	-	2(2)	1	2(1)
Bead roughouts	-	-	1	-	-	3
Decorated bone	-	-	-	-	1	1
Ivory palette	-	-	-	-	-	1
Carved ivory	-	-	-	-	-	1
Abraded tortoise-shell	2	1	-	-	-	-
Other abraded bone	1	-	1	-	-	-
Bone flakes	1	-	1	-	-	-
Totals	4(1)	3	3(1)	4(1)	3	14(4)

Table 5.29. Welgeluk: inventory and densities of freshwater shell, marine shell and ostrich eggshell ornaments and artefacts

UNITS	1A	1B	2	3	4A	4B	Total
COUNTS							
U.caffer pendants	0	1	6	1	0	0	8
OES frags	151	214	397	57	10	406	1235
OES beads	9	17	47	3	0	36	112
OES beads incompl	40	24	51	5	0	96	216
OES burnt	44	102	89	6	0	6	247
OES pendants	0	0	1	0	1	0	2
OES decorated	0	0	0	0	0	1	1
N. kraussianus	2	41	30	4	0	2	79
D. serra frags	0	2	1	0	0	4	7
P. perna	0	0	3	0	0	0	3
Cxystele sp.	0	0	1	0	0	0	1
Cypraea sp.	0	0	0	0	0	1	1
DENSITIES							
No. of buckets	163.5	112.5	108.0	99.5	40.5	109.0	
OES frags/bkt	0.92	1.90	3.68	0.57	0.25	3.72	
OES beads/bkt	0.06	0.15	0.44	0.03	0.00	0.33	
OES beads incom./bkt	0.24	0.21	0.47	0.05	0.00	0.88	
OES burnt/bkt	0.23	0.90	0.82	0.06	0.00	0.05	

CHAPTER SIX

BURIALS, PEOPLE AND PLACE

"When you're dead, you're dead and that's the end of you" (Baka informant from Woodburn 1982:195).

INTRODUCTION

The above quote succinctly summarises attitudes to death and burial in simple, immediate return hunter gatherer societies (i.e. the Hadza, Mbuti Pygmies, the Baka and the !Kung: Woodburn 1980, 1982). Ritual elaboration in death in immediate return, egalitarian systems is negligible to non-existent because questions of inheritance of material goods or social status do not arise. It is only when death creates social upheaval with the risk of conflict, disorder and stress that mortuary practices are elaborated (Woodburn 1982:206). In immediate return systems death comprises no more than an "elaborate farewell" (Wiessner 1983a:4) in which social continuity, replacement and reproduction are not stressed nor do they "...provide fertile ground for the ideological elaboration of death beliefs..." (Woodburn 1982:207- 8). Implicit in Woodburn's analysis is that little mortuary elaboration correlates with hunter-gatherer systems which emphasise social inclusion, wide ranging social networks, poorly developed notions of territory and highly permeable boundaries between groups.

A guiding assumption in this chapter is that this picture is at odds with the ritual elaboration and variability encountered in burials from the eastern and southern Cape. The aim of this chapter consequently, is to suggest that mortuary elaboration during the Holocene LSA in the research area and generally in the southern Cape is more profitably examined with more complex social structures in mind. I aim to relate burial data to the interpretations already discussed in the previous chapters proposing that the larger-scale of elaboration supports theories concerning more exclusive social interactions, smaller interactive spheres, firmer territorial definition and stronger boundary maintenance.

This approach makes another explicit assumption about burial practices. Burial and its associated ritual is not a self-contained and isolated sub-system of hunter-gatherer life. It reflects, relates to and is inseparably linked with social and economic process. As with San rock art, burial practices must have been "...influenced by a web of social relationships, all of which had an economic or potentially economic component" (Lewis-Williams 1982:431). Consequently, this discussion focuses primarily on the location and densities of burials as corporate symbols which identify people with place and provide a ritual mechanism for the transmission of rights to that place. An important paper by Wadley (1988) examines burial practice and grave goods in relation to shamanism, trance and metaphorical death. This scale of analysis is not undertaken here but her perspectives do not contradict the inferences drawn in my discussion.

Attention on LSA burials has been predominantly descriptive. A recent review by Inskeep (1986) surveys variability in LSA burial practices south of the Orange River but no attempts have been made to explain the social dimensions of this variability and place it within a wider archaeological context. The burial complexes recovered from Welgeluk and Klasies River Mouth Cave 5 (KRM5) (Hall & Binneman 1987) provided the inspiration to attempt a wider contextualisation of the mortuary variability observed. This chapter expands upon this attempt concentrating predominantly upon the synchronic significance of focused cave burial in relation to the identity between people and place. I also examine the possibility of the burial data highlighting social differentiation. The aforementioned burial paper is placed at the end of the thesis as Appendix I. The main points relevant to this discussion are summarised here but are not repeated at any length. The description of the burial complexes is also to be found in Appendix I.

Although the number of LSA burials recovered from the southern and eastern Cape is large, the quality of recovery renders any detailed analysis of this material difficult (see FitzSimons 1923, 1926; Dreyer 1933; Hoffman 1958; Louw 1960). Much of the discussion relating to burial variability is therefore speculative. It is maintained, however, that while the recovery of well provenanced burial data will help this situation, it is equally important that new frameworks for approaching the old and current data be used. I suggest, as with the case of late Holocene storage, that there are relevant implications to be drawn from the burial data only if it is approached using analogs derived from frameworks and case studies which examine similar features in the archaeological record of more complex hunter-gatherer societies. While there are clearly interpretive limits to which the Cape burial data can be pushed in terms of high- lighting more complex hunter-gatherer systems, I suggest that to ignore them will deny important insights.

PEOPLE AND PLACE

Bender and others suggest that trajectories towards increasing residential permanence must have occurred with, or were preceded by, the parallel and integrated development of places set ritual permanence. In Bender's view, the increasing structural complexity of hunter-gatherer systems can only be facilitated if there is "...a place pivotal within the cognitive scheme of things, pivotal to activities that reflect both the reality of sociopolitical relations and the symbolic mediation, or masking, of those realities" (Bender 1985a:26).

The identity of people with place can be articulated in numerous ways. It has been argued that the subsistence trends from ca 4000 BP indicate increasing residential permanence and that the storage of oil rich seeds must have marked sites as the domain of a particular group. It has also been suggested that the articulation between silcrete, stone tools, and their distribution was actively constituted socially to broadcast a geographic identity in the broader scale. It is, therefore, no coincidence that one of the Welgeluk burials (WG/2: Appendix I) is elaborated with ten silcrete flakes in association with ochre and ochre stained upper grindstones. This emphasises the importance of the raw material as a stylistic marker which 'functioned' in both technomic and ideotechnic domains. The practice of LSA burial in caves and rock shelters of the Cape coastal regions is another indicator that people are identifying with a place through burial and the ritual associated with it. Why would this be so and why would it be required? What, if any, is the significance of the apparent absence of focused cave burial on the scale known for the southern and south-eastern Cape outside of this region? Examination of ethnographic and archaeological examples of relatively complex hunter-gatherers provides some possible answers to these questions. Analyses of Aboriginal burial grounds in south-eastern Australia (Pardoe 1988), early Natufian cemeteries in western Judea (Wright 1978; see also Henry 1985) and burial data from central California (King 1978) provide a theoretically rigorous framework for examining the relationship between the living and the dead.

Pardoe's paper is particularly instructive. Drawing heavily from the work of Saxe (1970 in Pardoe 1988) Pardoe links formal disposal areas to rich environments which support relatively dense populations. Theoretically, in such instances, social organisation is characterised by descent groups, which may be corporate, localised and unilineal. Cemeteries therefore, constitute "...symbolic markers of group affiliation and through that, land ownership" (Pardoe 1988:1). In Pardoe's study area along the Murray River population density is high, the environment rich, territories small (see also Birdsell 1953), and exclusive burial grounds are common. Through this linkage, Murray River Aborigines promoted social exclusion facilitated by group membership through descent. However, in less benign areas of the continent, Aborigines pool risk in much the same way as the !Kung San, through *hxaro*, which maximises widespread inclusive ties (Wiessner 1982; Pardoe 1988) and cemeteries are not found.

In a more general context, Riches (1982:132-3) discusses socio-territorial notions among hunter-gatherers and concludes, among other things, that:

> Under conditions of relatively sparse and geographically unconstricted population, it may be contended that locational band ideology renders redundant the emergence of ideologies of descent for expressing the identity of the locational band.

On the basis of this link between the scale of population density and the theoretical degree of social inclusion versus exclusion, I submit that the distribution of cave burial in the Cape coastal regions is a general indicator of relatively more exclusive social activity compared to areas where cave burial does not occur. This assumption is obviously complicated by the unequal distribution of suitable rock shelters. However, burials outside the Cape coastal regions in unequivocal pre-contact LSA contexts are usually open location, solitary interments, with no indication that the place was cognitively important in encouraging further burials (Inskeep 1986). This picture is in keeping with the ethnography on San burial which is cognitively, completely unfocused in relation to a specific ritual identity with place (Schapera 1930; Silberbauer 1981; Wiessner 1983a).

The correlation so far drawn between focused burial activity and more exclusive social structure does not claim to extend this link specifically to unilineal descent groups. This is because the terms 'burial ground' and in particular 'cemetery', have specific definitions with wider cultural implications. 'Cemetery' usually connotes an exclusive burial area. As such, cemeteries are characteristic of fully sedentary and complex societies. Cemeteries are, therefore, exclusively areas for the disposal of the dead and do not double-up as habitation areas. Pardoe (1988) lists three additional criteria commonly employed for defining a cemetery. He states that there must be a significant number of burials (athough 'significant number' cannot be quantified because it is largely dependent upon the other criteria being satisfied). Burials must be shown to be contiguous, that is, the repeated burial of people at the same place must be related to the memory of previous burials and not just repeated, random events. Lastly, a cemetery must have a sense of 'boundedness' related to some landform definition and must have a clear and rapid drop off in burial density at the edge.

The cave burials of the research area and southern Cape fulfil all these criteria except that of exclusivity. Clearly cave burials are within domestic depositional matrices and while a rock shelter burial episode may be stratigraphically exclusive, the site would have functioned through time as a place for a diverse range of activities. This is well illustrated by the Welgeluk burial complex itself. The Welgeluk complex is stratigraphically the first depositional event in the rock shelter (Appendix I). Thus, although the time difference between the burial complex and the later build up of deposit is not known, the exclusive use of the shelter for burial is not maintained. Consequently, the Cape rock shelter burial-grounds cannot strictly be seen as cemeteries. Therefore, the full implications for ritually reinforcing a specific lineality cannot be made.

I do still suggest, however, that they were formal disposal areas, where formality is defined by the transferral through time of the memory of previous burials and that, consequently, the burials are not random events. Although the scale of lineality, ownership and exclusive access to resources implied in the Cape burials is considerably less than that for the Murray River Aborigines, group identity with place can still be implied.

Even though the case for generally exclusive cemeteries cannot be made for the cave burials of the Cape coastal region, there is one example from the eastern extension of the CFB which suggests that the concept should not be entirely rejected. This is the small Spitzkop rock shelter, some 25 km to the west of Grahamstown. The site was 'excavated' by the farm owner, W.W. Austin in 1921. It contained a minimum of 15 burials (Albany Museum H.S. 128-139). It is assumed that a remarkable collection of ornaments also recovered from Spitzkop was associated with these burials. These include several unique ivory ornaments illustrated by Clark (Clark 1959:238; Albany Museum Collection E379). This comprises two ivory pieces for which no utilitarian use can be ascribed.

The list of other ornaments from Spitzkop is no less remarkable including a wide range of marine shell ornaments such as *Turbo* pendants and 'discs', *N. kraussianus* beads, ochre stained *Conus* sp. pendants, a lot of pierced and unpierced *D. serra* valves and a number of other modified and unmodified marine shell species. Apart from the above mentioned ivory ornaments there is also an ivory ring as well as bone beads, four abraded and ochre stained bovid and carnivore atlases, an ochre stained bird metacarpus and a number of warthog tusks.

Much ochre was recovered along with ochre stained upper and lower grindstones, quarzite milled pebbles and miscellaneous ochre stained slabs and pieces. The collection also comprises two ochre stained Middle Stone Age flakes. Of further note is a minimum of ten 'palettes', made from shale, two of which have been edge-nicked around the circumference and are identical to a 'palette' found at Hellsport (pers. obsservation). Ostrich eggshell beads number in the hundreds.

There are several anomalies concerning the Spitzkop site and the available data handed down to us. As mentioned above, all this material must have been associated with the Spitzkop burials as grave goods. However, almost no other material exists in the collection. The richness of the burials possibly diverted attention away from the recovery of the more mundane domestic debris assumed to be in the deposit surrounding the burials. Apart from a few scrapers, other existing stone tools such as a bead stone and two broken bored stones could also have been part of grave fills (see Wadley 1988). No pottery is listed as having come from the site. Site location descriptions indicate that Spitzkop is a small, ephemeral shelter. A visit to the site by this author revealed that no LSA debris remains visible in the site or on the talus. The only material recovered was further phalanges missed during the original removal of the Spitzkop burials.

The quality of the data available from Spitzkop conditions interpretation of the site but some speculation is warranted. The plethora of burials and 'curated' ritual grave goods suggest, in accordance with Wadley's model discussed above (Wadley 1987), that Spitzkop be seen as an aggregation site. However, the small size of the shelter, fronted immediately by a steep slope down to a stream militates against the site as an aggregation center. If the practice of cave burial is posited as an aggregation criterion then nearly all, if not all sites in the eastern extension of the CFB, can be seen as aggregation sites and some of these are in very close proximity to one another. I suggest that the site was used more specifically as a burial ground rather than as a living site. This status cross-cuts any distinction between aggregation and dispersal. It is possible that some sites functioned more exclusively as burial grounds over long periods of time.

Whatever the scale of hunter-gatherer social organisation implied by cave burial in the Cape coastal region, I suggest that at a minimum, it constitutes a strong additional symbol of identity and association between people and place and is cognitively a model which facilitates in structuring an increasingly complex Holocene social and demographic land-scape. On the basis of the almost universal presence of burials in rock shelters in the research area and in the southern Cape, practice could have linked people to place at the scale of a sharing 'band' to a specific site and its surrounds. The use of Welgeluk Shelter as an exclusive burial ground sometime between 5000 and 4500 suggests, however, a specific instance in which burials may have functioned as markers in a much broader spatial context. The timing of the use of Welgeluk as an exclusive burial ground at this time is perhaps not coincidentally related to inferred regional demographic changes, the establishment of a socio-spatial boundary and the subsistence intensification which follows. A specific ritual location may have been very important in establishing, intensifying and maintaining boundaries and for controlling inter-group competition or tension which arose over access to areas and their resources. The presence of a burial cairn and probably many burial cairns on bedrock in an open shelter must have constituted a powerful reminder to people about the significance of the place and its surrounds in terms of group identity and rights of access. The burial ground would not only have broadcast this identity to those within the group but to those on the other side of the boundary as well. This could have operated at the scale mentioned above but also at the scale of the social signification implied by the regional use of silcrete.

BURIAL AND SOCIAL DIFFERENTIATION

It has been argued that social organisation and individual status in life structures and relates to variability in burial (Hall & Binneman 1987). This principle can be extended for the inter- pretation of grave-good variability in Cape LSA sites. The original premise is derived from Wiessner's studies on *hxaro*, especially as it relates to age and death where infants and juveniles are in a position theoretically to accumulate material possessions before reciprocal *hxaro* ties are formalised. In contrast, adults and the very old participate in a wide range of reciprocal *hxaro* exchanges which determine the social obligations they pass on and which are maintained through the redistribution of their material possessions at death (Wiessner 1982, 1983a).

On this basis, the extreme grave-good elaboration of infants in the KRM5, and to a lesser extent in the Welgeluk burial complexes, has been interpreted as symbolic of "...the denied potential of a prospective producer and that he or she becomes in death what was not to be in life" (Hall & Binneman 1987:149). Ritual elaboration of infant and juvenile graves presents an idealised future picture, in which a range of denied social obligations is symbolically represented. This interpretation remains a valid possibility but in its broader context, grave elaboration suggests additional, less mutually exclusive alter- natives.

If the correlation between focused cave burial and relatively more exclusive social organisation is correct, then it implies that wide ranging risk pooling strategies, such as *hxaro*, will not be the only, or necessarily the most important, risk reduction strategy. If so, the grave good elaboration among the KRM5 and Welgeluk infants may be explored further within a general framework of more exclusive social structure. A key to this is the examination of the social implications of grave good elaboration as it applies to 'earned status' on the one hand, and 'ascribed status' on the other. Binford predicts that age and sex are the only dimensions structuring mortuary variability in egalitarian systems, whereas social position and sub-group affiliation, independent of age and sex, determine variability in ranked systems (Binford 1971). In other words, truly egalitarian burial distinctions reflect achieved status only. However, the KRM5 and Welgeluk elaborated infant burials must represent ascribed status, for obviously infants have achieved nothing.

In turn, ascribed status has implications for group interment. This is dealt with by Wright (1978). For the interpretation of social differentiation in the Natufian, ritual elaboration of infants infers an ascribed status independent of age and implies inherited position. If the separation of adult from infant burials suggests that social position is not inherited, "...adults, children, and infants interred together might then indicate that some type of ranking and subgroup affiliation was present and that status is inherited" (Wright 1978:213). In Cape coastal cave burial, both ascribed status and group interment (i.e. the Welgeluk and KRM5 burial complexes) are apparent.

My purpose in pointing this out is again not to imply that Cape coastal hunter-gatherers were similar in structural complexity or had differentiated social positions similar in scale to these other populations. I am merely using this material to indicate potential ways of demonstrating a structural complexity which is at considerable variance with that seen in the Kalahari ethnography. Consequently, LSA burial practices of the Cape coastal region, and the social structures to which they relate, cannot be elucidated to their full potential through analogy with only the San ethnography.

LSA CAPE COASTAL BURIAL THROUGH TIME

So far this discussion has been synchronically orientated. The diachronic aspects of LSA burial in the Cape coastal region are discussed in Hall and Binneman (1987; Appendix I) and do not require much further comment here. Diachronic information on burial intensity and intensity of ritual elaboration is limited almost entirely to the Matjes River sequence (Louw 1960).

On the basis of the Matjes River sequence it is possible to suggest that cave burial was well established in the 'Albany' of the southern Cape coastal region, perhaps by 12 000 BP. If focused cave burial is symptomatic of relatively rich environments, high population densities and more exclusive hunter-gatherer social systems, then the seeds of this configuration can be seen in the 'Albany' cave burials. It is possible to infer that the appearance of cave burial in the Albany complements the all-round increase in archaeological visibility as an indicator of an absolute increase in population. As discussed in Hall and Binneman (1987; Appendix I), this population increase is more appar[illegible] the southern Cape coast and adjacent CFB, and it is suggested that the close [illegible] diverse habitats encouraged this. Although speculative, relatively high archaeological visibility coupled with the early practice of cave burial in the terminal Pleistocene may indicate that the southern Cape supported an important population core and was a prime region from which growth and fiss[illegible]ning took place. This has previously been suggested by Deacon (Deacon, H.J. 1976:160). It is also probable that the intensity of cave burial increased in the Wilton (Louw 1960), and an absolute population rise may again be inferred. The relationship between date and burial density is, however, complicated by an increasingly, residentially static Wilton population, as opposed to the relatively more mobile Albany groups. This would mean that any upsurge in burial density during the Wilton could equally have been a product of the more compact settlement strategies suggested by Deacon (Deacon, H.J. 1976) and discussed further above, rather than representative of absolute population increases. I think it is realistic to suggest that any firmer demonstration of increasing cave burial densities in the Wilton can be attributable to both population increase and settlement changes. Advocating a primacy of any one factor is pointless given that both are inseparably linked.

As discussed in Hall and Binneman (1987), it is also possible to suggest that the Matjes River Wilton burials are ritually elaborated considerably more than those of the preceding Albany (see Louw 1960). Explanation for this is based upon the assumption that it is a mid-Holocene phenomenon and is therefore tied to the widespread curated character of 'classic' Wilton assemblages. This elaboration of burial ritual correlates with the social stress of an increasingly saturated landscape and is symptomatic of the contradictions between the "...organizational limitations of hunter-gatherers attempting to 'stay put' within relatively confined areas", and the "...decreased...role of mobility..." in dealing with these social problems (Hall & Binneman 1987:151). As discussed in Chapter Five, ritual elaboration correlates with efforts to maintain an isomorphism between social process and environmental and demographic reality.

We argue that the suggested ritual elaboration of burial in the mid-Holocene indicates stress arising from incompatibility between traditional inclusive networks and the shrinkage of residential space (Hall & Binneman 1987). On the other hand, I have suggested that focused cave burial is an increasingly powerful indicator of identity between group and place with the possibility that burial grounds express some kind of corporate expression of ownership. I see no necessary contradiction between these two points. Rather, as the context or weight of the demographic, spatial and economic factors change, a practice is culturally rearticulated and redefined in relation to its significance in changing circumstances. Ultimately, LSA populations during, and in particular after, the mid-Holocene have to develop new ways of surmounting problems of resource access, ownership and control. I suggest here that focused rock shelter burial is one further mechanism through which this is achieved.

SUMMARY

This chapter and Appendix I draw attention to the practice of cave burial in the Cape coastal region as a further symbol of identity between people and place. In the absence of suitable local ethnographic analogs, a careful path needs to be taken, and continually evaluated, which uses the general principles of immediate return hunter-gatherer burial practices (as outlined by Woodburn 1980, 1982 and Wiessner 1983a), and burial practices of more complex hunter-gatherers. In doing this an appropriate scale for the interpretation of LSA burials of the Cape coastal region and elswhere can be found.

