

STONE TOOLS AND SANDVELD SETTLEMENT

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requirements for the degree of

Master of Science

by

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ABSTRACT

A comprehensive survey and site recording programme was carried out in the sandveld of the south-western Cape, South Africa. The types of site examined included rock art locations, stone artefact scatters, deposit-containing shelters and shell middens. Considerable variation was found to exist in assemblage composition and site density within an area stretching between the coast and the fringes of the Cape Fold Belt mountains.

A number of open sites were sampled in different contexts across the research area and detailed analyses of 21 assemblages are included in the thesis. Three main types of assemblage are described: assemblages in wind deflated hollows in open sand dune areas, talus scatters associated with small caves and shelters, and diffuse stone artefact scatters found on exposed rocky areas and referred to as open koppie scatters. This information is used to redefine the history of human settlement in the south-western Cape during the late Holocene.

Between about 4000 and 1700 B.P. occupation was focussed on open veld locations, mainly in near coastal riverine settings. After about 1700 B.P., coincident with the appearance of pottery in the archaeological record, there is a proliferation of small shelter and cave sites in the sandveld koppies. It is suggested that the move away from open veld locations was a direct result of the introduction of a pastoralist economy in the south-western Cape. After about 1700 B.P. there was a major change in the pattern of hunter-gatherer settlement with the focus of occupation shifting mainly towards the Cape Fold Belt mountains and, to a lesser extent, the koppies of the sandveld.

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TABLE OF CONTENTS

	Page No
Abstract	(i)
Acknowledgements	(ii)
Table of contents	(iv)
List of tables	(v)
List of figures	(vi)
List of plates	(viii)
CHAPTER 1 : INTRODUCTION	1
CHAPTER 2 : BACKGROUND TO LATER STONE AGE RESEARCH IN THE SOUTH WESTERN CAPE	4
CHAPTER 3 : THE SANDVELD PAST AND PRESENT	17
CHAPTER 4 : THE RESEARCH AREA: SURVEY AND SAMPLING	34
CHAPTER 5 : SITES, ARTEFACTS AND MATERIALS	47
CHAPTER 6 : THE ASSEMBLAGES: STONE TOOL PATTERNS IN THE SANDVELD	59
CHAPTER 7 : DISCUSSION: SETTLEMENT PATTERNS IN THE SANDVELD	79
References	107
Appendices	

LIST OF TABLES

Table No.		Following Page No.
5 : 1	Sites sampled in the research area	48
5 : 2	Length statistics of untrimmed flakes	58
5 : 3	Length statistics of scrapers	58
5 : 4	Length statistics of adzes and backed blades	58
6 : 1	Deflation hollow sites sampled in the research area	59
6 : 2	Comparative sample of Sandveld deflation sites	65
7 : 1	Tortoise Cave. Formal tool frequencies	84
7 : 2	Frequencies of selected stone artefacts from assemblages in the south west Cape	85

LIST OF FIGURES

Figure No.		Following Page No.
1 : 1	Location of research area in South Africa	3
2 : 1	Sites excavated in the western Cape	13
3 : 1	Geology of the south western Cape	19
3 : 2	Rainfall in the south western Cape	22
3 : 3	Veld types in the south western Cape	23
4 : 1	Search paths in the research area	35
4 : 2	Rock art sites	37
4 : 3	Stone artefact scatters and sites with deposit	38
4 : 4	Deflation hollows	39
4 : 5	Shell middens and shell scatters	40
4 : 6	Plan of site KK/H showing position of sample grid	46
4 : 7	Site KK/H : grid layout showing quadrats sampled	46
4 : 8	Profiles of site KK/H	46
4 : 9 to 13	Site KK/H : deflation / aggradation	46
5 : 1	Sites sampled in the research area	48
5 : 2	Frequency diagrams of untrimmed flake lengths (quartz)	58
5 : 3	Frequency diagrams of untrimmed flake lengths (silcrete)	58
5 : 4	Length measurements of untrimmed flakes	58
5 : 5	Frequency diagrams of scraper lengths (quartz)	58
5 : 6	Frequency diagrams of scraper lengths (silcrete)	58
5 : 7	Length measurements of scrapers	58
5 : 8	Frequency diagrams of adze lengths	58

Figure No.		Following Page No.
5 : 9	Frequency diagrams of backed blade lengths	58
5 : 10	Length measurements of adzes and backed blades	58
6 : 1	Raw material frequencies of waste category. Deflation hollows (Group 1)	64
6 : 2	Raw material frequencies of waste category. Deflation hollows (Group 2 & 3)	64
6 : 3	Raw material frequencies of formal tools category. Deflation hollows (Group 1)	64
6 : 4	Raw material frequencies of formal tools category. Deflation hollows (Group 2 & 3)	64
6 : 5	Raw material frequencies of waste category. Talus and Open Koppie sites	72
6 : 6	Raw material frequencies of formal tools category. Talus and Open Koppie sites	72
7 : 1	Correspondence analysis plot. Sandveld and Mountain sites	85
7 : 2	Correspondence analysis plot. Sandveld and Open sites	85
7 : 3	Distribution of sites	85