The suggestions offered here implement approaches explaining burial diversity which emphasise corporate economics, both from San ethnography as it relates to *hxaro*, age and death, and from other case studies which highlight the role of burial as a symbol of lineal descent, ownership, access and inheritance. Burial practices are not epiphenomena and cannot be separated from these processes in the wider archaeological context.

Burial activity in the Cape coastal region correlates with more exclusive social behaviour in relation to size of territory, firmness of boundaries and access to resources within those boundaries. This in turn relates to population densities and relatively productive environments. It is also suggested that areas with LSA sequences for which there is no evidence of focused burial activity would represent the more inclusive social systems evident in the San ethnography, where the attachment to specific place is less developed because of the need to maintain a relatively mobile approach to risk reduction. In essence, the structure of burial activity in any area during the LSA encapsulates wider social configurations and changes to these. Suggestions are also put forth concerning patterning in the burial data as it relates to social differentiation. It is possible that some grave good elaboration allocates an ascribed status. The interpretation of diachronic variability in the burial data are less satisfactory due to the quality of recovered burial sequences. Nevertheless, it is suggested that burial data can be used to elucidate population trends through the terminal Pleistocene and Holocene. There is also some evidence which suggests that mid-Holocene Wilton burials are ritually elaborated. If the density of burials and their ritual elaboration correlates with increasing population density, then it can be expected that this continually changed as new peripheral populations became cores which, in turn, fissioned new peripheral populations into available space. If the southern Cape was a population centre from at least the terminal Pleistocene, then increasing burial density and ritual elaboration in reaction to stress would have been felt there first. Adjacent areas, such as the eastern extension of the Cape Fold Belt may be expected to lag behind in developing those similar symptoms.

While the quality of the current burial data base leaves much to be desired, it is perhaps in answering questions about the timing of burial episodes in the Cape coastal regions that it can most usefully be put to work. An admittedly expensive dating program on burial collections may provide interesting regional trends which could be elaborated upon further, in conjunction with the wider archaeological context.

CHAPTER SEVEN

HUNTER-GATHERER RESPONSES TO FOOD PRODUCERS

INTRODUCTION

Contact between hunter-gatherers and food producers has come increasingly into focus in southern African pre-colonial studies. This is particularly so because of a theoretical shift away from viewing hunter-gatherers and farmers as social and economic isolates (Parkington 1984a; Hall, S. 1986; Campbell 1986, 1987; Hall, M. 1987; Mazel 1989), to one where social, economic and cognitive frontiers are continually breached in efforts to confront and find solutions to problems raised by the frontier. This escape from 'pristine' and isolated cultural systems has also been encouraged by Iron Age research, particularly in the San ethnographer's back-yard. Denbow (1984, 1986; Denbow & Wilmsen 1986) demonstrates at least 1500 years of contact between Stone Age San and Iron Age herders and farmers in Botswana. As emphasised in Chapter Two, this interaction seriously calls into question the status of ethnographically 'pristine' hunter-gatherers and especially the utility and relevance of this ethnography for pre-contact archaeological interpretation (Schrire 1984).

Questions as to what impact farmers had upon hunter-gatherers is often researched and answered in a negative light based upon principles of confrontation and social and economic incompatibility. The question is answered and summarily dispatched with the emphasis on the coercive power of farmers and the territorial displacement of hunter-gatherers (Moore 1985:94). In the eastern Cape, the apparent greater economic significance of interaction between Khoi and Xhosa relegates the San to a group which was simply "...eradicated and dispersed" (Harinck 1969:146). Consequently, they played little part in shaping the social and economic history of the eastern Cape. Evidence is discussed in this chapter which shows that this is a gross over-simplification.

A major problem with these interpretations stems from treating the San as passive players in any contact situation, whether it be in the present or the past. They are acted upon and have no effect on the process. They receive but have nothing to give (Gordon 1984, 1985).

The resonance between the archaeological facts relating to San life in the eastern Cape over the last two thousand years, early travellers' observations and current anthropological work on hunter-gatherer and food producer interfaces provides a more sensitive interpretation. This takes as its primary basis the fact that hunter-gatherers were active participants in shaping the eastern Cape pre-colonial frontier.

In the eastern Cape, distinctions between "moving" and "static" frontiers (Alexander 1984) imposes a typological straightjacket on interaction processes (see Moore 1985:95). Many of the types of interactive options outlined by Alexander are pertinent to the case at hand, but their rather generalised and linear progression downplays the synchronic range of potential types of interaction. Furthermore, the eastern Cape has a complex diachronic progression during which pastoralists, mixed farmers and colonials complicate the social landscape in different ways at different times. It is difficult to reduce this fluidity into a generalised model of moving and static frontiers.

This chapter addresses interaction from the hunter-gatherer perspective. This is because of the biased data base and no Iron Age comparative material of the quality that exists in Natal (see Maggs 1980a, 1980b). A previous publication (Hall, S. 1986) deals with certain aspects of the interactive process in the eastern Cape and this publication is given as Appendix II and repetition of its contents is kept to a minimum. The emphasis here is placed on an interpretive framework for the archaeo-logical data based upon ethnographic studies of hunter-gatherer and food producer interactions and early traveller records in the eastern Cape and Transkei. Of critical importance in elucidating the economic choices made by hunter-gatherers is the analysis of the rle played by shamans in controlling productive relations. This is done through the use of early traveller observations and an analysis of rock paintings which depict cattle and follows the work of Campbell (1986, 1987).

THE ETHNOGRAPHY OF INTERACTION

When hunter-gatherer societies are impinged upon by technologically more 'advanced' pastoralists or mixed farmers, a number of interactive options occur. These are departures from traditional hunter-gatherer economic, settlement and demographic patterns. The development of these options is currently under observation in a number of contact situations in different parts of the world. Of interest is that irrespective of the contextual details of these interactions and the variability of the ecological settings, they have in common repeated and regular patterns. The observation of these interactions in the present and similarities in their outcomes gives confidence in their analogical use for investigating such processes in the deeper contact past. The nature of these interactions emphasises that the addition of food producers to a previously hunter-gatherer dominated landscape creates both the cause of hunter-gatherer disruption as well as providing economic and social opportunities upon which a new order is based.

TRADE AND EXCHANGE

The establishment of trade between hunter-gatherers, pastoralists and mixed farmers is attributed to a number of factors. Fore-most is the disruption of traditional hunter-gatherer mobility ranges. A simulation study by Moore (1985) shows that the addition of only small numbers of food producers to the landscape rapidly raises the cost of hunter-gatherer settlement. As hunter-gatherer settlement options diminish and food producers and their stock exploit the resource base the costs of settlement and subsistence for hunter-gatherers rise. Mobility smoothes out spatial resource variability but when this is disrupted, alternatives are found. Trade is one such alternative which maintains hunter-gatherer energy levels (Cashdan 1977).

Disruption of hunter-gatherer economics is reflected in the types of goods exchanged. This in turn has implications for changes in traditional hunter-gatherer relations of production, particularly gender relations (Moore 1985). On the subsistence side hunter-gatherers invariably receive domesticated carbohydrates. For example, sandveld Basarwa living adjacent to Kalanga and Bateti farmers along the Botletle River in Botswana, receive a substantial amount of maize from these farmers in return for wood and *Grewia* berries (Cashdan 1977, 1986). Aka and Mbuti pygmies in the Congo basin receive starchy foods, salt and metal tools from Bantu speakers settled on the forest fringe in return for wild meat (Turnbull 1965; Bahuchet & Guillaume 1982). Agta hunter-gatherers in the Philippines also receive most of their carbohydrates from Palanan farmers. The Palanan, who produce limited protein, are supplied in turn by the Agta (Peterson 1978). Exchange appears to be the domain of men and the hunter-gatherer import of domestic carbohydrates undercuts the rôle of women in the supply of plant foods.

The exchange of wild meat for domestic carbohydrate is a regular feature of hunter-gatherer/food producer exchange. Hunter-gatherers may not necessarily prefer domestic carbohydrates, but this source may be easier to obtain and more dependable in light of the disruptions to mobility and the resource base. On the other side, farmers welcome alternative protein because it diminishes slaughter of their own domestic animals.

A common misconception about hunter-gatherer and food producer exchange, is that it is 'one way traffic'; from farmer to forager. The ethnography indicates that this is incorrect. Traditional hunter-gatherer expertise and food producer surplus combine in "...a higher order economic system" (Peterson 1978:346). This increases the effective habitat of a region and which is of equal value and benefit to both sides (Cashdan 1977). There is, however, a subtler aspect to the development of exchange beyond that of calories. The frontier allows, perhaps at first inadvertently, the accumulation of surplus by hunter-gatherers which gives rise to inequalities in distribution and erodes fundamental social relationships. In the San context, surplus is theoretically appropriated and controlled by shamans through their symbolic labour in ritual. Theoretically, inequalities can develop but are ritually masked through the self interest of the shamans in a "...shamanistic relations of production" (Campbell 1987:46). The development of exchange is therefore concerned with essential energy alternatives, but it is also concerned with the development and retention of prestige and power.

LABOUR

Goods offered for trade by hunter-gatherers are procured using traditional skills. These transactions may represent an initial stage in a contact trajectory during which hunter-gatherers are not yet directly involved in 'foreign' food producing economies. However, with increasing competition, hunter-gatherers can be forced into increasing sedentism through further declines in traditional resources and an increasing dependence on small scale stock rearing and cropping. These options initially are additions to the traditional resource range in a growing generalist strategy rather than as a wholesale replacement (Brooks et al. 1984). Such a stage is, however, inherently vulnerable due to the social contradictions food production can raise between traditional egalitarian principles of sharing and the accumulation of personal wealth. The development of ritual justification in order to accommodate incongruous social relations has been mentioned above.

Furthermore, rather than abuse kin and long standing exchange networks, hunter-gatherers can bypass this option and choose direct involvement within food producing economies by selling their labour as stock herders and also by working in the fields (Vierich 1982). The cost and predictability of farming may also be too high where more powerful food producers occupy optimal farming habitats (Cashdan 1977). The exchange of labour for a portion of the produce which hunter-gatherers are hired to tend may initially take place on a seasonal basis. As traditional options decline further and new kinship ties are established with assimilated hunter-gatherers already settled near villages or stock posts (and with the food producers themselves), the frequency and length of visits to such centres is facilitated.

RELIGIOUS EXPERTISE

Food producers not only provide new economic options for hunter-gatherers but also provide social resources (Moore 1985). One benefit is that of conflict resolution, where increasing friction and dispute in hunter-gatherer bands resulting from socio-economic stress cannot be resolved by mobility and fission. In such cases appeal to the authority of neighbouring farmers can be made.

Social benefits, though, are not unidirectional. Hunter-gatherer rituals are readily fused onto food producer belief systems. This permeability stems from the recognition that hunter-gatherers are the original occupiers of the land and are adept at controlling its natural rhythms and cycles. Kalanga farmers on the Botletle River seek permission from Basarwa to hunt in their ranges. If this courtesy is not paid, Basarwa have the ritual power to deny the Kalanga hunting success (Cashdan 1986). Wright (1971:14) records that Southern Sotho and Thembu hunters generously shared meat with their San accomplices.

Bantu speakers in Botswana acknowledge the power of San medicine men who are frequently used for healing purposes (Katz 1982). In the eyes of their Bantu neighbours, Aka pygmies are derided for existing in an intermediate condition between the human (village) world and that of animals (forest) but are nevertheless feared and admired for their coexistence and contact with the spirit world. "They resort to the magical and therapeutic knowledge of the Aka and their own pantheon shows the influence of their natural and supernatural world" (Bahuchet & Guillaume 1982:194).

In the eastern Cape and Transkei Xhosa use of San rainmakers is well known (Lichtenstein 1928; Macquarrie 1962). The Pondomise had permanent contracts with San rainmakers who lived off the stock paid to them for their prowess. Sick Khoi herders in a Kat River settlement were administered to in an explicitly described San trance healing dance (Kay 1833:480-482) and it is possible that in this particular instance the San came to the settlement specifically for this purpose.

EARLY TRAVELLERS RECORDS

Tantalising insights into San and food producer interactions by early travellers in the eastern Cape and Transkei indicate that the modalities observed in the ethnography were in operation during the historic period.

The specialist use of San ritual expertise in rainmaking and healing has already been given. Other insights into trade and exchange are made by Steedman (1836:280), who recorded an incident in which a group of 120 "Bushmen" were subsisting off elephant, the ivory from which they exchanged for corn and tobacco (dagga?) from neighbouring pastoralists. As with the ethnographic examples, the pattern of hunter-gatherers receiving domestic carbohydrate is repeated. Bain records San subsisting entirely off elephant and hippo and although exchange is not specifically mentioned one can speculate that in this example the ivory would have also been exchanged (Lister 1949:118). In terms of clientship, Sparrman (1786) encountered a Gonaqua group (Khoi and Xhosa) accompanied by several "Bushmen", possibly as herders. Also during his extended stay in the vicinity of Somerset East he was visited by a Xhosa group who had the services of "Bushmen" and "...who belonged to their party" (Sparrman 1786:194). Sparrman also mentions that "snese-bushmen" in the Tsomo River area were hired by Thembu smelters to collect and carry wood for their furnaces (ibid:115). There are also references by Le Vaillant to "...good bushmen", who herded a few cattle (Le Vaillant 1790). The fact that the Xhosa isiThathu clan can trace its origins in part, to a San base indicates that complete assimilation into Xhosa society took place (Peires 1981:24). In contrast, those "Bushmen" in the Winterberg who were outside the immediate acculturation mosaic of clientship and incipient food production were seen as "...wild... troublesome neighbours..." (Impey 1838-1847:49).

These records indicate that San were not simply displaced and eradicated from those areas more favourable to pastoralist and agro-pastoralist groups. This viewpoint stems from the tense relations between all groups in the eastern Cape from the mid-18th century, due to colonial expansion and landscape saturation. Within this context the frequency of San cattle raids rose. This short but stressful period is illustrated by the high percentage of Drakensberg rock paintings in which horses and Europeans are depicted (Campbell 1987:132). Consequently, most historical observations portray the San in a negative light and generalise the 19th century patterns. That certain San groups did choose to retain their independence by restricting settlement to the uplands of the second and main escarpments is well known (Sparrman 1786; Barrow 1806; Hewitt 1920; Derricourt 1974, 1977). These reconstructions have tended to be diachronically generalised and overlay the earlier interactions hinted at by colonial travellers.

With the interpretive possibilities outlined above the archaeology of the contact period is now described and discussed.

ARCHAEOLOGICAL EVIDENCE FOR INTERACTION

REGIONAL DIFFERENCES IN CERAMIC SEQUENCE DEPTHS

A crude index of interactive intensity between hunter-gatherers and food producers is given by the depth and dating of pottery sequences. At both Wilton and Melkhoutboom pottery sequences are insubstantial (Deacon, J. 1972; Deacon, H.J. 1976) and are better represented at smaller sites. It has been suggested that the disruptions caused to hunter-gatherer settlement strategies fragmented hunter-gatherer groups into smaller units, which utilised the landscape in a 'secretive' manner. One such site, Springs Rock Shelter located just outside Grahamstown in the CFB (see Deacon, H.J. 1976:157-8), is small and inaccessible and pottery throughout the sequence indicated a date within the last 2000 years. Radiocarbon samples submitted to investigate this aspect in the current project, indicate that occupation of Springs only occurred over the last 400 years (360± 50 BP, Pta-4372; 290± 50 BP, Pta-4369). This is relatively late in terms of the regional indications for at least a 1900 year food producer presence (Hall, S. 1985:45, Appendix II; Binneman 1985:122; Leslie-Brooker 1987:230-1).

The late occupation of Springs, plus the apparent ephemeral occupation of Wilton and Melkhoutboom suggest substantial chronological gaps in the LSA of the eastern extension of the CFB over the last 2000 years. This points towards regional demographic shifts necessitated by the presence of food producers. The greater depth of the pottery sequence at Welgeluk, (from at last 0,80 m below the historic dung crust), and also perhaps at Edgehill, suggests that one such strategy was to continue and perhaps intensify occupation of sites situated within habitats favourable for food producers.

This is contrary to what one would expect if the San had been displaced from the lower Fish River Basin. The suitability of the habitat for grazing is beyond question. The local Subtropical Thicket provides excellent sweetveld and winter forage, to which local Nguni cattle are well adapted (Mr V. Biggs pers. comm.). Furthermore, the open sweetveld grasslands immediately to the north provide some of the finest pasture in the eastern Cape and the word "Koonap" translates roughly into "fine fields" (Skead pers. comm.).

The implication of these observations is that in the context of traditional eradication and displacement models of interaction, the depth of the Welgeluk pottery sequence is anomalous. This suggests that some parts of the landscape were empty over long periods during the last 2000 years, while in others LSA occupation continued and perhaps even intensified. If the ephemeral character of LSA occupation in the CFB is at all correct, then parts of the landscape were empty of hunter-gatherers, not only because they were displaced but because settlement alongside food producers in habitats favourable to them, provided a new set of social and economic resources which helped solve the complex problems brought about through the food producer presence. In other words, food producers also attract hunter-gatherers. Similar suggestions have been made by Sampson (1985:87, 103) for herder/San interactions in the Seacow Valley and by Mazel (1989) for the central Thukela Basin. On ecological grounds, pastoralist or farmer utilisation of the Sourveld of the Winterberg highlands to the north of Edgehill and Welgeluk would have been for relatively short periods in summer (Hall, S. 1986; Appendix II). However, because the sweetveld of the Fish River Basin supports stock for most of the year, even summer grazing in the Winterberg highlands may not have been necessary. The rugged topography of the Winterberg would also have further inhibited the grazing of domestic herds. Hunter-gatherers, therefore, could either have retreated relatively permanently into these highlands or have at least secured a seasonal retreat outside the grazing range of pastoralists. At Fairview (Robertshaw 1984), located in the pastorally more inaccessible sourveld of the Winterberg, the author suggests that the impact upon the hunter-gatherer economy was minimal.

The depth of the Welgeluk pottery sequence carries general information concerning the degree of interaction with food producers which continued unabated and perhaps intensified through the contact period. The CFB appears to have emptied of hunter-gatherers while the highlands of the Winterberg seem to have been minimally impacted. The question arises as to why different options within the frontier are selected by hunter-gatherers. Different densities of food producers is an obvious reason but type of interaction may be premised just as much on pre-contact hunter-gatherer social and economic configurations.

CERAMIC SEQUENCE CONTENTS

Pottery

A total of 34 potsherds was recovered from the Edgehill excavation as well as from surface collections from the whole site (Table 7.1). The pottery occurs predominantly within the top four 0,05 m spit levels of unit 1. It is generally well made with the occasional hint of red ochre burnish on the exterior. Five of the sherds are decorated and these are illustrated in Fig. 7.1. Although the sample is small, all, except the one punctate body sherd, appear to fall within the range of Cape Coastal Pottery (Rudner 1968).

At Welgeluk a total of 290 potsherds were recovered from units 1A and 1B (Table 7.2). The pottery sequence at Welgeluk divides into two components. These are defined on differences in decoration. In the lower component 1B, pottery is decorated with horizontal or diagonal incisions on the neck and corresponds to typical Cape Coastal Pottery (Rudner 1968) or the Albany ware of Leslie-Brooker (1987) (Fig. 7.2 nos 3 & 4). Pottery in unit 1B is thin walled compared to 1A, and relatively well made. The first sherds of this type occur in WFBA which is dated to 1980 ± 50 BP (Pta-3984). This date was thought to be too early for pastoralists and it is possible that sherds have moved down in the deposit. However, reference to the date for the first pottery at Edgehill (1830 ± 60 BP, Pta-3564) suggests that these dates are associated and should not be discarded.

Although the range of sherd thickness of unit 1B pottery is wide, there is a tendency for pottery to be thinner than the pottery from unit 1A. This general distinction is, however, only one distinguishing factor between the assemblages, the others being that the unit 1A pottery is relatively coarse, poorly fired, black in colour and, most importantly, is decorated with incisions across the lips of the vessels (Fig. 7.2 nos 1 & 2) as well as possible moulding on the necks. Furthermore, in the uppermost units of 1A (BA, GVA), grass temper occurs, but does not replace grit temper entirely. Many of the 1A sherds retain a thick carbon rind on the interior surfaces, presumably residues from food which was cooked in the vessels.

The appearance of this rim nicked pottery at Welgeluk has been dated to 510 ± 50 BP (Pta-3934, SBVA). A similarly decorated rim sherd was recovered by Hewitt from Uniondale, which is also placed late in the ceramic sequence (Leslie-Brooker 1987:223, 230). An original interpretation of the Welgeluk pottery sequence (Hall, S. 1985) saw this upper assemblage as indicative of an increasing mixed farmer presence on the landscape based on its repeated association with Bantu speakers (Schofield 1948). There may still be

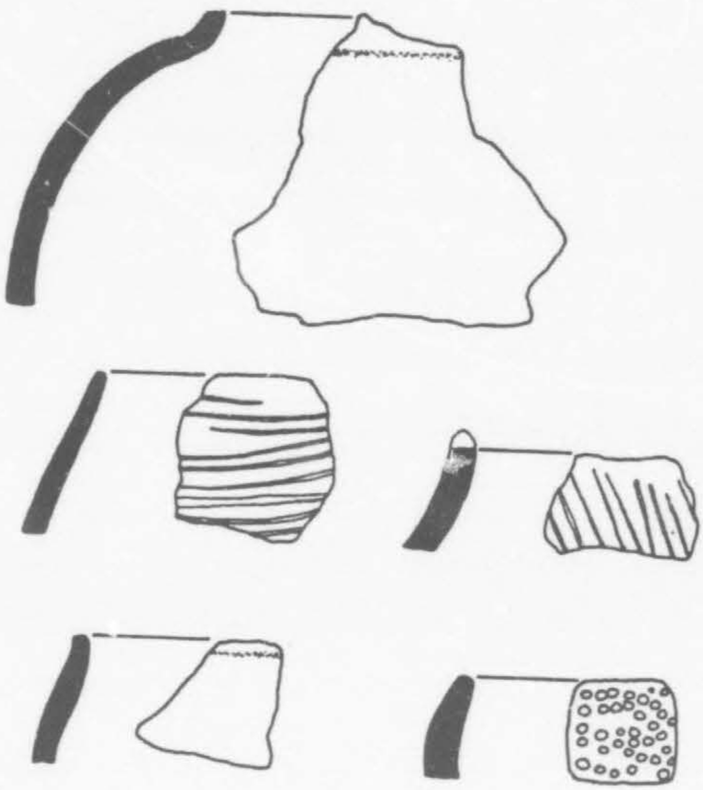


Figure 7.1. Edgehill: decorated pottery

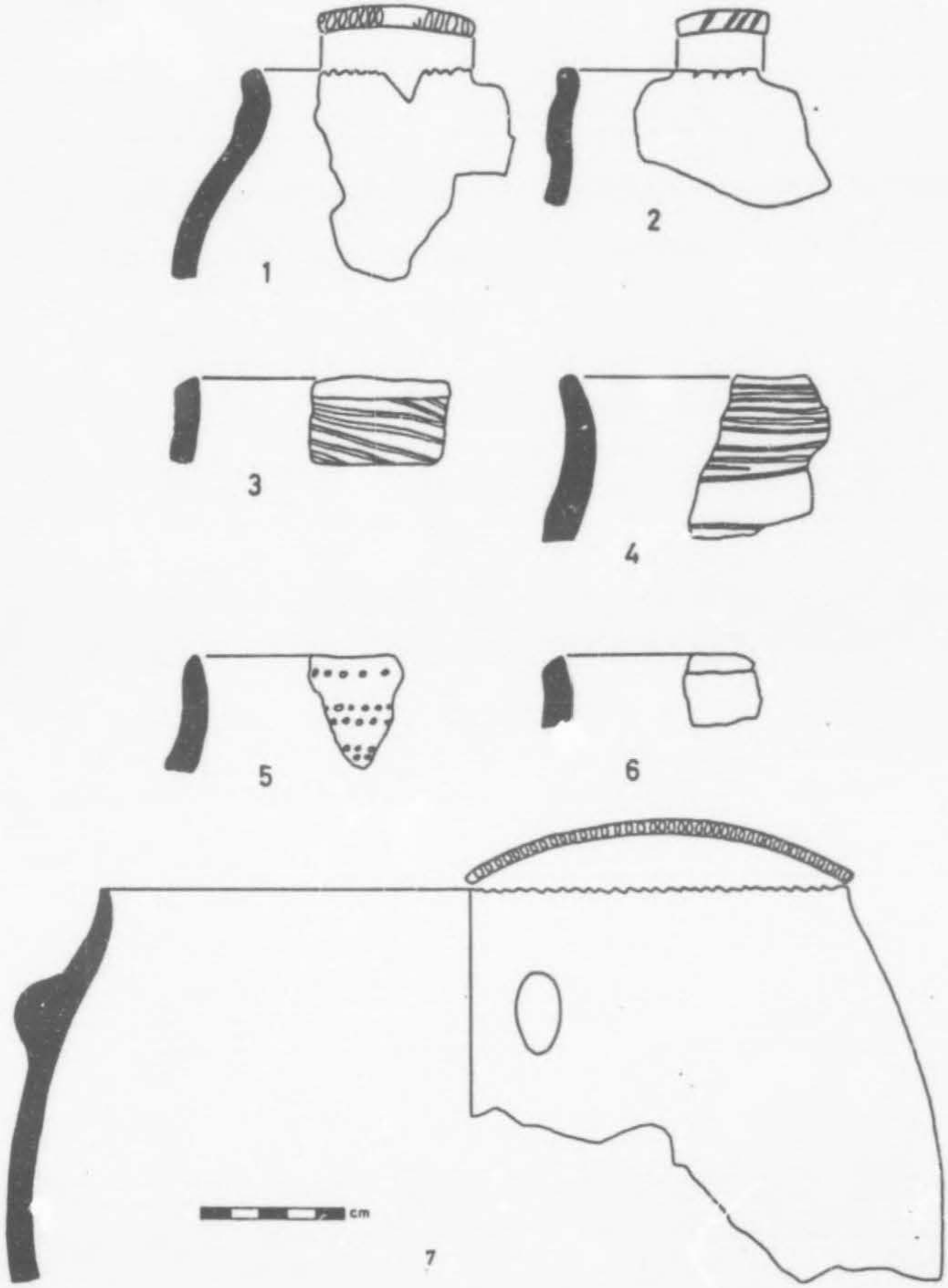


Figure 7.2. Welgeluk: decorated pottery (No 7 from Adelaide)

some validity for this viewpoint but a rim nicked vessel from the Winterberg foothills near Adelaide (Fig. 7.2 no.7) has unpierced vestigial lugs which may be relict pastoralist features. It cannot be ruled out that the upper pottery assemblage reflects the emergence of mixed Khoi and Xhosa groups which appear historically as the Gonaqua and Ghunukhwebe (see Maingard 1931).

This two-fold Welgeluk pottery sequence is correlated with the discrete distributions of rock paintings in which sheep and cattle are depicted (Hall, S. 1986; Appendix II Fig. 1). Images of sheep are found mostly on the coastal foreland to the south of the Winterberg, while images of cattle are restricted exclusively to the Winterberg. It is postulated that the lower Khoi pottery unit at Welgeluk is chronologically equivalent to the sheep paintings (ca 1800 to 500 BP). Both reflect a pure pastoralist presence on the landscape. The cattle images, restricted to the Winterberg, are interpreted as chronologically equivalent to the upper pottery unit 1A at Welgeluk (ca 500 to 150 BP). The discrete distribution of sheep and cattle motifs is therefore chronologically discrete as well. One implication of this interpretation is that cattle were only introduced, or alternatively only became numerically important, in the area over the last 500 years. Drawing this conclusion is dangerous, however, given that cattle painting may reflect their increasing importance to shamanistic status in the developing "shamanistic relation of production" (Campbell 1987), rather than indicating an absolute increase in cattle numbers.

Logically, the absence of cattle paintings south of the Winterberg indicates that there were no hunter-gatherers in that area left to paint. The discussion above concerning the depth of the Welgeluk pottery sequence indicates that this was not the case. Hunter-gatherers certainly were present. Assuming that the late occupation at Springs Rock Shelter was by hunter-gatherers, then this is more evidence for their continued presence on the landscape. Explanations for the lack of cattle paintings on the coastal plateau and forelands focus on two possiblities.

Firstly, two distinct hunter-gatherer groups which bear some resemblance to pre-contact configurations, were present. The group represented by the upper pottery unit at Welgeluk, and with the longest interface with food producers, could have been enculturated to such a degree that painting was no longer a part of their cultural expression. Consequently, the distribution of cattle paintings in the Winterberg represents hunter-gatherers in a mountain refugium situation who opted at times to keep as much distance between themselves and food producers as was practically possible.

A second interpretation considers a much more flexible situation, in which hunter-gatherers perhaps still employed a seasonal pattern of movement between upland and lowland. Theoretically, the upper Welgeluk pottery sequence and the later deposits at Fairview could have been laid down by the same people. The distribution of cattle paintings in the Winterberg is perhaps one expression of summer occupation, during which shaman rain makers symbolically laboured at that time for the reproduction of the veld and the group, for cattle farming clients and for entrenching their own status and prestige. A difficulty with this scenario is that if pre-contact hunter-gatherer socio-spatial identities (see Chapter Five) still existed, these may have formed social barriers to movement.

The two pottery components at Welgeluk are interesting for stratigraphically recording the increasing influence of firstly, Khoi herders and, secondly, Xhosa mixed farmers in the area. I suggest that this archaeological sequence sheds light on the discrete distribution of sheep and cattle motifs in San rock paintings and places them more correctly in a diachronic sequence.

Artefacts

Table 7.3 lists artefacts, ornaments and raw materials from units 2, 1B and 1A at Welgeluk. Data from unit 2 are included in order to provide a comparison over the pre-contact/contact boundary. Examination of the densities for waste tools, total formal tools and scrapers, shows that change in densities is most marked in unit 1A. The density of waste artefacts slightly increases in 1B while the densities of scrapers in 1B are down on those in unit 2. Formal tools drop in density by about half between units 2 and 1B, and this is attributable to the other formal tool categories, particularly backed bladelets, falling to almost zero in unit 1B. It appears that the ubiquity of scrapers among formal tools remains in the initial contact situation, but that all other formal tools become insignificant in the lithic repertoire. All components of the lithic inventory drop off significantly to very low densities in the upper pottery unit 1A.

One significant factor in accounting for the stone tool drop off, particularly in unit 1A, is that iron tools could have been substituted in their place. Three pieces of iron were recovered, all securely from within the pottery units. One unidentifiable scrap came from 1B (BGOA). The other two pieces were recovered from 1A and consisted of one small iron bead (GBOL) and one iron button of European origin. This was found in H2. The locus of smelting activity by mixed farmers would have been to the east of Welgeluk and Edgehill, as is suggested by Sparrman's account (Sparrman 1786:115; see also Feely 1987). Iron could therefore have been obtained in exchange for labour in the actual smelting process, or exchanged in the course of other interaction. Maggs has posited that an apparent oversupply of iron at the Early Iron Age site of Msuluzi Confluence in the Thukela Basin could have been traded with San (Maggs 1980a:138).

The presence of a European button in secure stratigraphic context late in unit 1A indicates that hunter-gatherers were still on the landscape within the colonial frontier. Wine bottle bases also provided another raw material for 'stone' tool manufacture. Several pieces from Fort Double Drift, on the lower Fish River, appear to be formally flaked LSA shapes. An unaccessioned collection of glass tools in the Albany Museum, particularly bladelet cores, collected by J.J. Kissack in 1931 from the vicinity of Cradock, includes undoubtedly worked pieces.

The occurrence of silcrete over the contact period is of considerable interest given the prominent position of this material as a social and geographic marker in the ca 5000 to 2000 BP sequence (see Chapter Five). The percentage of silcrete waste is low through the contact period (Table 7.3). For formal tools silcrete contributes 72.5% of the material in unit 1B, compared to 0% in 1A. This is accounted for by the near total absence of formal tools in unit 1A, but it does suggest that either access to silcrete was blocked or that the previous status of the material in terms of social identity no longer applied.

Of more interest is the sharp increase in silcrete use for formal tools over the relatively low frequency of 37,9% in the immediately pre-contact unit 2 (Table 7.3). Also in unit 2, local hornfels makes up 27,2% of the formal tools, the highest percentage for the whole site, while other local materials, such as chert and sandstone contribute 33% of the total. In Chapter Five, the relatively greater use of local materials in unit 2 (ca 2500 BP) was interpreted as evidence of an increasingly confined residential focus interlinked with the intensification process. Logically, the resurgence of silcrete use in the ceramic unit 1B as well as the appearance of Zuurberg chalcedonies and the decrease in local shales, cherts and sandstones indicates a re-expansion of the raw material catchments that is somewhat analogous to the ca 5500 BP basal units at Edgehill. A similar diversification in raw material consequent upon the initial introduction of pottery has also been noted at Uniondale (Leslie-Brooke 1987).

Interpretation of this trend in unit 1B is difficult and the following is tentative. It has been inferred on the basis of tool densities and frequencies that the pastoralist impact on hunter-gatherers in the area was not as great as that by the later mixed farmers. The raw material expansion might signal the build up of social and ecological stress in hunter-gatherer groups, who responded by expanding their ties over a wider area. In so doing, opportunities to relocate in the face of pastoralist competition may have been facilitated. The apparent relative archaeological invisibility of hunter-gatherers in the CFB at this time, however, would argue against this. On the other hand direct contact or some form of networking with the coast is illustrated through the slight increase in *Nassarius kraussianus* beads in unit 1B (Table 7.3). The frequencies of these, however, drop markedly in unit 1A and suggest that all regional networks had been seriously disrupted or were no longer required. There is no indication, however, that other *hxaro* type tokens, such as ostrich eggshell beads, are emphasised more in unit 1B, compared to unit 2. Ochre increases in unit 1A significantly over 1B, and if the association between this material, ritual and increased stress is made, then obviously unit 1A is the more stressful period.

The hunter-gatherer system over the course of the initial pastoralist presence remained reasonably intact. Examination of the food waste from the pottery units provides more evidence, however, that economic pressure was exerted. The most economical interpretation of the artefactual and settlement data relating to the agro-pastoral phase of the contact period, is that widespread hunter-gatherer networks appear to have broken down entirely and that groups have became increasingly fragmented and socially and economically separated from one another. In this light, each hunter-gatherer group had its own spatial and temporally variable relationship with food producers, with the emphasis on self interest. Similar conclusions have been drawn about this period from a theoretical consideration of contact rock art (Campbell 1987) and this aspect is returned to below.

Food waste

In Chapter Four, mention was made of the interpretation that the widespread increase in freshwater mussel exploitation in the later Holocene was tied to the influx of pastoralists (Deacon & Deacon 1963; Deacon, J. 1972:38; Deacon, H.J. 1976). The evidence from Edgehill and Welgeluk indicates that any peak in mussel exploitation is part of a pre-contact intensification process, and that hunter-gatherer mussel exploitation within the contact period actually declines (Table 7.3). I suggested that the ephemeral nature of the pottery sequences at some of these sites has confused the picture.

Explanation of the downward trend in mussel exploitation in the pottery units at Welgeluk focuses on two possibilities. Firstly, alternative protein sources from pastoralists may have already been tapped, and the need to maintain mussel exploitation decreased. Secondly, as noted by others (Hall, M. 1981; Alexander 1984), food producers, particularly in pioneer "moving frontier" conditions, often also exploit hunter-gatherer resources, thereby undercutting hunter-gatherer subsistence needs. Large, mussel strewn sites, with pottery similar to Sampson's 'Khoi' (Sampson 1985), on the banks of the Great Fish River above Cradock, certainly demonstrate that pastoralists liberally exploited wild foods (pers. observation). Furthermore, much smaller mussel sites with grey, relatively thick, grass tempered pottery ascribable to the San (Sampson 1984) are located on and within the kopjies which stand back from and overlook the river.

These more distant San riverine camps may reflect similar settlement preferences to Smithfield camps in the Seacow Valley, which as a rule are located 1 km from spring eyes or river banks (Sampson 1985:87), presumably to encourage the presence of game. However, the Smithfield (San) and Khoi (herder) camps are undoubtedly contemporary and while Khoi apparently attracted San to their camps, it is not improbable that access to riverine resources became increasingly restricted to hunter-gatherers, coupled with a concomitant decline in biomass. It is also possible that Khoi herds were instrumental in floral and river bank degradation, which could have upset subtle ecological balances, particularly in terms of the tolerance of mussels to increased sediment loads. It is not inconceivable that the near total absence of this species today in eastern Cape rivers is the end point of a process started by herders.

The downturn noted for freshwater mussel in the pottery sequence at Welgeluk applies equally to the freshwater fish (Table 7.3). Of interest, though, is that riverine resources such as crab and turtle, which may be seen as relatively low on a food preference ranking, become more prominent during the pottery sequence. Another significant trend is the dramatic increase in grysbok/steenbok sized animals in the upper pottery unit 1A (Table 7.3). This surge in small bovid frequencies is also a feature of unit 1 at Edgehill. Sheep have also been identified from both units at Welgeluk as well as from the pottery unit at Edgehill.

Together, these trends suggest that herders, and in particular mixed farmers, increasingly disrupted access to key resources both through their own exploitation of them as well as the presence of their herds. In order to maintain protein intake, hunter-gatherers compensated by intensifying exploitation of species which can sustain exploitation pressure and which are even further down the ranking scale and, therefore, perhaps outside the subsistence focus of herders.

Additions to the plant food list within the contact period have been previously noted in hunter-gatherer contexts. *Cyperus usitatus* is limited in its distribution to the pottery layers at Melkhoutboom (Deacon, H.J. 1976:91,164), and has a similar distribution at other CFB sites (Binneman pers. comm.). At Welgeluk unit 1A preserves the only plant domesticates found (*Citrullus lanatus* and *Lagenaria siceraria*), and lend considerable weight to the interpretation of unit 1A as indicative of an agro-pastoral presence. Also, there is a marked increase in the amount of plant food waste in the upper pottery unit 1A which may not be solely a product of better preservation. Intensification of carbohydrate resources may be indicated which included domesticates as well.

As with the artefactual evidence, the food residues at Welgeluk demonstrate that significant departures from traditional hunter-gatherer lifeways occur during the later agro-pastoral phase. Technological breakdown, reduced mobility, group fragmentation and subsistence stress can all be tentatively inferred. This picture certainly casts a negative light on the lot of hunter-gatherers at this time. However, if the mechanisms through which the bits and pieces of evidence enter the hunter-gatherer context are in any way analogous to the trade and exchange, labour and ritual expertise options highlighted by the ethnography, then this picture can be interpreted in a different way.

Undoubtedly hunter-gatherer lifeways were disrupted by food producers, but in turn, hunter-gatherers may have perceived farmers as another resource around which solutions to their subsistence problems were based. The archaeological scraps from contact sites reflect the active selection of those options. I maintain that the very depth of the Welgeluk pottery sequence, placed as the site is within prime agro-pastoral land, reflects one aspect of the frontier which is fundamentally cooperative.

SHAMANS, RAINMAKING, CATTLE AND ROCK ART

Within this cooperative framework, there are deeper and more obscure issues for San society, arising from an increasingly contradictory dialectic between aspects of hunter-gatherer social relations of production. The early travellers clearly indicate that barter and exchange between San and Xhosa took place (see Lister 1949:118), and yet hunter-gatherers do not traditionally barter food (Moore 1985:106-107). It is shared with the knowledge that others will share in turn. Furthermore, hunter-gatherers exchange meat with food producers thereby reducing the amount available for themselves. This undercuts dietary needs and removes one medium through which social relationships are embedded. Why is it exchanged? The archaeology also indicates that alternative domestic sources of plant carbohydrate are coming into the hunter-gatherer system (see Maggs & Ward 1980; Mazel 1989), and any exchange for domestic carbohydrates also undercuts the productive rle of women. This has been noted by Wiessner (1984) who records that San women have elaborated personal stylistic expression in beadwork as a reaction to the negative effects of contact on their productive rle.

To be acceptable to the wider San society these departures from traditional hunter-gatherer norms have to be embedded within new social relationships. An analysis of contact rock art by Campbell (1987) points out the increased importance of shamanism during the contact period for weaving the new economic developments of contact into the everyday fabric of San life. A 'shamanistic relation of production' develops which in essence manages the changing risks of the contact period by orientating social relationships towards new economic dependencies. As already noted, rock paintings in which cattle are depicted occur in the Winterberg and it is argued that they focused San groups on one of these new dependencies. Several paintings of cattle from one site are now examined. It is concluded that these are specifically rainmaking scenes and that they 'functioned' to embed new economic and social relationships in the contact period which emphasised the importance of cattle and the rôle of the shaman in bringing them to the group.

BRAKFONTEIN

Three panels occur in this western Winterberg site (Fig. 1.2), two of which depict cattle and the third a scene with eland.

Panel 1

Figure 7.3 shows a panel composed of a number of running figures between bovids, most of which can be clearly identified as cattle. A cursory examination of the panel suggests a literal cattle herding scene. A key in unlocking a more complex conceptual content is provided by the syntax. Closer examination shows that both the cattle and figures are juxtaposed and superimposed within and over an older scene composed of at least five eland. Nowhere is this better illustrated than by the upper central cow associated with the zigzag line. The 'patch' within the body of this cow is one of the older eland. This superpositioning is not random and underpins a conceptual transferral concerning eland, water and San rain making beliefs to cattle (Lewis-Williams 1981; Hall, S. 1986). "Eland and cattle then become closely related, perhaps in some ways equivalent symbols in San thought" (Campbell 1987:76). The close association between eland and cattle is repeated in several other Winterberg panels.

Figure 7.3. Brakfontein rock art panel 1

This symbolic and metaphorical continuity is further emphasised through the entry of the zigzag line into the cow's back. Close examination of this line, however, shows that its end point is on the older eland back, but by precise superpositioning, the cow has been given the same association. This relationship has significance in terms of San beliefs concerning n!ow potency or power and the influence this can have upon the weather (Lewis-Williams 1983:9). The middle cow in the bottom row has a similar line entering its back, and the area around the point of contact has a series of delicately painted flecks. The zigzag and straight lines, the flecks and the line of nine semi-cross motifs running across the panel help identify the panel further as a trance scene, related to the hallucinations of shamans in an altered state of consciousness.

Interpretation of these features draws upon universal neuro-psychological phenomena which emphasise that altered states of consciousness induce similar aural, somatic and most important for the rock art, visual hallucinations (Lewis-Williams & Dowson 1988; Dowson 1989; Dowson & Holliday 1989) which identify the paintings with altered states of consciousness. These entoptics usually take the form of dots, microdots, grids, nested curves and zigzags (Dowson 1989:86). These writers suggest that entoptics, such as the zigzag in Figure 7.3 represent the released supernatural potency from the eland/cow seen only by the trancing shaman and harnessed by him to capture rain-animals (Dowson & Holliday 1989:46). N!ow potency and its possible relationship with the n//au spot (the point on the back of the neck from which a shaman can expel sickness) point towards these features as being associated with rain and rainmaking.

Furthermore, the uppermost animal with its hind limbs directly on the zigzag line is rather amorphous in shape and suggests that it may be the rain bull and that its association with the potency indicates shamanistic control and capture. Zigzag lines are a recurring feature of Winterberg rock art (see Lewis-Williams 1988a:Fig. 8). A middle panel at Brakfontein Shelter (Fig. 7.4) has similar features. It shows two lines of eland associated with zigzags as well as the semi-cross motifs which also occur in the cattle panel. Both can be interpreted as entoptics emanating from the hallucinations of shamans which possibly represent potency. The flecks associated with the back of the lower cow in Figure 7.3 can also be interpreted as the potency seen by the shaman, and may also be associated with the n!au spot (Dowson 1989:91).

There are other features in Figure 7.3 which identify the painting as one of rain-making. Although the panel is faded badly on the left side it is clear from on-site inspection that the circular red line does enclose faded images. It is probable that this line represents a further

Figure 7.4. Brakfontein rock art panel 2

depiction of released potency associated with another rain-animal (see Dowson & Holliday 1989:Fig. 2). A clearer demonstration of this is evident in a further isolated Brakfontein painting (Fig. 7.5). The figures running in tandem in the upper left hand part of Figure 7.3 have white faces. This feature is relatively common in Drakensberg panels (see Vinnicombe 1976). From the ethnography this feature can be associated with rituals, particularly hunting ritual, in which the white faces make a clear relationship with the animal (Vinnicombe 1976:257; Leslie-Brooker 1987:290-295 with refs.).

Figure 7.3 does demonstrate the trance related and shamanistic character of this contact painting. It also very clearly articulates cattle into the general San belief system concerning trance, eland, potency and the control of rain. This underpins the importance of cattle during the later contact period in ensuring renewal of basic environmental conditions of existence. The symbolic labour of the shaman-rainmaker in trance both assures cattle payments to the camp as well as hampering the pursuit of cattle raiders (Campbell 1987:54). Moreover, the use of the word "shaman-artist" (Dowson 1989:84) is particularly appropriate because the paintings were a ritual demonstration to the camp of their dependency upon his symbolic labour, manipulated by the shaman both for the camp's, as well as his own benefit.

Panel 2

Examination of panel 1, in which trance related elements are relatively obvious provides confidence to approach the second main panel at Brakfontein (Fig. 7.6) because there appears to be nothing shamanistic about this painting. Again the syntax of the panel helps in this regard. In the central section, the cattle are superimposed over a previously painted bovid with an amorphous form similar to the one associated with the zigzag line in Figure 7.3. The suggestion again is that similar concepts concerning rain making are being expressed but articulated in a different way. Furthermore, close examination of the snouts of several of the cattle, show that short wavy lines have been painted. No doubt in reality these depict some form of halter or rein by which the cattle are led and controlled. It is possible, however, that these thongs had symbolic meaning to the San painter and viewers. San mention the difficulty of capturing a rain-animal and recourse to reins for control, either to lead or ride the rain-animal is mentioned (Lewis-Williams 1988b:15; Campbell 1987:73). It is, therefore, not inconceivable that the thongs in Figure 7.6 represent metaphors for the control of rain-animals.

Moreover, the snouts of several cattle are embellished with small projections, which again may be real attachments associated with the connection of the thongs. Recourse to neuro-psychological analogy, however, indicates that in altered states of con-sciousness

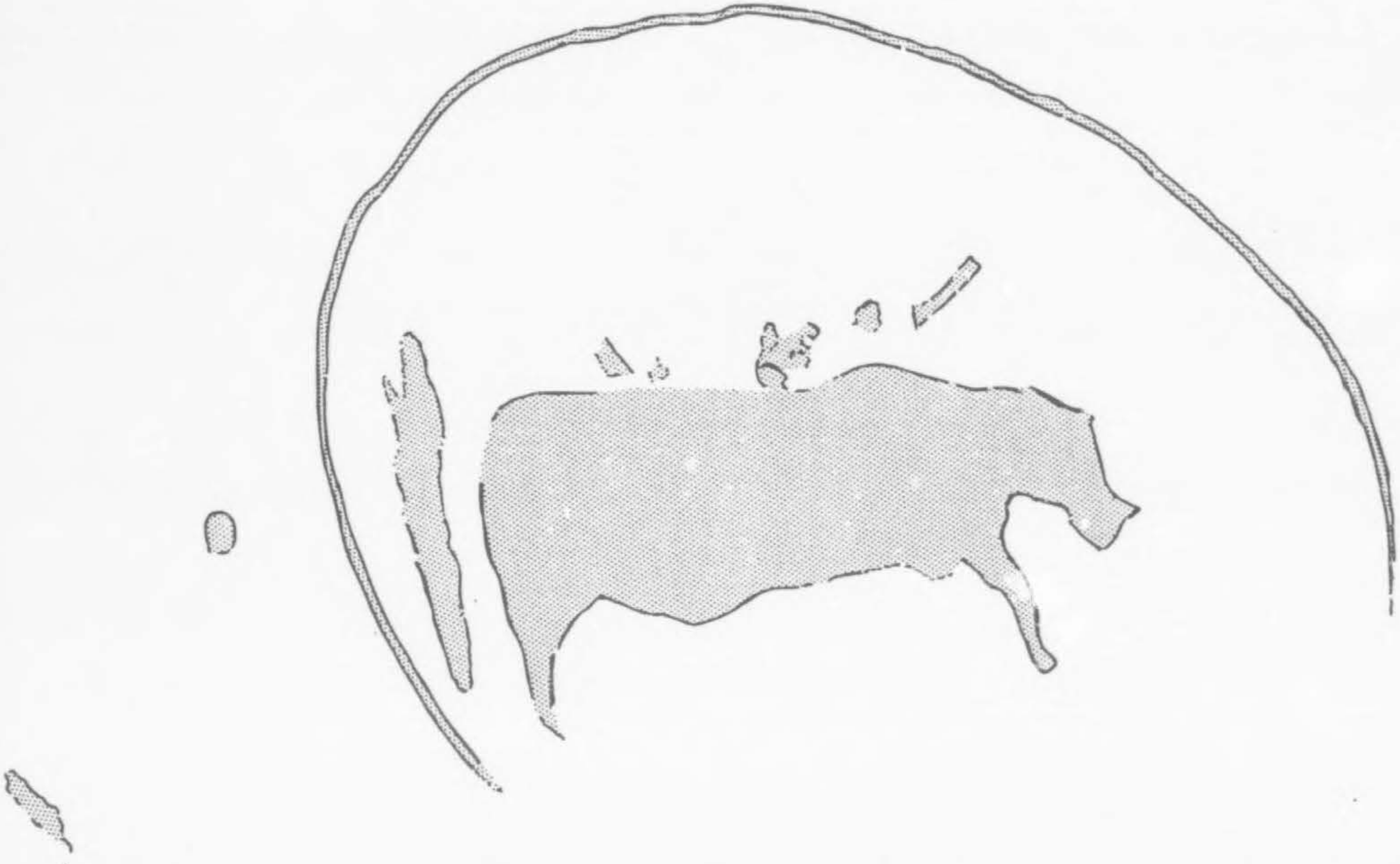


Figure 7.5. Brakfontein rock art panel 3

Figure 7.6. Brakfontein rock art panel 4

prognathism is sometimes experienced, and the cattle 'tusks' may be metaphors for this feeling (Dowson 1989:90; Fig. 12). Both snout 'thongs' and 'tusks' are depicted in other Winterberg cattle panels, and one on the farm Austrey closely articulates the cattle within an older panel of eland.

The panel in Figure 7.6 has enough features to dispel notions about literal depiction. The detail to the left side of the panel remains uninterpreted and may add to the general conclusion reached. Its presence in a shelter redolent with trance imagery also supports a shamanistic interpretation. Just as traditional social and economic rôles are embedded and emphasised through the symbolic labour of the shaman (Lewis-Williams 1982), so too must contradictions to these brought about by new means of production introduced through farmers. Evidence for the appropriation by Xhosa farmers of San rain making prowess is particularly abundant (see Macquarrie 1962:128-130). Payment for rainmaking was made predominantly with cattle, as well as allocation of a portion of the harvest (Campbell 1987:42). The importance of these new economic elements to the San had to be grafted onto existing ritual metaphors underpinning productive relations, thereby rationalising these relations and providing the basis for economic and social form in the contact period. As mentioned above, this can be seen as managing new forms of economic and social risk. Cattle paintings are one clear expression of this.

Most important, however, is that shamans increasingly controlled access to cattle, and thereby the conditions for inequality arose through the appropriation of surplus for themselves. The heightened stature of the shaman during the late contact period is embedded by the shaman himself through trance and he communicated to the wider group through rock paintings in which cattle are depicted as trance metaphors. These are essentially "...statements about the social power of shamans and provided indelible reminders to the camp that access to cattle... depended on the symbolic labour of the shamans..." (Campbell 1987:91).

From this background a final word can now be added about the absence of cattle paintings to the south of the Winterberg and in the vicinity of Edgehill and Welgeluk. If cattle paintings underpin shamanistic control of new productive relations their distribution indicates that in those areas hunter-gatherer groups still retained a relative autonomy over their economic and social lives. In contrast, areas where such paintings do not occur indicate that shamanistic control had broken down completely.

SUMMARY DISCUSSION

This chapter has attempted to show that the impact upon hunter-gatherers in the research area by food producers was by no means simply one of eradication and dispersal. Even while it may have been one aspect of the frontier, it is probable that spatially and temporally it was highly variable. The archaeology has suggested certain aspects of economic interaction which have been articulated through ethnographic and historic observations which seek to emphasise that cultural contact does not merely create acculturation or similarity on the part of the weaker party. Alternatively, cultural contact exerts mutual forces which restructure groups, just as much towards a self serving complementarity which may be maintained, or gives way eventually to wholescale acculturation (Sahlins 1964). Contact between people with different lifeways creates stress and consequent alleviating action contradicts previous economic and social models of both participants. For the San, new economic and social relations were underwritten in the supernatural sphere. The pace and intensity of interaction between hunter-gatherers and food producers appears to have been variable in time and space. While this must in part relate to different densities of food producers in different areas, pace and intensity may also be tied to the social and economic structures of hunter-gatherer groups prior to contact. "Every culture carries the penalty of a past within the frame of which...it must work out its future" (Sahlins 1964:369). It is perhaps in examining the nature of pre-contact hunter-gatherer systems in different areas, rather than differences in the densities of food producers, that variable responses in the contact situation can be explained. Only some very tentative speculations can be offered in this regard.

Parkington (Parkington & Poggenpoel 1971; Parkington 1972, 1984a, 1984b) has drawn attention to marked changes in hunter-gatherer settlement focus consequent upon the influx of pastoralists. Numerous small shelters in the pastorally less favourable CFB and rocky pediments in the sandveld are occupied only over the last 2000 years and seldom before and displacement is indicated. Accompanying these settlement shifts, is an increase in painting and shamanism as well as a marked broadening of the subsistence base. All these suggest a context of considerable stress, compared to pre-contact times. From the perspective of this hunter-gatherer intensification in the western Cape, Parkington extrapolates and generalises this pattern into the LSA of other regions. He states:

> What has often been taken as a Holocene pattern of extensive reliance on underground plant foods is more likely to reflect a refuge situation among residual hunter-gatherer peoples (Parkington 1984a:123).

From the perspective of sites in the eastern Cape the evidence for extensive use of plant foods during the Holocene in the eastern Cape is good. The scale of stress which encouraged pre-contact Holocene intensification in the eastern Cape was, therefore, only experienced in the western Cape once pastoralism had arrived. The pre-contact social, economic and demographic contexts in the two areas are quite different. In the western Cape the pre-contact structure emphasises few people, large territories, few sites, large mean food parcels and a narrow diet breadth (Parkington 1984a:171, Fig. 6.3). This contrasts in all respects with the evidence from the eastern Cape. The scale and type of change in the contact period will be premised on this structure, just as much as upon the density and type of incoming food producer. There is no reason why the two should be the same. The archaeological facts in both areas appear to be correct, but the logical interpretations of them cannot be generalised.

It could be expected that hunter-gatherer systems which emphasise a relatively high degree of social exclusion, boundary definition and maintenance, and which consequently have relatively high population densities, would react somewhat differently to hunter-gatherer groups who maintain more flexible, wide ranging and open networks for risk reduction. Structurally more rigid systems, perhaps such as those occurring in the eastern extension of the CFB and the southern Cape, may have been characterised by more competitive interactive relationships. Fundamental to this was that hunter-gatherers had nowhere to go and a relative spatial and social rigidity within hunter-gatherer systems would have seriously inhibited relocation options (see Barth 1956; Peterson 1978). Furthermore, in such cases hunter-gatherers and pastoralists were competing for the same environment more intensively, using much the same strategies. If a social and perhaps linguistic pre-contact boundary between the groups in the CFB and those in the Cape Midlands to the north existed (Deacon, H.J. 1976:170), this may have further decreased options.

In contrast, low population densities and relatively open networks in the western Cape gave hunter-gatherers the option to relocate into refugia outside the food producer sphere. The data from Welgeluk suggest that an equally viable or perhaps only option was to settle down within the food producer mosaic.

A certain degree of ecological/subsistence stress is indicated relatively early by the Welgeluk pottery sequence. Furthermore, if the diachronic interpretation of fat-tailed sheep paintings as belonging more to this early contact phase is correct, then a relative degree of stress is indicated. It is not inconceivable that they represent an earlier establishment of a shamanistic relation of production, which was soon followed by a situation in which acculturation via economic complementarity was the norm and shamanistic control broke down, hence the absence of cattle paintings.

On the other hand, the same degree of stress in the escarpment areas is not felt until much later, probably only because of the encroachment of the colonial frontier (Campbell 1987:132). More open and flexible hunter-gatherer structures coupled with a seasonal access to habitats not extensively exploited by food producers (sourveld uplands), may have allowed an environmental balance in which refuge, or complementarity and cooperation could persist in a longer term stability.

These general remarks highlight several other points. No matter what the pre-contact configuration and contact setting, hunter-gatherer contact trajectories are considerably different from those which went before. If the archaeology allows us an overall picture of this kind, it again turns attention towards the danger of generalising the ethnography. Moreover, just as it is dangerous to extend the ethnography into pre-contact settings, so too is it dubious to generalise conclusions from one LSA context into another, particularly, as the example above shows, from a contact sequence to a pre-contact s[illegible]. The scale of regional generalisation in the case of the western or the eastern Cape [illegible] be narrowed to the specific contexts in which the archaeological observations have been made. I suggest that the archaeology in the eastern Cape is different from elsewhere both in the pre-contact and post-contact configurations. Generalising a western Cape Soaqua pattern is no different from generalising the ethnography. Both deny contextual differences.

Table 7.1. Edgehill: inventory of pottery

Unit 1	body	Decorated body	Plain rim	Decorated rim	Decorated neck	Totals
Surface dust	14	1	1	2	2	20
GA1	8					8
GA2	1					1
GA3	2					2
GA4	2					2
GA7	1					1
Totals	28	1	1	2	2	34

Table 7.2. Welgeluk: inventory of pottery

UNIT 1A (0,87 sherds/bkt)

LAYER	PLAIN SHERDS	DEC SHERD	PLAIN RIMS	DEC RIMS	TEMPER
BA	1				grass
BD	3				grit
BOA	13				grit
BVA	10				grit
BWA	7	1			grit
CA	1				grit
FGH	3				grit
FthBB	12			1	grit
FWAO	1				grit
FWAU	2				grit
GVA	8				grit/grass
GVA2H	4				grit
H1B	10				grit
H2	3				grit
H2U	3				grit
OA	1				grit
SBH	1				grit
SBVA	37		3	2	grit
SWA	5	1	1		grit
SWAH	1		1		grit
TG	1				grit
VBL	2				grit
VBL2	12				grit
YD	2				grit
SUB-TOTAL	143	2	5	3	

UNIT 1B (1,30 sherds/bkt)

LAYER					
CBA	4				grit
DCWA	1				grit
DMGA	16		1		grit
GMA	2				grit
LGMA	1				grit
MGA	7				grit
MGAH	9	2	1		grit
SBWA	2	1			grit
SGOA	10		1		grit
TBB	3				grit
TBBO	20			1	grit
TBBOH	14				grit
TBVA	3				grit
WBC	3				grit
WFBA				1	grit
WGA	9		1		grit
WMA	2				grit
YH	24	1			grit
YHO	12	2		1	grit
YHP	5				grit
SUB-TOTAL	147	6	4	3	
TOTAL	290	8	9	6	

Table 7.3. Welgeluk: summary of lithic, shell and food waste remains in units 2, 1B and 1A

UNITS	1A	1B	2
LITHICS			
Waste pieces per bucket	5.12	45.7	44.2
Formal tools per bucket	0.01	0.36	0.62
Scrapers	1	31	42
Backed bladelets	1	2	15
Segments	0	1	1
Adzes	0	0	1
Silcrete waste	5.0%	4.1%	4.4%
silcrete formal	0.0%	72.5%	37.9%
Ochre	76.5 g	5.6 g	38.4 g
SHELL			
Oes frags per bucket	0.92	1.90	3.68
Oes beads per bucket	0.06	0.15	0.44
Oes incompl. beads/bucket	0.24	0.21	0.47
Unio caffer pendants	0	1	6
Nassa kraussianus beads	2	41	30
Other marine shell	0	2	5
FOOD WASTE			
Raphicerus sp.	11	1	1
Mussel	32	278	488
Fish	132	123	222
Crab	122	23	83
Turtle	6	5	2

CHAPTER EIGHT

CONCLUSION

An ecological framework provides useful interpretations on band/land relationships for a large body of data generated by hunter-gatherer studies. A 'regional' orientation to eastern Cape hunter-gatherer lifeways can now be pursued by building upon such previous studies (i.e. Deacon, H.J. 1976). New interpretations for the eastern Cape Holocene LSA data base also arise with an infusion of social factors added to previously employed ecological frameworks.

The data generated in this study are, to a large extent, similar to those recovered from other sites in the eastern extension of the CFB. However, to have guided the interpretation through an ecological framework may have contributed little that is new about the long range history of the region. The investigation of riverine settings does provide new subsistence insights which were previously only dimly visible. Yet, within an ecological framework approach, these contribute only additional detail on previously recognised patterns and principles of hunter-gatherer exploitation.

Rather than using only an ecological typology of hunter-gatherers which stresses the means and forces of production, this study includes an alternative typology which also emphasises relations of production. This design became essential with the realisation that functional definitions of hunter-gatherers based upon sub-sistence alone mask, suppress and fail to explain other aspects of variability in the evidence recovered. Furthermore, in order to maximise the interpretive potentials of the archaeology, recourse to the wider ethnography outside that of the San is required.

This approach does not call for a complete "...deconstruction of typological thinking" in regard to San ethnography (Myers 1988:262), or the complete "de-!Kunging" of archaeology (Parkington 1984). It is simply that if archaeologists studying the Later Stone Age do not venture outside marginal habitat San analogues then we will remain in a poor position from which to gain new insights. This regional study of Holocene hunter-gatherer-fishers in the eastern Cape demonstrates the contributions a social typology of hunter-gatherers has for ethnographic usage and archaeological interpretation.

Hunter-gatherer and San archetypes moulded in evolutionary and ecological frameworks tend to present people in a timeless and spaceless vacuum. The generalisation of synchronic ecologically based, ethnographic-present perspectives into the Stone Age past denies history and emphasises stasis. Change in ecological/ subsistence frameworks also tends to emphasise external forces. In contrast, a social relations framework allows change to be interpreted in terms of "...the purposes and aspirations of the participants" (Myers 1988:273).

This 'active player' approach allows, in turn, that the specificity of the local Later Stone Age is highlighted and drawn out in terms of its own cues, trajectories and outcomes. This may also encourage the opportunity for critical comparisons between case studies which focus upon differences in the archaeological sequences rather than searching for generalising similarities. Without an historical approach, generalising between areas risks masking differences in the same way as does generalising from the San ethnography into the past.

If the use of more social, historically orientated frameworks pinpoints differences in regional sequences, then this raises questions concerning the methods by which such differences are recognised. Obviously, the scale of ethnographic use becomes critical in this regard. Irrespective of whether the ethnography is employed within a functionalist framework, or one that is more structuralist or marxist in orientation, the archaeological interpretations will mimic the ethnography with analogical use. This is by no means wrong, especially given that many ethnographic contexts are comparable with archaeological scenarios and a search for differences outside analogical touchstones could, in fact, mislead archaeological interpretations. This is also not meant to detract from the significance of contributions where ethnographic analogy offers insights for patterns extending into the deep past. Clearly, any ethnography must be assessed and used with care within each specific research context so that the archaeological data are not stifled.

In this regard one of the strongest uses of ethnography for hunter-gatherer archaeology in southern Africa is in elucidating the last two thousand years when the historical context of the ethnographic and archaeological records are more comparable. The use of ethnography for pre-contact periods seems most suitable at the scale of general principles and not specific content. The juxtaposition of ethnographic testimony on the religious experience of the San with appropriate theory, for example, provides a general framework within which much of

San rock art can be plausibly interpreted. The specific detail between specific rock art contexts may change but the general principles can still be applied.

Most importantly, there should be a continuous comparative resonance between the archaeology and ethnography which systematically reveals differences and similarities and which allows the archaeology to speak for itself and perhaps even to inform on the historical status of the ethnographic present (Parkington 1984:171; Price and Brown 1985b:4).

These types of contributions are discussed by Deetz (1988:363) in [illegible] assessment of Historical Archaeology methods where the documentary and oral records (ethnography) are worked against the archaeology of the more recent past:

> In many cases, researchers will use the documentary base (read 'ethnographic' in this context) as a starting point and attempt to find reflections of aspects of the documentary (ethnographic) record in the archaeological data. Such an approach is not productive because it guarantees that nothing significant will be contributed by the archaeology and, furthermore, what is demonstrated by the archaeology can be more clearly perceived in the documents (ethnography). Conversely, it is also common practice to attempt to determine the reflection of some artefactual pattern in the historical (ethnographic) record, such as a relation between a class of expensive ceramics and the value of the estate of the owner. Since the value in question is already a known quantity, again, nothing more is provided by the archaeology beyond affluence and quality of possessions. Both approaches are *unidirectional* and fall short of the critical step in which each body of data is used to inform the other in such a way as to arrive at conclusions that neither set could provide alone. It is only through such an approach that one can prevent archaeology from being a handmaiden to history (ethnography) or history (ethnography) to archaeology (my emphasis).

The historicism allowed by a social approach assumes change both between present and past and between different contexts in the past. A unidirectional relationship between archaeology and the analogical base, or the other way around, may downplay the chance to investigate such differences. While the process described by Deetz for constructing an interpretation of the past is preferable and ideal, if a unidirectional approach cannot be avoided, it seems best to begin with an independent assessment of the archaeology first. This approach can highlight peculiarities in the data without having them prematurely biased by preconceived ethnographic perceptions.

Such a progression has characterised, in a general way, the development of this study which has advanced through a resonance between the archaeological base, present and past environmental parameters, the San ethnography and the wider hunter-gatherer ethnography. One must not forget that there is also a resonance between the construction of the historical interpretation and the context of the researcher. The 'active' role given to the hunter-gatherer players of these interpretations, is no doubt influenced by societal conditions conducive for the dispelling of misguided and hurtful perceptions of them as static and 'historyless' both in the past and present. The summary which follows is the result of a gradual refinement of explanation as factor after factor is brought into line providing the best interpretation of the data at hand.

Occupation of the inland margin of the CFB begins ca 5500 BP. Low key and subtle mid-Holocene environmental changes created an increasing heterogeneity in the inland environments, particularly in terms of increased river flow, which encouraged relatively high biomass riverine resources. The initial occupation at Edgehill is characterised as expedient or pioneer in nature reflecting the fissioning of increasing populations into available space required by saturation in CFB demographic cores. Low material culture diversity suggests periods of intermittent and perhaps focused seasonal occupations. The diversity of the raw material catchments suggest inclusive social stucture and social and economic risk reduction facilitated by wider ranging ties and a relative degree of mobility.

By 5000 BP lithic raw material use shifts almost exclusively to exotic silcretes and away from local hornfels. This is part of a contemporaneous regional shift in the eastern extension of the CFB. This represents the constitution of raw material as a socio-spatial stylistic marker required, it is suggested, as population densities approached regional saturation while fissioning opportunities became increasingly limited. These markers structure both inter-and intra-group interaction.

Welgeluk was occupied after this raw material change (ca 4500 BP), and the initial occupants used the site as a ritual burial centre. These deposits are also dense with shamanistic and *hxaro* type tokens. This combination is interpreted as facilitating increasing boundary definition interlinked with heightened identities between specific people and place. It is also suggested that intense ritual and *hxaro* type activity indicates increasing incompatibility between maintaining inclusive networks in the face of reduced mobility and scheduling options, and a resource scarcity induced by a changing ratio between population density and resources.

By 4000 BP shamanistic and *hxaro* tokens drop off in frequency and subsistence intensification immediately increases. The resources selected indicate an increasing emphasis on 'aseasonality' and, coupled with seed storage, point towards hunter-gatherers increasingly confining themselves to smaller areas for longer periods of time. This indicates further reduction in mobility as well as little specific habitat and resource scheduling.

These trends are regional, indicating that economic security can no longer be premised upon open access to other areas. Risk reduction, therefore, depends equally upon securing suitable subsistence more locally. Raw material markers define socio-spatial areas providing the wider basis for social interaction. Smaller scales of marking identity, however, are also initiated. The appearance of kasouga flakes and 'unique' styles of worked bone are examples of signification at these scales. The evenness in the range and abundance of artefacts at all sites suggests that aggregation is much reduced in intensity relative to the mid-Holocene.

The introduction of food producers into the eastern Cape elicits a range of responses by hunter-gatherers with varying intensities in differing areas. The distribution of contact rock art provides a clear regional picture of the temporal progression while the content of the paintings highlights economic and ideological changes made by hunter-gatherers. It is suggested that the fabric of hunter-gatherer lifeways in the eastern extension of the CFB breaks down relatively rapidly through a process of cooperation leading to acculturation in which the power of the shaman for controlling productive relations rapidly diminishes. A further factor in this breakdown is the spatial inflexibility of these hunter-gatherers, which is premised on pre-contact configurations. On the other hand, hunter-gatherers in more marginal habitats were buffered and flexible, with inclusive, risk reduction strategies permitting more stable and self-serving relationships with food producers to develop. In such contexts shamanistic control articulated new risks and dependencies into the social fabric.

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APPENDIX I

Hall, S. & J. Binneman. 1987. Later Stone Age burial variability in the Cape: a social interpretation. *South African Archaeological Bulletin* **42**:140-152.

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LATER STONE AGE BURIAL VARIABILITY IN THE CAPE: A SOCIAL INTERPRETATION *

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ABSTRACT

Burial complexes from mid- to late Holocene Later Stone Age occupations at Klasies River Mouth Cave 5 and Welgeluk Shelter are described and analysed. The data indicate that the expected relationship between increasing age, status and grave good 'wealth' does not always hold and some inversion of this expectation is visible in that the very young and juveniles received more ritual elaboration of burials than older people. In addition, the greater degree of ritual elaboration in the Klasies burials is interpreted as an explicit social display during a period of stress brought about through higher population densities and the consequent strain this placed upon inter-group relationships. The less elaborate Welgeluk burials reflect lower population densities within the more marginal eastern Cape environment. The social institution of hxaro provides the ethnographic basis for these interpretations.

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Introduction

In *The Loom of Prehistory*, Goodwin (1946) described the archaeology of the southern Cape as an 'efflorescence' and that the Wilton of the Later Stone Age (LSA), represented the cultural culmination of that period (Goodwin 1946:115). This characterization was based on the richness of the deposits encountered in the shelters of the coastal belt and the adjacent mountains of the Cape Fold Belt (CFB), as represented through the cavalier excavations of FitzSimons (1923, 1926), as well as his own systematic work at Oakhurst (Goodwin 1938). Compared to sites in the winter rainfall area of the western Cape and in the region to the east, where summer rainfall increases, considerably more bone tools, as well as bone and shell ornaments had been found. Goodwin saw the 'wealth 'of the southern Cape LSA archaeology as a reflection of a particularly 'generous' environment (Goodwin 1946:106).

Coupled with this distinctive material culture was the discovery that these rock shelters had been the repositories for considerable numbers of LSA burials (see Inskeep 1986:222). At Matjes River, the initial work by Dreyer (1933), followed by that of Hoffman (1958), and Louw (1960), had accumulated between them over 100 burials (Deacon, J, 1979:78), while Fitz Simons unearthed 51 from Whitchers Cave (FitzSimons 1926), and records 23 further skeletons from one of the Tsitsikama shelters (FitzSimons 1923). At Oakhurst, Goodwin recovered a minimum of 18 burials (Goodwin 1938; Drennan 1938), while other sites such as Coldstream and those on the Robberg Peninsula were also the foci of considerable burial activity (Rudner 1971). Although the density of burials appears to be highest in the southern Cape, the pattern of rock shelter graves also extends into the western Cape as well as eastwards. At Spitzkop, a small shelter in the Albany District, at least of 15 graves were found, while further excavations at Middelkop, Vygeboom and Melkhoutboom all recovered further graves (Hewitt 1931; Deacon, H.J. 1976; Albany Museum Register), some associated with variable amounts of grave goods. Painted burial stones, while not common, were sometimes part of ritual burial inclusions, which further set the LSA archaeology of the region apart (Rudner 1971). On present evidence the majority of rock shelter burials appear to be found in the Cape coastal region (Deacon, J. 1984a:299).

The basis of this paper lies in the description of two burial complexes, one recovered from Klasies River Mouth Cave 5, (KRM5), situated on the south-eastern Cape coast, and the other from Welgeluk Shelter (WG), located on the Koonap River some 90 km as the crow flies from the Bathurst coast (Fig. 1). Both complexes were encountered in the course of excavations into LSA deposits dating from the mid- Holocene, undertaken as part of wider research projects into the LSA archaeology of the respective regions (Hall & Binneman 1985; Hall 1986). While the description of these complexes is the primary aim of this paper, the differences in the amount of ornamentation between the burials are discussed and placed within the wider archaeological context of the region.

Klasies River Cave and The Havens Cave Burials

KRM5 is situated approximately 2 km to the east of the well known main site near the mouth of the Klasies River (Fig. 1). The cave is about 90 m in length from entrance to rear with the mouth of the cave about 18 m a.s.l. and almost entirely blocked by a Late Pleistocene sand dune. The LSA shell midden within which the burials were found caps this dune. It was previously suggested by Wymer and Singer (1982), that the entire deposit at the mouth of KRM5 was archaeological. Re-excavation of the cave was carried out during January 1984 and again in May and June of that same year. These excavations were located at the entrance to the cave and adjacent to Wymer and Singer's excavations, some 20 m from the cave entrance (Fig. 2). The excavations at the entrance revealed a 1,30 m deep LSA deposit, radiocarbon dated to 4230 ± 60 BP at the base (Pta-3919). Five burials were located within 1 sq m of this excavation, while a sixth remains unexcavated but visible in the western section.

The top of the deposit was extremely disturbed due to the burial hollows as well as other disturbances (Figs 3 & 4). None of the burials have as yet been directly dated but the absence of pottery in the burial hollows and in the excavation as a whole indicates a date between 2000 BP and the Pta-3919 reading of 4230 ± 60 BP. Three sherds were however recovered by Wymer and Singer (1982) from their excavations towards the rear of the cave.

Fig. 1. Map showing localities of sites in the southern and eastern Cape.

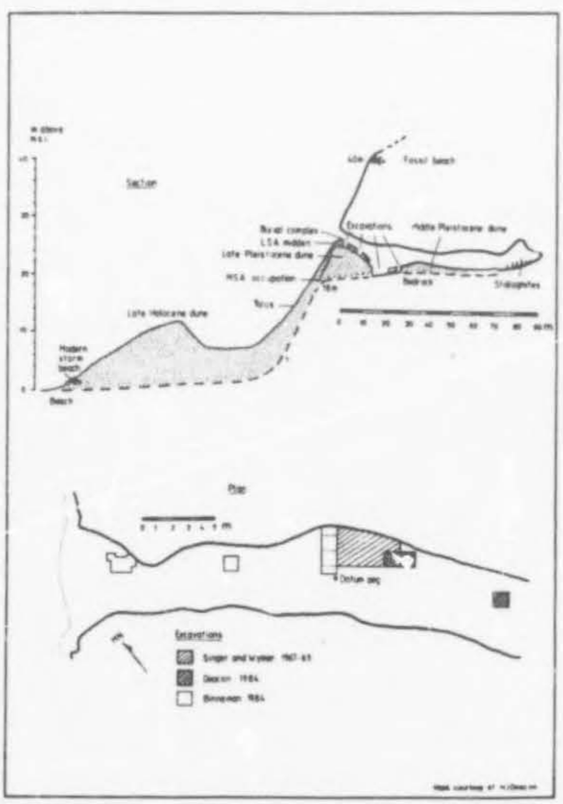

Fig. 2. Plan and section of KRM5.

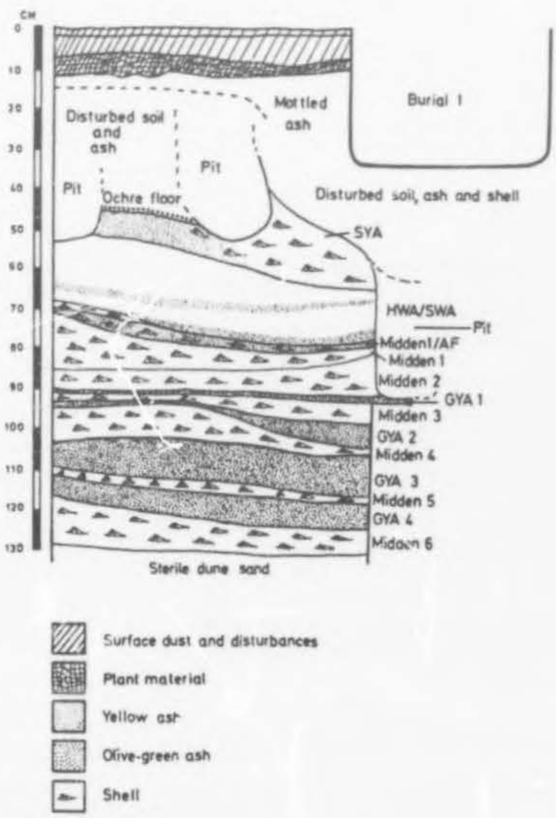

Fig. 3. Section of KRM5 excavation.

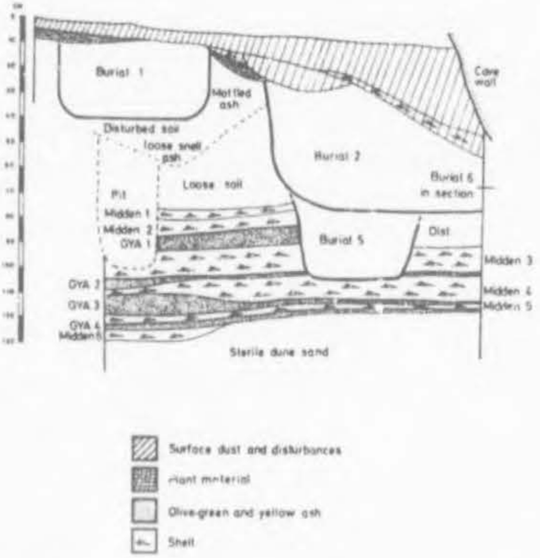

Fig. 4. Sect' ɔn of KRM5 excavation.

Stone artefacts and other cultural material have been found in the excavations. The stone toolkit consists mainly of quartzite flakes and flaked cobbles. The typical microlithic elements found in the adjacent CFB are totally absent. The commonest shellfish species in the deposit are *Oxystele sinensis* and *Perna perna*. Details of the burials are given in Table 1 while a breakdown of the grave goods is provided in Table 2. All the burials were placed in shallow hollows and were lying in a flexed position upon their left sides (Figs 5 & 6). The exception is KRM5/3, which was placed upon its right side (Fig. 5). All burials were facing in a north-easterly direction. In all cases the burial hollows had been back-filled with shell midden material which must have been derived from elsewhere in the shelter because the deposit surrounding the burials was relatively shell free.

KRM5/1. This individual was probably a young female, between 16 and 18 years old at death. The base of the burial hollow was lined with a thin layer of plant material, which in turn was covered by a layer of red ochre. A thick layer of red ochre was found below the pelvis. The whole skeleton was covered by a layer of sand mixed with red ochre. The skeleton was in a good condition, except for the nasal, maxillary and frontal sections of the skull which showed considerable damage in the form of scratch or cut marks and splintering that appears not to have resulted post-depositionally. Whatever the cause, the trauma from this damage may have resulted in the death of this individual. Red ochre stained ostrich eggshell (OES) beads were found around the neck, chest and pelvis. The way in which OES beads were found in the vicinity of the right ulna and radius suggests that they had either been embroidered onto a square of leather, or had simply been sewn together and suspended as a decorative square from the neck by another string of OES beads. Those OES beads around the pelvis were laid down in strings and may have been attached to two serrated and concave *Turbo sarmaticus* pendants which would also have been worn around the hips. These pendants had been pierced by a single hole. Around the shoulders were two serrated oyster pendants and strings of *Nassarius kraussianus* beads which were red ochre stained.

Table 1 Age, sex and orientation of skeletons, and grave goods associated with them from Klasies River Mouth, The Havens Cave and Welgeluk. (1 = side body placed; 2 = direction body faces).

No	Age	Sex	Orientation 1 2	Grave goods
KRM5/1	16-18	?	LS/NE	present
KRM5/2	18-20	?	LS/NE	none
KRM5/3	infant	?	RS/NE	present
KRM5/4	infant	?	LS/NE	present
KRM5/5	infant	?	LS/NE	present
THC/1	infant	?	?	present
WG/1	?65	?M	LS/NE	none
WG/2	?65	?M	LS/NW	pressent
WG/3	?30	?	disturbed	present
WG/4	infant	?	LS/N	present
WG/5	infant	?	LS/NW	present
WG/6	sub-adult	?	?	present

KRM5/2. This burial was that of a young male, between 18 and 20 years old at death. The skull was not located and was possibly disturbed and removed when the burial hollow for KRM5/6 (unexcavated), was dug. The bones were in good condition except for the right femur, tibia and fibula, which were white, broken and flaky. There were no grave goods with this burial and no indication that the burial hollow had been prepared in any way with ochre. The ornaments listed in Table 2 were not directly associated with the burial in any way, having been found in the pit fill.

KRM5/3. This individual was an infant with a 'rich' assemblage of grave goods associated with it (Fig. 6). An ochre and charcoal stained split cobble had been placed directly on top of the skeleton. Strings of OES beads were found around the left femur and pelvis. Around and next to the collapsed skull were *Turbo sarmaticus* 'buttons' and two *Fissurella aperta* shells, which are obvious choices for ornaments because of the natural apical apertures. The upper part of the skeleton was draped with strings of *Bullia digitalis*, *Tricolia* spp. and *Nassarius kraussianus* beads. A cormorant beak found with these shell beads was probably also part of the ornamentation. The skull was lightly ochre stained. This burial was removed to the Albany Museum *in toto.*

KRM5/4. This burial was also that of an infant and was richly decorated with four oyster pendants, strings of *Nassarius kraussianus* beads as well as some OES and *Tricolia* spp. beads. This burial was also removed *in toto.*

KRM5/5. This individual was that of an infant but had no shell grave goods. A thick layer of yellow ochre was found between the bones and the collapsed skull was red ochre stained with lumps of ochre still attached to it.

THC/1. The Havens Cave is situated in the Cambria Basin of the Baviaanskloof Mountains at the confluence of the Groot and Wit rivers, approximately 55 km inland from KRM5 (Fig. 1). An infant burial, possibly foetal, was found near the surface during test excavations at the site. A small shallow hollow was dug into a thick layer of white ash and the whole burial was covered by strings of *Nassarius kraussianus* beads as well as some OES beads. The carapace of a small tortoise *(Homopus areolatus)* was also found with the burial.

Although the sample described above is biased towards

Table 2. Grave goods associated with burials from Klasies River Mouth, The Havens Cave and Welgeluk. The part of the skeleton they were associated with is given in square brackets and ornaments found within burial fills are given in rounded brackets.

No	OES beads	*Nassarius* beads	*Turbo* pendants	*Turbo* buttons	Oyster pendants	*Bullia* beads	*Tricolia* beads	*Fissurella* shells	Other
KRM5/1	269 [neck/shoulders] 735 [pelvis] (24)	272 [neck/shoulders] (28)	2 [pelvis]	(3)	2 [shoulders]	–	(10)	–	(1 polished bone)
KRM5/2	(37)	(18)	(1)	(4)	–	(2)	(7)	–	(1 bone point) (1 bone wedge)
KRM5/3	89 [pelvis] (1)	745 [chest]	–	106 [skull] (10)	–	35 [chest]	745 [chest]	2 [skull]	1 ochred cobble [chest] 1 cormorant bill [chest]
KRM5/4	70 [?]	1108 [all over]	–	–	4 [chest]	–	14 [all over]	–	–
KRM5/5	–	–	–	–	–	–	–	–	–
THC/1	18 [?]	730 [all over]	–	–	–	–	–	–	1 tortoise car[illegible]ace
WG/1	–	–	–	–	–	–	–	–	–
WG/2	–	–	–	–	–	–	–	–	1 turtle carapace [pelvis] 1 ochred g'stone [ankles] 241 g ochre [ankles] 1 ochred g'stone [neck] 287 g ochre [neck]
WG/3	–	–	–	–	–	–	–	–	–
WG/4	264 [pelvis]	–	–	–	–	–	–	–	14 [illegible] e yellow ochre [?]
WG/5	45 [?]	–	–	–	–	–	–	–	4 *Polinicies tumidus* [?]
WG/6	–	–	–	–	–	–	–	–	1 river pebble [?] 3 *Pol[illegible]ies tumidus* [?] 1 warthog tusk [?] 1 Bov. I meta-podial [?]

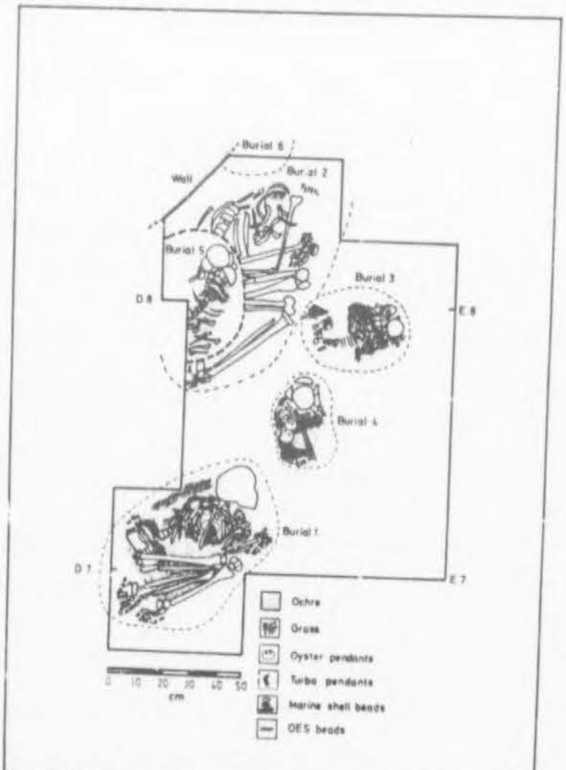

Fig. 5. Plan of burial complex at KRM5.

infants and sub-adults it is of interest that these individuals were buried with considerable amounts of grave goods, whereas no grave goods were associated with the adult.

Welgeluk Shelter Burials

Welgeluk Shelter is situated upon the coastal plateau of the eastern Cape, intermediate between the second escarpment ranges of the Winterberg and the Amatolas to the north and the Cape Fold Belt to the south (Fig. 1). The shelter has been water cut by the Koonap River through the differential removal of soft shales and mudstones below a more resistant sill of sandstone belonging to the Adelaide group. Rainfall in the area is relatively low, averaging around 400 mm a year and this is much reduced in effectiveness through high evaporation and runoff rates. Vegetation is consequently an arid adapted type in which succulents and thorny creepers dominate in what is generally known as the Fish River Scrub (Acocks 1975). This vegetation, as well as the more open thornveld to the north of the site is sweetveld and provided good grazing for pastoralists and mixed farmers over the last 1800 years, as attested by the meaning of the Khoi word Koonap or Caapna, which translates as 'fine fields' (Skead pers. comm.).

A trial excavation was initiated at WG in 1982 and work was concluded at the site in 1984, at which time the burial complex was found, comprising six individuals covered by a stone cairn, with the whole complex lying directly on bedrock. The deposits at WG have a maximum depth of just over 2 m and are well stratified with good organic

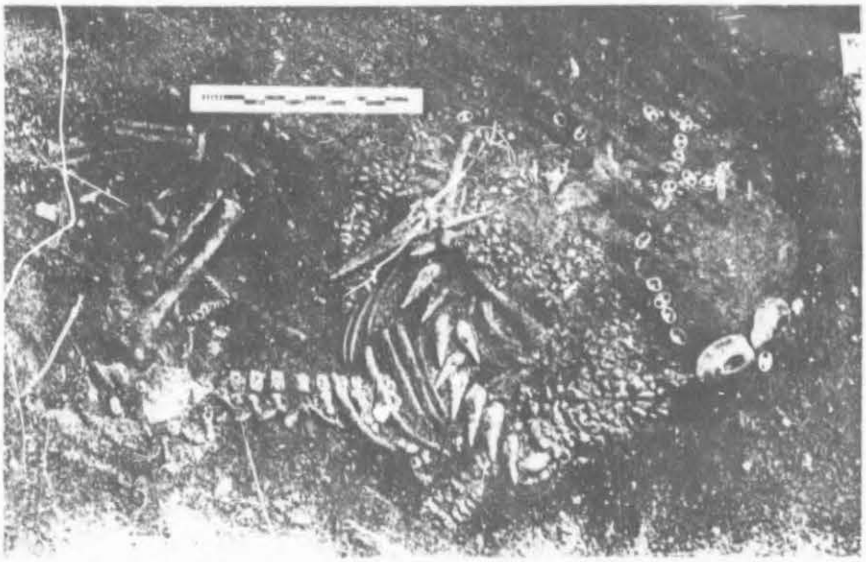

Fig. 6. Infant burial KK M/3.

preservation, especially in the upper pottery layers 1A and 1B (Fig. 7). Six radiocarbon dates have been processed, of which the basal date is relevant here because it stratigraphically lies closest to the burial complex. This charcoal sample, dated to 4560 ± 70 BP (Pta-3947), was taken from layer S1, which is a red soil, some 0,10 m off bedrock. No suitable charcoal samples were found below S1. The date therefore only provides an indication of the time at which occupation was initiated at the site. Stratigraphically the burials pre- date the 4560 ± 70 BP date, as well as the first build up of deposit, but it is not known by what margin. The rib cages from WG/1 and 2 were submitted to the CSIR for dating but bone collagen was negligible and no age determinations could be obtained. It is thought, however, that the age of the burials must lie somewhere between the basal date at WG and about 6000 years ago. This estimate is based on the accumulating evidence for the timing of shelter use in this region north of the CFB. At Edgehill, a shelter some 7 km upstream from WG, the basal deposits at a depth of 1,70 m are dated to 5500 ± 70 BP (Pta-3581), and recently discovered shelters at Adams Krantz on the Fish River, at Charlgrove on the Kat River and at the Kat and Fish River junction itself, all have deposits of 1 m or less and by extrapolation must have similar or younger basal dates to those at WG and Edgehill. An assumption is that shelter occupation reflects the wider build up of population in the region and it is therefore anticipated that open sites will also be similarly dated from 5500 BP onwards and that the WG burials will fall somewhere between this date and the 4560 BP reading from WG.

Strictly speaking, the complex at WG cannot be referred to as a burial complex, for the burials have not been placed in shafts or hollows dug into older deposits but, as mentioned above, lie directly on bedrock. For convenience sake the term burial will be retained here. The complex was first encountered in sq K6, in the form of flat waterworn sandstone river slabs which made up the cairn (Figs 7 & 8). Completion of excavation in sq J6 exposed most of the cairn. From north-east to south-west the cairn measured some 1,50 m across, with the apex lying just over 0,30 m above bedrock at that point. The cairn was located more towards the rear of the shelter. A smaller 'cairn' was exposed immediately to the south-west of the main cairn but because it straddles the line between J and I6, it remains unexcavated. This smaller cairn measures 0,65 m across (Fig. 8). It is possible that it also covers a burial for the central stones had slumped downwards over its centre. It may mark a hearth but this is unlikely because a small hearth was found adjacent to this cairn in the western corner of J6, associated with poorly preserved charcoal and some charred bone, but not marked with stones in any way.

Evidence from the disturbance of some of the burials and the rather jumbled nature of the slabs in the north-eastern sector of the cairn suggests that two and possibly more burial episodes are represented, and that the primary cairn has been somewhat 'robbed' as the apex shifted to the south-west.

In section it was apparent that some care had been taken in the selection of suitable slabs and the placement of these in the construction of the cairn. On average the depth of the cairn at any one point comprised three slabs laid one upon the other (Fig. 8). Three of the slabs were red ochre stained on the upper surfaces but were not grindstones. While this ochre may have been deliberately applied it may also have resulted from contact with ochre nodules from the overlying deposits of Layers 4A and 4B which, relative to the layers above, were rich in ochre as well as OES beads and fragments. The soil fill between the slabs also had pieces of ochre, OES fragments and flecks of charcoal but probably occurred there through the downward movement of the overlying deposits.

Six individuals are represented in the complex (Figs 9 & 10). The basic data concerning the burials is given in Table 1, while a breakdown of the grave goods is provided in Table 2. A brief description of the burials follows.

WG/1. This burial comprised a complete adult in-

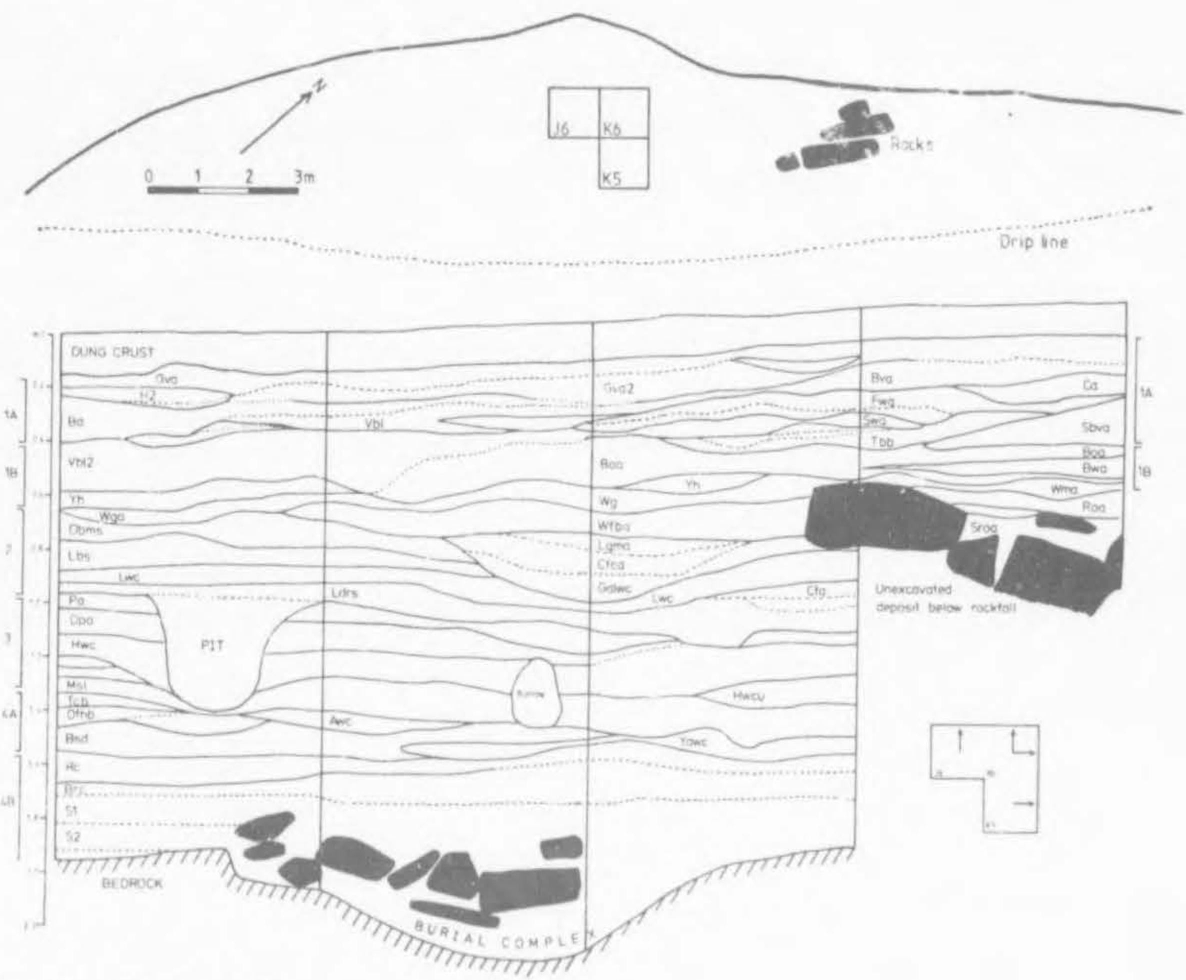

Fig. 7. Plan and section at WG.

dividual, probably a male, of the order of 65 years old. The burial was centrally placed below the apex of the cairn (Fig. 8). No grave goods were associated with the burial and there was no sign of ochre staining.

WG/2. This burial was also an adult which was located under the north-eastern sector of the cairn. The burial was also probably a male, approximately 65 years old at death. The cairn at this point was not well defined and the feet were uncovered. The lower limbs were extremely fractured and it is possible that this resulted from later burial episodes and the relocation of some of the burial slabs. Further disturbance is also evident in the position of the cranium, which has been moved to the south-west of the postcranial skeleton and has also been rotated and was found lying on the parietal bone. Within the 'V' formed by the lumbar vertebra and the flexed femora, lay the complete carapace of a fresh water turtle, *Pelomedusa subrufa*. The turtle carapace slightly overlapped a squarish slab of sandstone to the south-west which suggests that this stone was a formal part of the grave rather than the burial cairn. Clustered around the ankles were several large lumps of red and yellow ochre, associated with a large red ochre stained sandstone upper grindstone. In the same place ten unretouched silcrete flakes and flake fragments were found as well as two silcrete cores. All pieces were creamy grey in colour. Another ochre cluster was found adjacent to the left proximal humerus, also associated with a small red ochre stained dolerite upper grindstone.

WG/3. This individual was represented only by the parietal and occipital bones and was about 30 years old at death. The cranial remains lie immediately to the south of the cranium of WG/1 and it is probable that the rest of the skeleton is located in the unexcavated deposit to the north-west (Fig. 9). As with WG/2, the cranium has been disturbed and again indicates that the complex comprises a series of separate burial episodes. No grave goods can be associated with this individual.

WG/4. This is the first of two infants located. It was relatively intact and positioned just to the north of the feet of WG/1. A string of ochre stained OES beads was found around the waist as well as a single lump of yellow ochre.

WG/5. This was the second infant and had been disturbed. It is possible that the proximity of two infants of like age suggests some relationship, possibly twins. Four

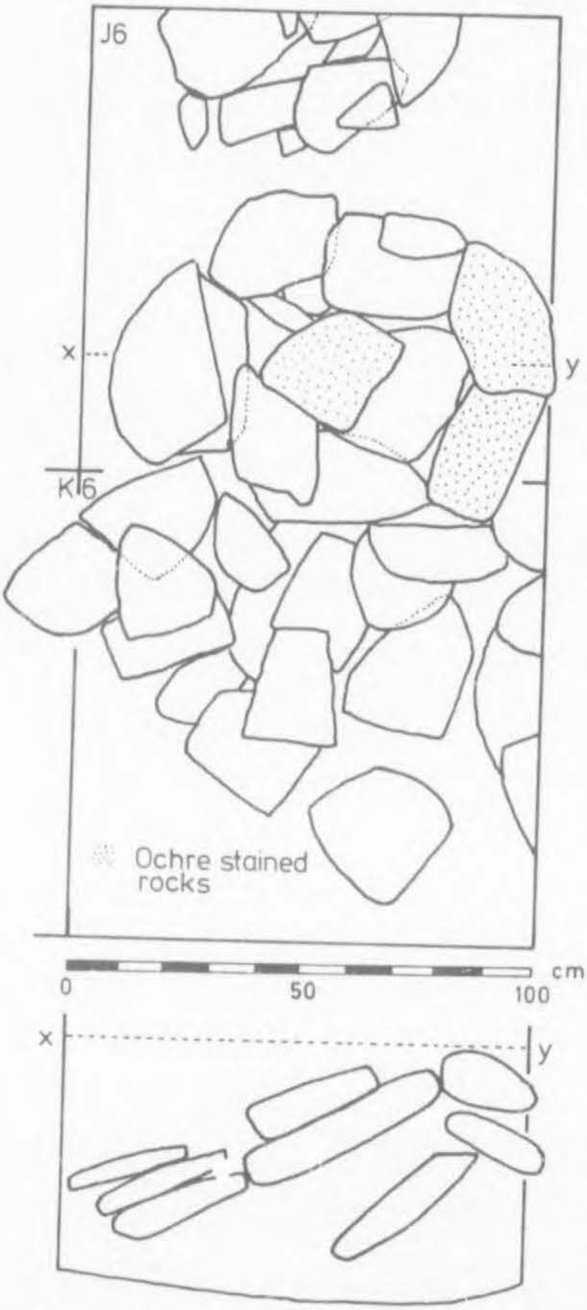

Fig. 8. Plan and section of burial cairn at WG.

Polinicies tumidus shells were found upon the chest. Three were positioned so that the anterior bases were joined and presumably this facilitated threading through the pierced whorls so that the shells could be suspended in a cluster. Ochre stained ostrich eggshell beads and a palm sized river pebble were also found but their direct association was not clear.

WG/6. These are the remains of a completely disarticulated sub-adult lying below the cranium of WG/2 and extending into the section to the north-west and therefore has not been completely recovered. Within this complex of bones three marine shells of the species *Polinicies tumidus* were found and it is possible that they were grave goods associated with this individual. According to Kilburn and Rippey (1982), the range of this species extends only down to the Transkei coast indicating a source point some 200 km distant from the site. These shells were in a crumbly condition but reference to the four similar shells found with WG/5 suggests that they were pierced on the lower whorl and suspended around the neck in a cluster. A complete metapodial from a steenbok sized bovid was also found amongst the human remains. Initially it was thought that this was a chance in clusion with the burial but subsequent study of grave goods associated with burials from Middelkop Cave in the Suurberg (Fig. 1) (Albany Museum H.S. 198 and 199) suggests that the metapodial was a formal part of the grave goods. With the Middelkop burials seven metapodials were found, five of which had been punctured on the proximal articular surfaces that were also ochre stained. One of the metapodials from Middelkop H.S. 199 had a number of paired nicks running down the anterior surface of the bone. Also found with the WG/6 remains was a poorly preserved warthog tusk, (*Phacochoerus aethiopicus*), and reference to the Middelkop material again suggests that this too was a formal part of the grave goods, four well preserved tusks having been found in association with the Middelkop burials.

These burials appear to represent a minimum of two and possibly three separate burial episodes. The disturbance of WG/2, 3 and 6 may have been caused by the later burial of WG/1, while WG/4 and WG/5 may be associated with either WG/1 or WG/2, or alternatively, may have been buried at completely different times. The presence of the same species of marine shell with WG/6 and WG/5 may indicate interment at the same time. As with the KRM5 burials and the single burial from THC, the infants and the sub-adult have been given a large portion of the grave goods, while the adult WG/1 is associated with none. The cairn enclosing the complex may be interpreted solely in terms of a protective 'shell' around the burials in order to keep off scavengers.

Discussion

In this section general approaches to the interpretation of burial remains are discussed briefly, followed by a review of the ethnographic literature on death and burial. What is of specific concern is the search for principles which may influence the placement of grave goods with the deceased and which may have some utility for explaining the variability already described for the KRM5 and WG burial complexes.

It has long been recognized that burial practices can be highly variable in all aspects, even within the same social system, and workers have concentrated on the nature of the link between the living and the dead in order to find explanations for this variability (Ucko 1969; Binford 1972; Hodder 1982; Pearson 1982). Two general viewpoints can be isolated. The first is presented by Binford (1972) who anticipates a logical transference of the living social structure into the realm of the dead and, consequently, mortuary variability reflects the individual's living status. Within hunter-gatherer groups these are derived from the

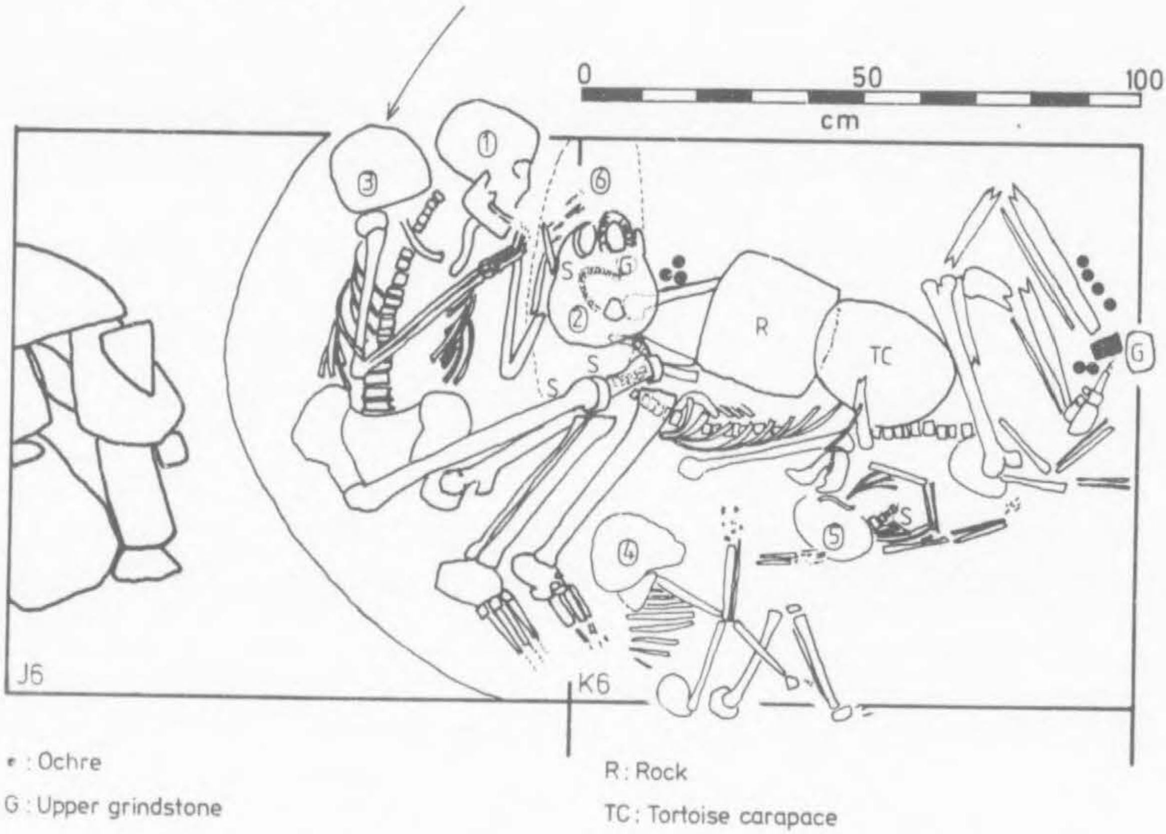

Fig. 9. Plan of the WG burial complex. The circled numbers refer to the order of the burials as presented in the text.

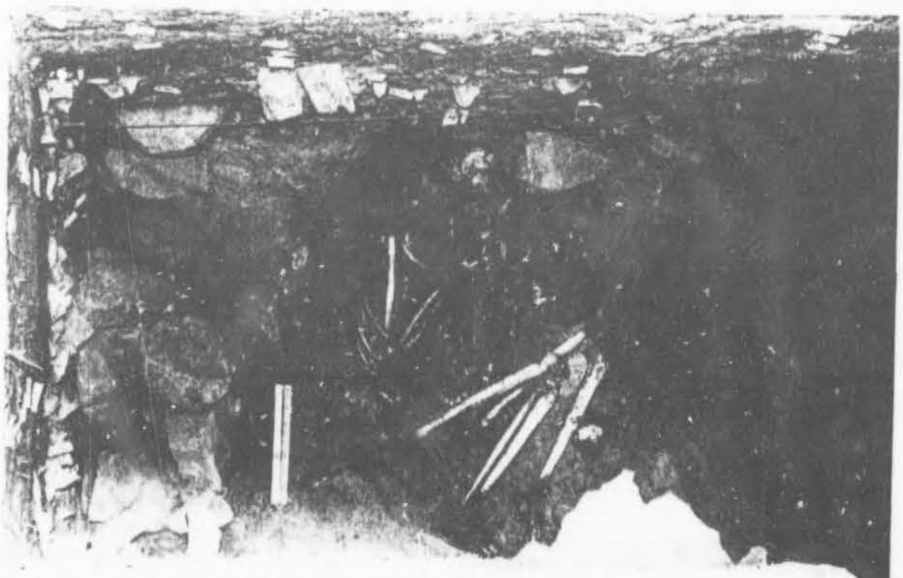

Fig. 10. Burials WG/1, 2 and 3. The cranium of WG/4 is just showing to the right of WG/1's left tibia.

pivotal roles of age and gender. On the basis of this one-to-one correlation between the the social persona in life and material remains in death, Binford (op cit:232), proposes that among hunter-gatherers, young people are involved in few duty-status relationships and consequently have low rank. Rank accrues with age as an individual participates in a broader network of social relationships and this is symbolised through the place of the burial and the 'wealth' of goods placed in the grave. Gender distinctions are made through the types of grave goods.

A wealth of ethnographic detail presented by Ucko (1969), however, indicates that funeral and burial symbols can bear little resemblance to a person's living status. This contradiction provides a basis for the second approach to burial variabilty laid down by Hodder (1982) and Pearson (1982). They suggest that attitudes to death are formulated within the ritual sphere which tends to present an ideal picture of the society or an individual's secular role within it and therefore burial ritual 'relates' to in some way rather than 'reflects' the living structure (Pearson 1982:101). In Hodder's words, "In death people often become what they have not been in life" (Hodder 1982:201). If such ritual inversion is in operation, the task of interpreting burial remains becomes even more difficult. Some indications that an ideal picture is being represented in the burial com plexes described here is suggested by the elaboration in the graves of the very young as opposed to older individuals. Examination of southern African ethnography suggests a relevant framework in which this inversion can be placed.

Schapera's review (1930:160-172) on funeral and burial customs collates several sources but many appear to be hearsay or composite reconstructions. These data are therefore presented in general terms, whereas the archaeological data show considerably more variability than Schapera could anticipate from his sources (Deacon, J. 1984a:298). In terms of the deceased's possessions, it is generally stated that all are placed in the grave. Women are buried with all their ornaments, while a man's weapons are also interred, or if too long for the burial pit, are placed on top of the grave or hung upon a nearby bush (Schapera 1930:160 ff.; Roos 1931). Within these data, as well as those presented by Bleek (1928) for the Naron, there are inconsistencies which suggest that the generality concerning the placement of all a dead person's belongings with him or her in the grave is questionable. Bleek records that all Naron women valued their possessions and that as they grew older these were handed on to their daughters. Furthermore, ostrich eggshell beads were not buried with the dead (Bleek 1928:10). Later, however, it is recorded that all belongings are placed with the body at death (op. cit.:35). For the !Kau, a northern Namibian San group, Roos (1931) states that all an individual's belongings are placed within the grave, but he also noted of the one funeral which he witnessed, that all the bone and iron arrow heads were removed and passed on to the eldest brother (Roos 1931:83). These few examples suggest that not all artefacts went to the grave and that some at least were inherited because they were valued tools or ornaments.

Examination of recent ethnographies suggests a broader social context in which the relationship between possessions and death can be placed. What is more important than the inheritance of material goods is the inheritance of social relationships which may still have been current at the time of death. Among the !Kung, there exists the institution of *hxaro*, which is a method of social storage in which exchange partners are established in other land right areas (n!ores), thereby creating reciprocal responsibilities with a partner. One reason for operationalizing a *hxaro* tie is to secure access to the food resources of another n!ore when scarcities are present in your own (Wiessner 1982). Any one individual may have as many as 16 *hxaro* partners, chosen for their location in different areas so that risk can be spread as widely as possible. The establishment and maintenance of *hxaro* networks is undertaken through the discrete delayed exchange of non-food gifts, such as ostrich eggshells, ostrich eggshell beads, arrows, blankets and so on. Among the Kung, 69 % of a person's possessions have been accumulated through *hxaro* exchange. The other 30 % while recently made or bought, will also eventually find their way into the exchange network (op. cit.:70).

The relationship between death, *hxaro* ties and the material goods which facilitate them may provide a basis for explaining the grave good variability in the burial complexes described here. The key point is that an individual's possessions are part of a continuous cycle of exchange, even after that person has died. In old age, Kung are increasingly dependent upon their kin for support as their productive potential declines. In order to aid kin in their support and expand sibling hxaro ties, an older person's own hxaro ties are gradually shed and as one of Wiessner's informants put it, "We are too old, we don't want them any more. What would we find to give?" (Wiessner 1982:74). The only new *hxaro* ties taken up by the elderly would be with their grandchildren. At death, "Some possessions are buried with him or her, but most are passed on to remaining *hxaro* partners by children with a request for return so that the *hxaro* network will not be broken" (Wiessner 1983:4). At the other end of the age scale great care is taken by immediate kin, especially grandparents, to inculcate the *hxaro* principal in the very young and the first symbolic exchanges occur when the child is between six weeks and six months old. Thereafter, many presents accrue to the child but no reciprocity is required. These gestures symbolically emphasize the value of the child and that, "God shouldn't take him or her away" (Wiessner 1982:72), and certainly the death of a child is a painful experience, perhaps more so than that of an adult (Shostak 1981:317). Children are sheltered from the death of a child because if they see the body they themselves will become ill (Shostak 1981:203).

Lewis-Williams (1984), has drawn attention to the possible link between painted burial stones, trance and their symbolic placement within graves as a link between the living and the dead. The ethnography is not helpful in assessing this possibility. Wiessner (1983), does point out that there is little in common between the ritual associated with puberty rites, male initiation and trance and a San funeral and that the central metaphor of the eland is absent in the latter, a funeral being no more than an "elaborate farewell" (Wiessner 1983:4). The intensity of trance healing for seriously ill people and those near to death varies with the standing of the individual in the group and the number of close kin nearby but it does raise the possibility that the grave good elaboration within the infant burials is related to the intensity of trance healing attempted prior to death.

The relationship between *hxaro*, material goods and death may explain the grave good variability evident in the cemeteries described here, and perhaps further afield. Given this relationship we might expect that individuals who die well after their prime *hxaro* years will no longer have the material possessions for grave goods while those unfortunate to die at a very young age may have had the possessions because the reciprocal side of their exchange relationships have not yet been formalized.

The WG and especially the KRM5 complexes suggest that, in contrast to Binford's (1972) predictions, material grave good elaboration is inverted and that the infant and child burials have been given the most attention. Relative to the KRM5 burials, the WG complex is poor in grave goods and yet those items which may have been most valuable in exchange, such as marine shell and ostrich eggshell beads, are found in the infant burials and possibly with the sub-adult as well. The adult burial WG/1, has no grave goods whatsoever, while those with WG/2 are predominantly ochre and ochre stained grindstones which admittedly cross cuts expectations, but may reflect the obvious but speculative possibility that this individual was a medicine man. Within the KRM5 complex the ritual elaboration for the infant and child burials is more marked, as well as for THC/1, whereas the adult burial again has no grave goods. What this may be signalling is that infants have not yet formalized exchange ties and can accumulate ornamentation which is not committed to partners outside the group. Furthermore, and in reference to the theoretical position outlined above, the ritual elaboration for the infants suggests that an ideal situation is being portrayed and that the 'richness' of these graves symbolises the denied potential of a prospective producer and that he or she becomes in death what was not to be in life. This is obviously not to deny that adult burials without grave goods were social and economic 'paupers', and to interpret them as such could be misleading. Status may be reflected in other ways and not merely through grave goods. In this regard the central position of WG/1 below the burial cairn contrasts with the peripheral placement of the two infants and while this is purely speculative, the accumulation of more data in the future may highlight such features as significant patterns.

The discussion so far has focused upon providing a framework for assessing grave good variability which has drawn heavily upon Wiessner's observations concerning *hxaro*, material goods and death (Wiessner 1982, 1983). It has been primarily concerned with variability at the within complex scale. As is clear from the descriptions of the WG and KRM5 burials however, the two complexes contrast markedly in their respective 'richness'. The KRM5 complex may be seen as a part of Goodwin's LSA 'cultural efflorescence' in the southern-Cape, while the WG complex falls outside this range (Goodwin 1948). To interpret this 'richness' solely in terms of direct access to the sea, and hence suitable raw materials for ornamentation, is simplistic. If raw material availability was the dominant factor in encouraging ritual elaboration then the absence of grave goods within the adult KRM5/2 burial is anomalous. This emphasizes that social considerations intervene in the allocation of ritual resources. Furthermore, the evidence from Matjes River indicates that it is only in the burials from the Wilton layers that the full diversity of marine shell, ostrich eggshell and bone ornamentation is realized, the preceding Albany burials being treated predominantly with ochre, and yet access to these materials must have been similar (Louw 1960:133-34). How then can these disparities in grave good elaboration in space, as represented by the WG and KRM5 complexes, and through time, be explained?

A key to this question is suggested by Childe who noted that in stable societies very little, if any, of a person's wealth found its way into the grave (Childe 1945:17). While Childe is referring in part to highly stratified societies, ethnographic evidence suggests that the same relationship between stress and stability in southern African hunter-gatherer societies and ritual elaboration also applies. At the ethnographic time scale ritual elaboration is known to fluctuate hand in hand with seasonal aggregations and dispersals of groups (Lee 1979). One reason for this is to maintain and emphasize economic and social dependencies when larger group sizes may give rise to friction which can threaten these. Archaeologically, rock painting in the Natal Drakensberg has been linked to increased trance performance during the wet summer months when aggregation of groups may have occurred (Lewis-Williams 1981:114). Returning to the temporal scale, the relationship between ritual intensification and stress has been addressed by Johnson who notes, "Intensification of ritual, however may signal a system in trouble rather than one doing particularly well. Conversely, absence of elaborate ritual need not be taken as evidence of a benighted population so occupied with the struggle for subsistence that they have no time for more 'intellectual' affairs" (Johnson 1981:406). This idea is explicitly addressed by Wadley in an innovative interpretation of the Wilton, in which the artefactual elaboration of this period is viewed not as an economic and social success story but as a signal of stress, during which territories were restricted and resources, both natural and human, were at a premium (Wadley 1986). Consequently, this intensification during the Wilton is interpreted as the fuel which feeds increased exchange and networking between groups in order to overcome these difficulties. If the descriptions given by Louw (1960), for the differences between the Matjes River Layer D burials (?Albany), and those from Layer C (?Wilton), are correct, then the grave good elaboration in the Layer C burials may be seen as a further indication of stress during this period and an overt 'social advertisement' during a time of relative instability (Pearson 1982:112). The 'richness' of the KRM5 burials relative to those from WG in this scheme suggests that the former complex was subject to a context in which stress was higher than in the latter.

In searching for a cause which may have prompted instability during the Wilton, the role of environmental deterioration is posited (Wadley 1986). The absence of archaeological occupations dating to the early/mid-Holocene from the regions inland of the Cape Fold Belt (Deacon, J. 1974), has been somewhat modified by the chronology of Jubilee Shelter in the Transvaal (Wadley and Verhagen 1986), but occupation nevertheless still appears to be sparse and patchy relative to the Cape coastal regions (Wadley 1986). Clearly a first line response by hunter-gatherers under these conditions was to reduce absolute population, and certainly social networking in these circumstances may have increased in order to secure suitable mates. The notion, however, that populations spilled over into the Cape coastal regions is some what mechanistic given the possible disparity between the time scale over which environment changed and the shorter term response to perceived stress through out migration. While environmental stress may have compounded the ritual elaboration evident during the Wilton of the southern and south-eastern Cape it is felt that this is unlikely to have done so through the movement of more people into the area from the interior.

The model favoured here is one in which the settlement and demographic changes evident for the terminal Pleistocene/Holocene boundary (Deacon, H. J. 1976; Deacon, J. 1984b) continue to develop, giving rise to increasing subsistence intensification within smaller resource ranges. Perhaps what was of most importance for the continuation of this trajectory, was the development of ritual permanence in which places became central in the enactment of inter- and intra- group social and economic relationships (Bender 1985). The seeds of this development may be seen in the early burial of people within caves in the Albany and elaborated in the Wilton as increasingly smaller and perhaps socially firmer boundaries were established that required more intensive social networking in order to cross those boundaries. It is possible that the strongest indicator for ritual and greater residential permanence in this area comes from the placement of burials within caves and rock shelters, which were the foci of daily domestic life as well, whereas the ethnography indicates a strong avoidance principal between a residential camp on the one hand and death and burial localities on the other (Schapera 1930; Silberbauer 1981; Wiessner 1983). The elaboration in the LSA burials of the southern Cape may therefore be seen as an *in situ* development related to circumstances specific to the region. It remains to discuss briefly what these circumstances may have been.

As mentioned above, the elaboration of grave goods within Wilton burials of the southern Cape appears to correlate with the wider archaeological evidence for greater tool and ornament manufacture. While it is suggested that this intensification in the manufacture of tools and ornaments is possibly related in some way to scale dependent stress, it may also reflect the greater degree to which relative organizational complexity in the form of subsistence intensification, residential semi-permanence and ritual foci could be elaborated within the limits of the local environment. In the southern Cape the CFB runs close to the coast, consequently squeezing the coastal plain into a relatively narrow band (Fig. 1), and thereby providing a diversity of coastal and inland habitats within a small area. To the east and west the coastal plain broadens and the immediate geographical complimentarity of habitats decreases. Also, these areas lateral to the southern Cape become seasonally more specific in, for example, rainfall.

It is suggested that the geographical proximity of diverse habitats in the southern Cape may have been one factor in encouraging the scenario sketched above. One indicator of this habitat complimentarity is suggested by the radiocarbon profile along the southern Cape coast and eastwards. At coastal sites such as Nelson Bay Cave and Matjes River, LSA occupation is well established by about 12 000 BP (Deacon, J. 1979, 1984b), and it is probable that other sites along this stretch of the coast, such as Coldstream, will have similar basal dates. Moving to coastal sites to the east, the exploitation of marine resources appears to gather momentum only from about 6000 years ago as represented at Klasies River (Wymer & Singer 1982; Binneman in prep.), Cape St Francis and Kabeljous River (De Villiers 1974; Thackeray & Feast 1974; Binneman in prep.), and at Chalumna River (Derricourt 1977). While the core southern Cape area is the only coastal region with terminal Pleistocene LSA occupations, sites all along the adjacent CFB are consistently occupied from 15 000 years ago onwards (Deacon, H. J. 1976, 1979; Opperman 1978; Deacon, J. 1984b). What these chronological profiles suggest is that the CFB provided a relatively optimum habitat for LSA hunter-gatherers which was complimented in the southern Cape by the proximity of the coast there. It is perhaps no coincidence that the increased exploitation of coastal habitats eastwards of the southern Cape as well as the riverine habitats inland of the far eastern extension of the Cape Fold Belt from about 6000 years ago correlates with the ritual elaboration evident in the Wilton burials from this same period. What this may signal is that population packing in the optimal areas of the Cape Fold Belt and southern Cape reached an organizational break point which could no longer be sustained and consequently, from the mid-Holocene onwards, LSA groups had to reconfigure socially and economically. This may have been encouraged by environmental changes for the better. The ritual elaboration evident in the Wilton burials of the southern and south- eastern Cape is therefore not so much a product of social stress induced by resource failure and access to mates because of low population densities, but of stress imposed on the organizational limitations of hunter-gatherer groups attempting to 'stay put' within relatively confined areas which consequently decreased the palliative role of mobility in dealing with social problems.

Summary

This paper has examined the grave good variability of the KRM5 and WG burial complexes, using the ethnographic observations on *hxaro* exchange as an interpretive framework. We have suggested that there is a relationship between the amount of grave good elaboration and the age of an individual at death and that the number of formal exchange relationships that individual had, forms the determining link. Contrary, however, to the expectation that ritual elaboration as expressed through ornamentation increases with age, the KRM5 and WG data suggest that greater ritual elaboration was given to the juveniles and the very young, because exchange for them was a symbolic intra-group practice with no commitment to reciprocity. Consequently, ornamentation was available for placement in their graves. The material 'wealth' of older people who died was, however, 'recycled' so that intact inter-group exchange commitments could be reallocated and maintained.

A second concern of this paper has been to discuss the regional and temporal variability in grave 'richness' using the KRM5 and WG complexes as examples of this variability. The KRM5 complex was ritually elaborated to a greater extent than the WG complex and we see this as a further dimension of Goodwin's cultural 'efflorescence' in the LSA of the southern Cape from the mid-Holocene. This is interpreted, however, as signalling a stressed social system in the southern Cape, brought about through relatively higher population densities and the increased demands this placed on *hxaro* exchanges for the maintanance of inter-group relationships. It is suggested that one factor in permitting higher population densities was the close proximity of complimentary resource zones in the southern Cape. In this scheme, the WG complex indicates relatively lower population densities and a concomitant decrease in exchange intensity.

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APPENDIX II

Hall, S. 1986. Pastoral adaptation and forager reactions in the eastern Cape. *South African Archaeological Society Goodwin Series* 5:42-49.

PASTORAL ADAPTATIONS AND FORAGER REACTIONS IN THE EASTERN CAPE

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ABSTRACT

This paper presents historical evidence from the eastern Cape which indicates that at the time of European contact, the coastal plateau south of the Winterberg was favoured for settlement by pastoralists and agropastoralists, whereas hunter-gatherer occupation was confined for the most part to the north in the mountain escarpments. Some environmental factors influencing this distribution are discussed. Against this backdrop, the discrete distributions of two rock art motifs (cattle and fat-tailed sheep) are examined, and these are interpreted as representing successive stages in the assimilation and displacement of hunter-gatherers from pastorally favoured habitats. Other archaeological evidence from an excavated pottery sequence is given to bolster this interpretation.

Introduction

From the late 17th century onwards, an increasing number of European travellers penetrated the eastern Cape and described the indigenous peoples they encountered. Whereas the preoccupation of the colonial authorities and the Dutch graziers with the acquisition of domestic stock may have biased these travellers' accounts in favour of pastoralists, it is clear that encounters with hunter-gatherers were rare. Pastoralists and agropastoralists held sway over much of the landscape. This situation is most apparent for the areas south of the escarpment highlands, variously known as the coastal plateau and coastal forelands. In the vicinity of the lower Fish River (Fig. 1), the social landscape was fairly complex and fluid, with pure pastoralists, some of mixed Khoi and Xhosa descent (Gonaqua), struggling to maintain traditional grazing ranges in the face of Xhosa expansion from the east and colonial movement from the west (Giliomee 1979; Peires 1981).

Amongst this pastoral, agropastoral and colonial milieu, occasional references to 'Bushmen' are made. Le Vaillant had the services of several Bushmen as guides who he hired at the Sundays River. These people were referred to as 'good Bushmen' because they herded a few cattle and did not pillage other pastoralists' herds (Le Vaillant 1790). Similarly, Sparrman (1786), also on the Sundays River, encountered 'Bushmen' who were living with Gonaqua pastoralists and, further to the east, Steedman (1836:280) recorded a group of 120 'Bushmen' who were subsisting off elephant. They exchanged the ivory for corn and tobacco from neighbouring agropastoralists. It is only within the more rugged escarpment areas to the north of the coastal plateau that a stronger and better defined forager presence was encountered. Barrow (1806), for example, found that 'Bushmen' were still numerous in the Sneeuberg and he also mentions that the Winterberg (Fig. 1) was uninhabited, except for 'Bushmen'.

The historical dominance of pastoralists and agropastoralists along the coastal plateau has long been noted. Hewitt concluded that, at the time of contact along the coastal foreland, "there is no evidence that Bushmen occurred there except as almost solitary stragglers", and Derricourt's historical reconstructions show the same pattern (Hewitt 1920:312; Derricourt 1974, 1977). It appears that foragers had been geographically displaced into regions that were relatively inaccessible to pastoralists. Also, the paucity of references to hunter-gatherers becomes even more explicable in light of the contexts in which they were observed, namely that by historical times assimilation into pastoralist and agropastoralist groups was nearly complete. That such assimilation did take place is attested by the make-up of the Xhosa isiThathu clan which, in part, traces its origins to a San base (Peires 1981:24). Peaceful interaction, however, was not universal and whenever the Winterberg 'Bushmen' met the amaPhathabe there was "a battle of extinction," but encounters with the amaNdlambe on the other hand were peaceful (Williams 1983:161). There are some historical records that point to the processes by which assimilation of foragers into pastoralist and especially agropastoralist groups came about. Some indicate that economic interdependencies were forged, of which the exchange of agropastoralist cattle, corn and dagga for forager rainmaking prowess is well known. The Pondomise chiefs kept "the remnants of a Bushmen family" who were their "official rainmakers" and the "Bushman" in the district of Tsolo "lived largely on the stock paid to them by the Pondomise for bringing rain to the country" (Macquarrie 1962:28-30). These historical records of barter transactions, especially between foragers and agropastoralists, provide a basis for the interpretation of some of the changes visible in the archaeological record of the contact period, and may also have influenced the incorporation of cattle into Bushman rock art. One of the aims of this paper is to examine briefly the historical and archaeological evidence for various types of forager, pastoralist and agropastoralist interaction. First, however, the environmental basis for pastoralism along the coastal areas and the Winterberg is described because this provides an essential background against which these interactive processes took place.

Pasture and Water

The area under consideration comprises the Winterberg section of the second escarpment in the north and the coastal plateau south of this range, through which the lower Fish River runs (Fig. 1). The relief of the coastal plateau is generally undulating, but is broken by the eastern extension of the Cape Fold Belt, upon which Grahamstown is located. The area between the Cape Fold Belt and the sea is referred to as the coastal foreland (Badenhorst 1970).

Two broad categories of pasture occur in the region. These are the well known sourveld and sweetveld, with an intermediate type called mixed-veld. Sourveld, in particular, provides quality pasture only during summer and this influences significantly any free range pastoralist strategy. The importance of this distinction to present day stock farmers is somewhat reduced because of seasonal supplementary feeding. The major sourveld area lies above the 1 220 m contour in the Winterberg (Fig. 1). Parts of these upland pastures have an extremely high carrying capacity, where one Large Stock Unit can be supported on 2 ha. However, whereas this carrying capacity may appear to provide a prime area for pastoralists, the quality of the pasture is retained only for a limited period of the year. Several interrelated factors give rise to this, the most important of which is the high rainfall that is in excess of 700 mm per year. This precipitation produces relatively leached, nutrient poor soils and also encourages proportionately greater flower and seed production which rapidly depletes the grass of much of its leaf nutrient (Childs 1971). Furthermore, the harsher and earlier onset of frosts at these higher altitudes rapidly lignifies and envelops any remaining nutrients. The high carrying capacity of the Winterberg sourveld is therefore limited only to the summer growing season, and any traditional free range pastoralist groups would have had to move elsewhere once the growing season ended because, no matter what bulk of graze is available, stock will lose condition rapidly and die. The availability of the most important pasture grass, *Themeda triandra*, is even more seasonally restricted to early summer, after which it is replaced and overshadowed by coarser species.

Quite obviously, the limited summer nutrient life of the sourveld pasture requires that in order to maintain herds, alternative pastures must be found from late summer. The problem can be solved through the removal of stock to lower lying areas, such as the valleys to the south, in which the Koonap and Fish rivers flow (Fig. 1). In these habitats the mean temperature is higher, and there is considerably less rainfall (300-400 mm) that is diminished in effectiveness through high evaporation rates and consequently the nutrient status of the soil is higher. Overall, these factors combine to produce sweetveld in which the late summer/autumnal nutrient drop-off is considerably less than in the sourveld. Sweetveld therefore retains its nutritional

Fig. 1. A map showing the area under discussion and the location of known rock art panels in which cattle and fat-tailed sheep are depicted.

value in the winter months after the growing season has ended. The carrying capacity of the sweetveld is considerably lower than for the sourveld, but perhaps is of more importance to a free range pastoral system in that, if it is well managed, the pasture can maintain stock on a year-round basis (Comins 1962).

Moving further to the south into the Cape Fold Belt and the coastal foreland, rainfall increases steadily to as much as 900 mm and this gives rise to more sourish veld. Because of the marine influence, frosts are rare and the autumn nutrient drop-off is again not as marked as in the higher ground of the Winterberg. Furthermore, the relatively deeply incised river valleys running across the coastal foreland retain a more succulent and sweeter vegetation (Martin & Noel 1960), and so a range of grazing opportunities occur within relatively short distances. The potential of this area for stock farming was realized rapidly by the early Dutch graziers.

The essential pasture contrast in the region is one of sourveld/-summer/upland grazing and sweetveld/all year round/lowland grazing. There are no early travellers' records that specifically describe seasonal transhumance of Khoi pastoralists between the low lying areas and the Winterberg, but early European stock farmers in the region sometimes possessed both sweetveld and sourveld farms, between which stock was moved seasonally in order to retain both the condition of the stock and the quality of the sweetveld that would be rested in summer (Childs 1971). Possibly this was a pattern learnt from Khoi pastoralists. However, regular upland-lowland seasonal transhumance appears not to have been absolutely essential. Van Reenen recorded that in the vicinity of the Sneeuberg, the inhabitants preferred to use the Karoo plains for grazing their sheep "and only use the Sneeuberg when they are forced to do so" (Blommaert & Wiid 1937:241).

Records of seasonal transhumance among the Xhosa are somewhat more detailed and although the ideal situation would be to graze stock all year round as close to the permanent homesteads as possible, this could not be done always. Most of the Xhosa's permanent homesteads were located in the predominantly summer rainfall areas east of the Fish River. The Mbalu chiefs maintained their settlements in the vicinity of the Tyhumie Valley at the base of the Amatola range that was predominantly sourveld and ther[illegible] provided summer grazing. During winter they were observed [illegible]ing their stock down to the sweetveld in the vicinity of the middle reaches of the Koonap River (Fig. 1). Similarly, the Ndlambe moved their stock between the sourish veld along the coast in the vicinity of the Bushmans River and the sweetveld of the Fish River valley to the north (Peires 1981:8-9).

Of significance about both the patterns given above is that the winter move was into a major river valley where permanent water could be found that would be essential for cattle herds. In the area under consideration, there is a northward and eastwards trend towards summer precipitation and the Winterberg highlands receive 70% of the annual precipitation between October and March (Badenhorst 1970). During winter, surface water becomes increasingly limited to the major rivers south of the escarpment and although there is a 65% probability that rivers such as the Koonap will stop flowing and contract into disconnected pools (River Flow Data 1978), water will always be found along its course. The dry winters are more marked in the Winterberg where the smaller and steeper streams will not retain much water after the summer spates have ceased.

At the time of contact, the historical records, coupled with an environmental assessment of the area, define fairly general areas where pastoralists, agropastoralists and forgers were settled. For pastoralists, the settlement emphasis was predominantly upon the coastal plateau and forelands, with the permanent agropastoralist settlements further to the east in the summer rainfall area where their domestic crops could grow. At the time of contact, though, Xhosa were increasing their use of the areas west of the Fish River. On the other hand, forager populations were maintained in the escarpment areas that were less suited to pastoral settlement. It is probable that the rugged terrain and the increased vulnerability of stock to forager raids would have been further factors influencing pastoralists against settlement there. The remainder of this paper considers the nature of the interaction between foragers and pastoralists, especially from the viewpoint of the foragers.

Rock Art

Rock paintings of both fat tailed sheep and cattle are found in the area under consideration. If it is assumed that foragers were responsible for these paintings and not the pastoralists themselves, they indicate in a general way that pastoralism made some impact upon foragers. As far as is known, there are no historical records from the eastern Cape which mention that pastoralists or agropastoralists ever painted their domestic stock in paint upon rock walls. Stanford (Macquarrie 1962:30) was told by a 'Bushman' in Transkei that her husband had been a painter and it is more than likely that the paintings which Stanford saw of Europeans, horses and yoked oxen were painted by San. Perhaps the most convincing evidence for the forager authorship of cattle paintings comes from their distribution in the escarpment area which, as it has already been argued on environmental grounds, were less favourable to pastoralists. This correlation between a refugium away from direct Iron Age influences and the presence of cattle paintings has already been noted by Mazel (1982) for the Natal Drakensberg. It must be admitted that the forager authorship of sheep paintings remains only a reasonable assumption, simply because they are found in contexts unsuitable for pastoralist occupation.

In light of the information shed by the distribution of cattle images on the contact between foragers and Iron Age agropastoralists in Natal, all known records of paintings in which cattle and sheep are depicted were collected for the part of the eastern Cape under consideration here. These records are presented in Fig. 1. Although the sample size of known sheep and cattle motifs is small, they appear to display discrete distributions. Images of sheep are found predominantly within rock shelters situated on the coastal plateau and coastal foreland, whereas no cattle are found in this area and are known only from the region of the second escarpment.

The interpretation of these discrete distributions is speculative at this stage, but the interrelated environmental and historical evidence already presented provides some framework for analysis. These lines of enquiry indicate that by the time of the colonial advance, foragers were more frequently encountered in the escarpment areas, whereas pastoralists held sway over the coastal regions to the south. This may be rather a static picture [illegible] proposed that the addition of the rock painting distributions [illegible] intermediate glimpse of forager response to the pastoralist [illegible]. It is proposed that the discrete distributions of cattle and sheep images represent progressive stages in the geographical displacement and/or assimilation of foragers from the coastal regions by pastoralists and agropastoralists. The occurrence of sheep paintings in the coastal areas may represent a first stage in this process and suggests that at this early time of contact, the landscape was still being shared by pastoralists and foragers. There is some evidence to show that forager settlement patterns did change as a consequence of pastoralism at this time, but these were local adjustments and were not on the scale of regional displacement. The second, later phase in this progression is represented by the discrete distributions of cattle paintings within the pastorally more inaccessible escarpment area, and this may demonstrate regional displacement and confinement of foragers to this area. Although the absence of cattle paintings to the south of the Winterberg indicates that there may have been no foragers left to paint in that area at the proposed later date, a second possibility exists. This considers that forager populations may still have been resident during this later phase, but had been socially and economically changed to such an extent that painting no longer figured as part of their cultural expression.

Confirmation of this two-stage painted progression obviously rests upon proof that sheep paintings are older than those of cattle. To begin with the cattle paintings, these sometimes form part of panels in which horses also occur and this indicates an even more recent date (Fig. 2). Furthermore, there is little doubt that these images in the Winterberg represent Nguni breeds which are multi-coloured, patchy animals (Epstein 1971) (Fig. 3). Although it is more difficult to assess the horn configurations of these painted cattle, this feature also tends to confirm the Nguni identity. The historical evidence (Peires 1981) suggests that Xhosa expansion into the areas immediately to the south and east of the Winterberg took place during the 17th century and that the cattle paintings are associated directly with this expansion. Several early travellers and missionaries noted that the Xhosa were geared exclusively towards cattle and a few goats, but that they possessed no sheep whatsoever (Wesleyan Methodist Missionary

Society n.d.). This suggests that the fat tailed sheep paintings south of the Winterberg were painted before agropastoralists had penetrated the area. One difficulty with this particular assessment is that many sources show that at the time of contact with Europeans most Khoikhoin also owned large herds of cattle. If both sheep and cattle arrived simultaneously in the Cape, it is anomalous that foragers painted only sheep. It is possible that our historical picture is misleading and is not representative of the earlier phases of pastoralism in the Cape. If the earlier date of the sheep images along the coastal areas is correct, then we can assume only that at that time sheep were numerically dominant over cattle, or even that cattle were entirely absent.

The explanation for the discrete distributions of sheep and cattle paintings in the area under consideration has emphasized a diachronic sequence in which foragers were displaced progressively from and disrupted within the coastal plateau and forelands. Central to this scheme are environmental factors such as the availability of suitable pasture and water as well as the suitability of the landscape which combine to define areas more favourable to pastoralists, and where forager disruption would have been considerable. Areas such as the Winterberg, however, provided refugia for foragers. The evidence cited so far tends to emphasize geographical displacement but when other data are considered this model would seem to be rather simplistic and other less conservative interactive processes between foragers and pastoralist took place. Evidence for thse processes is considered in the final section.

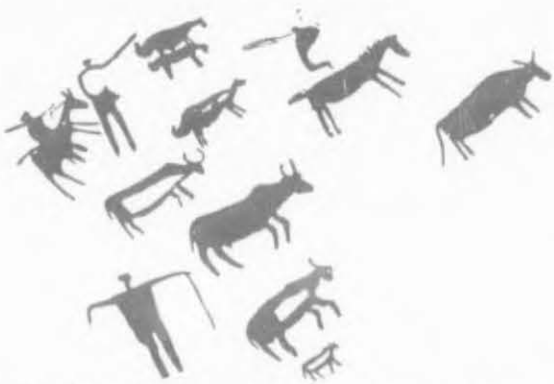

Fig. 2. Rock art panel from Oxford in the Winterberg. The panel measures 0,70 m across.

Pottery Sequences

If displacement of foragers by pastoralists and agropastoralists from the coastal plateau and foreland took place, one of the archaeological expectations might be that pottery sequences within the rock shelters in these areas would be thin and ephemeral. At Wilton and Melkhoutboom this expectation certainly seems to be met (J. Deacon 1972; H. J. Deacon 1976), and at both sites pottery occurs mostly within the surficial deposits. This situation, however, is complicated by the observation that the last 2 000 years in the eastern extension of the Cape Fold Belt is archaeologically better represented in small rock shelters, rather than larger shelters such as Wilton and Melkhoutboom, and that this change evidences altered forager settlement patterns and/or smaller group size consequent upon the introduction of pastoralism (H. J. Deacon 1976:157). Although much work still needs to be done in order to establish this trend more fully, the implication is that forager displacement was initially on a local scale and not on the regional scale evident from the 17th century onwards.

The expectation for pottery sequences on the coastal plateau and foreland is further complicated by excavations at two Later Stone Age sites (Edgehill and Welgeluk) on the banks of the Koonap River (Fig. 1). Both sites are located within sweetveld and coupled with the all year round availability of water, would have been prime areas for pastoralists and agropastoralists. Pottery is well established in the sequence at Welgeluk by 1360 ± 50 BP (Pta-3960) and possibly even earlier at Edgehill by 1830 ± 60 BP (Pta-3564). Although this latter date falls within the known age range for pottery at the Cape, it appears that most of the Edgehill pottery layers have been removed and so the date must be used with caution. Derricourt's work on the open site ash mounds at Middledrift some 40 km east of Edgehill and Welgeluk indicates a strong pastoral presence by 1000 BP (Derricourt 1977).

Contrary to the expectation of short pottery sequences in this region, pottery at Welgeluk, and also possibly at Edgehill, occurs within well developed deposits, reaching a depth at Welgeluk of just under 0,80 m. Assuming that foragers were still the occupants of these shelters during the contact period, the extent of the Welgeluk pottery sequence in particular implies considerably more contact and interaction with pastoral groups along the Koonap River than the initial expectation anticipated. A contrast to the Welgeluk pottery sequence is that from Fairview (Robertshaw 1984) located within the sourveld of the Winterberg. It would have been less favourable to free range pastoralist systems, and the pottery sequence is poorly developed and, as the author suggests, the impact of pastoralism upon the forager economy was minimal.

The Welgeluk pottery sequence is of further interest in that it separates into two components. The first, older component contains decorated sherds and shapes typical of Khoi Cape coastal pottery. The second, younger component has coarsely made rim-nicked pottery which is first found within a layer dated to 510 ± 50 BP (Pta-3934). Although this rim nicked ware is known from only five localities it is relatively widespread, ranging from the foothills of the Winterberg to a coastal shell midden near the Fish River mouth. The presence of this rim nicked pottery implies either an Iron Age presence in the area or the appearance of mixed Khoi/Xhosa groups (Gonaqua). Schofield describes Thembu pottery as having notched rims (Schofield 1948:185). If the two pottery components at Welgeluk do represent a pure pastoralist presence at first, followed by a later mixed agropastoralist expansion into the region, then it is possible that they also correspond to the two painted phases (sheep then cattle) outlined above. The radiocarbon date for the appearance of the rim nicked pottery is roughly equivalent to the westerly expansion of the Xhosa (Derricourt 1977:185). Taken together, all lines of evidence provide a more balanced but at the same time more complex picture of forager response to pastoralists and agropastoralists. The expectation for thin rock shelter pottery sequences is not met, and rather than demonstrating wholesale regional forager displacement, suggests smaller scale settlement adjustments, with the possibility that forager occupation of habitats favourable to pastoralists actually intensified.

Examination of some of the content of the Welgeluk pottery sequence, especially the upper component, provides some idea of the nature of this forager occupation. First, within the pottery layers there is a decrease in the frequency of formal tools and, in the upper pottery component, formal tools are entirely absent. Scraps of iron have been recovered from these levels and it is probable that this new material substituted for stone tools. It can be speculated that iron may have been bartered between agropastoralists and foragers, and foragers may also have formed part of what Harinck (1969:164) has termed "the Xhosa-Khoi trade diffusion network." Of further interest is that silcrete, the dominant raw material out of which stone tools were made, also decreases within the pottery layers and, while this may also be tied to the raw material substitution, it is significant that the closest *in situ* silcrete deposits are located some 35 km south of Welgeluk on the Grahamstown peneplain (Mountain 1980). The decrease in silcrete may therefore provide an indicator of disrupted forager settlement patterns and a decrease in traditional mobility ranges, with the additional implication that foragers were becoming increasingly sedentary. Possible reasons for this would lie in the greater complexity of the social landscape that would have lessened the effectiveness of traditional mobility strategies. In order to offset the rising costs of successful settlement, new economic opportunities had to be established, both within the traditional forager framework and also by entering into exchange arrangements with their new neighbours, especially agropastoralists (Moore 1985). The depth of the Welgeluk pottery sequence may indicate that foragers were in fact settling down within the pastoralist framework.

One resource development that may indicate the processes mentioned above is a sharp increase in the exploitation of plant foods, especially seeds, within the pottery layers. Also, the recovery of

Fig. 3. Rock art panel from Brakfontein in the western Winterberg. The panel measures 1,44 m across.

Fig. 4. Rock art panel from Brakfontein in the western Winterberg. The panel measures 1,35 m across.

pumpkin seeds, *Citrullus testa*, in the upper pottery component hints at the evolution of new resource opportunities being forged between foragers and agropastoralists; mention has been made already of iron. Historical records provide instances of further exchange items and Steedman's observation (1835:286) of foragers exchanging the ivory from their elephant and hippo kills for corn and tobacco from the Mpondomise has already been mentioned. This archaeological and historical evidence points to interesting departures from the foragers' traditional system of mutual reciprocity within groups and regional exchanges between groups and the reinforcing effects this has on maintaining the economic and social systems. For example, Moore (1985) asks why foragers in a frontier situation with farmers would barter for domestic vegetable calories, thereby undercutting the traditional role of forager women in the productive process. The answer again lies in the decay of traditional settlement strategies and the need to maintain energy levels. Moore also points out that the disruption of the foragers' productive effort away from reciprocity towards barter and exchange must also impinge upon a group's ability to maintain social order and settle disputes. Consequently, conflict resolution is transferred to the agropastoralists which may be another factor in promoting foragers towards increasing sedentism.

The discovery of plant domesticates in supposed forager contexts raises the possibility that exchange between foragers and agropastoralists was raised to the level of what Peterson (1978:344) calls 'tandem specializations'. These relationships commonly involve the exchange of meat acquired by foragers for domestic vegetable foods from farmers. It is of interest that "a wandering tribe" observed by Bain (Lister 1949:118) was subsisting entirely by hunting elephant and hippo, but in this instance no mention of exchanging this meat is made. One well known specialization with which foragers provided agropastoralists in the eastern Cape was their rainmaking prowess and the example of the Pondomise and 'Bushman' transactions have already been mentioned (Macquarrie 1962:128-130). For their efforts these 'Bushmen' were paid with both cattle and corn. Lewis-Williams (1981) draws attention to the similarity San saw between eland and cattle and therefore by extension also the possible relationship between cattle and rainmaking. Certainly in the historical records available, not only did foragers receive cattle as payment from agropastoralists, but cattle were also ritually slaughtered as part of the rainmaking process. Lichtenstein (1928:316-317) records that "In long continued droughts, they have recourse to magic to procure rain. A Hottentot commonly, very seldom one of their own people, is made use of for this purpose. A certain number of cattle are brought to him, of which he chooses one, when it is slain, and he dips a rod in the blood, with which he sprinkles the ground all about . . . ." This arrangement could be developed to such a degree that certain forager groups were continually contracted to and were "kept" by certain agropastoralists as their "official rainmakers" (Macquarrie 1962:28-30). It is probable that foragers who were more on the periphery of agropastoral society also used cattle for their own rainmaking rituals and these would have been acquired either through exchange or by raiding (Lewis-Williams 1981:106). San raiding of Khoi herds was particularly devastating and in may instances Khoikhoin sent their stock to the Xhosa for protection (Harinck 1969:167).

The Winterberg may have provided the base from which raids were mounted and cattle returned for either subsistence or ritual purposes. Lewis-Williams points out that San saw many similarities between eland and cattle and this implies that the eland's metaphorical qualities were transferred to cattle. This association is perhaps represented in the rock painting shown in Fig. 4. This panel from Brakfontein in the western Winterberg shows a number of cattle juxtaposed within an older eland panel. Not only are the cattle juxtaposed, but the central animal has been superimposed directly over an older eland, and the whole association between eland and cattle appears to have been done quite deliberately. Of further interest is that the superposition of the cow on eland also takes advantage of the black zig-zag line associated with the back of the eland and by superposition the back of the cow as well. This association between this black line as well as the straight red line above the back of the cow in the right lower corner of the panel, may have significance in terms of San beliefs concerning the *n!au* powers focused at this particular point, and the effects this can have in influencing the weather (Lewis-Williams 1983:9). If this is correct, it illustrates a metaphorical continuity between eland and cattle and the importance of the latter in emphasizing and maintaining traditional social values and economic norms. It is significant, therefore, that paintings of cattle are found in the Winterberg in an area where some forager groups managed to retain these values and norms, whereas to the south the archaeological and historical records suggest that other alternatives, such as settling in with agropastoralists, were taken up.

Conclusion

The historical and environmental evidence furnished here provides a framework for the description of pastoral adaptations, the impact the pastoral presence had upon the forager lifestyles, and the impact of agropastoralists upon both of these groups. Whereas some of the explanations are preliminary, the archaeological data available indicate the complexity of the social landscape over the last 1 500 years. This complexity is not so evident perhaps in the historical records that were made when the assimilative and displacement trajectories had been largely completed. Much archaeological work will be required to understand these trajectories with any confidence.

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