LIST OF PLATES

Plate No.		Following Page No.
1	Verlorevlei	18
2	View across "Death Valley" deflation area	18
3	View of deflation hollow KK/I with stakes used in the monitoring program. Active dune front in the foreground	43
4	An example of sand movement in the centre of the "Death Valley" dunefields showing a fence buried by driftsand	43
5	View of "Pepper Tree Hill" with sandy deflation area visible around the base of the koppie	60
6	Site LPV/E. An example of a large riparian deflation bay	60
7	Ochre stained lower grindstone	62
8	Site AND/6. A typical example of a small deposit - containing cave with a prominent talus slope	62
9	A water filled rock basin at Point 582	71
10	Site RON/15. A small shelter at the base of Rondeberg fronted by a level terrace	71
11	View of Klipheuwel. Several small shelters are visible at the base of the koppie	73
12	Wolfberg	73
13	Bruinkop. A cache of four ostrich eggs	102
14	Site RON/1. An example of juxtapositioning with human figures and an eland forming a balanced group	102

CHAPTER 1

INTRODUCTION

This thesis is concerned with the changes in human settlement which took place in the sandveld during the late Holocene. It is primarily a spatial study of open sites in that it documents the changing patterns of archaeological sites across a large segment of the landscape. The sandveld was selected as a focus for research as it contains a wide spectrum of sites and is a central theme in many of the projects already embarked upon in the south-western Cape.

The sandveld is the term used to describe the broad undulating plain lying between the coast and the Cape Fold Belt mountains. It is a lowland area interrupted in places by prominent sandstone koppies and massifs and is traversed by several minor rivers. Although, by today's standards, the sandveld is an economically marginal zone it has a long history of human settlement and is potentially a key area to the understanding of the prehistory of the south-western Cape. It is well suited to the study of surface assemblages as artefact scatters are numerous, highly visible and remain in a relatively stable condition.

The current phase of research in the south-western Cape began in the late 1960's with excavation of De Hangen (Parkington & Foggenpoel 1971b) and Elands Bay Cave (Parkington 1977). This led to a model of seasonal mobility which postulated the movement of people between the coast and the interior, with a cycle designed to maximise the exploitation of seasonally available food resources (Parkington 1972, 1977).

The most striking archaeological remains in the sandveld are the dense artefact scatters found in dunefield areas. Unfortunately these attracted the attention of early collectors whose instincts were acquisitive as well

as inquisitive. The first controlled artefact studies were undertaken by Wadley (1973) and Feitelson (1975), both of whom concentrated on the analysis of single open site assemblages from different parts of the sandveld. In a more ambitious project, Mazel (1978) compared a number of deflation hollow assemblages with surface collections from the Cape Fold Belt mountains. With the available data base from these projects, it was suggested (Mazel & Parkington 1981; Parkington 1980a) that the open scatters from the sandveld were broadly contemporary with assemblages found on the talus slopes of cave sites in the neighbouring mountains. The variability between assemblages from these very different environmental contexts were interpreted as reflecting activity differences within a single economic framework. These investigations formed the basis of the present study.

Previous recording and sampling methods had been purposefully selective in that sites were chosen in areas of dense artefact scatters. The present project attempted to remedy this situation by recording, in specific areas of the sandveld, all artefact occurrences, irrespective of whether they were substantial or ephemeral. With this greatly increased data base it was possible to test whether the generalised picture of apparent homogeneity of artefact scatters in the sandveld was in fact true. The notion of contemporaneity of assemblages in the very different contexts of the mountains and sandveld also came under scrutiny.

The survey and recording methods used in the field work owed much to an earlier rock art recording programme undertaken in the sandveld (Manhire 1981). In order to arrive at meaningful distribution patterns in rock art it is imperative that saturation recording techniques are employed as there is no such thing as a typical or even a representative rock art site. Whilst stone artefact assemblages are more uniform, in terms of composition, subtle variations do occur and these are only apparent if a

wide cross section of sites are examined.

Although the field work programme was, by design, orientated towards stone artefact assemblages all other types of archaeological sites were recorded during the survey. These included painted sites, shell middens and deposit-containing shelters. Using these data it was possible to fill in some of the gaps in earlier projects, in both the physical sense of site distribution and assumptions based on a less comprehensive data set.

The second stage of the fieldwork programme was the sampling of stone scatters in different contexts within the sandveld. As a large number of sites were sampled it was deemed undesirable to collect any of the material and all sampling operations were carried out in situ, thus inflicting as little damage as possible to the integrity of the site.

Both the survey and sampling procedures were very time consuming and the actual time spent in the field was probably not commensurate with the number of hard facts actually gleaned from the exercise. What was achieved, however, was an extensive data base of sites in the sandveld. This was used to modify previous reconstructions of settlement patterns in the south-western Cape and will, hopefully, serve as a basis for future projects carried out in the same area.

The remainder of this thesis is divided into six chapters:- Chapter 2 is a brief review of the development of LSA studies in South Africa and the lines of research adopted in the south-western Cape. Chapter 3 describes both the environmental setting of the south-western Cape and the resource background of the sandveld. Chapter 4 contains a description of the research area, the methods used in the survey and sampling programmes and the monitoring experiments carried out in deflation hollows. Chapter 5 discusses the sites, artefact classification and raw materials. Chapter 6 is concerned with the analysis of a number of assemblages from the sandveld whilst Chapter 7 discusses assemblage patterning in terms of settlement.

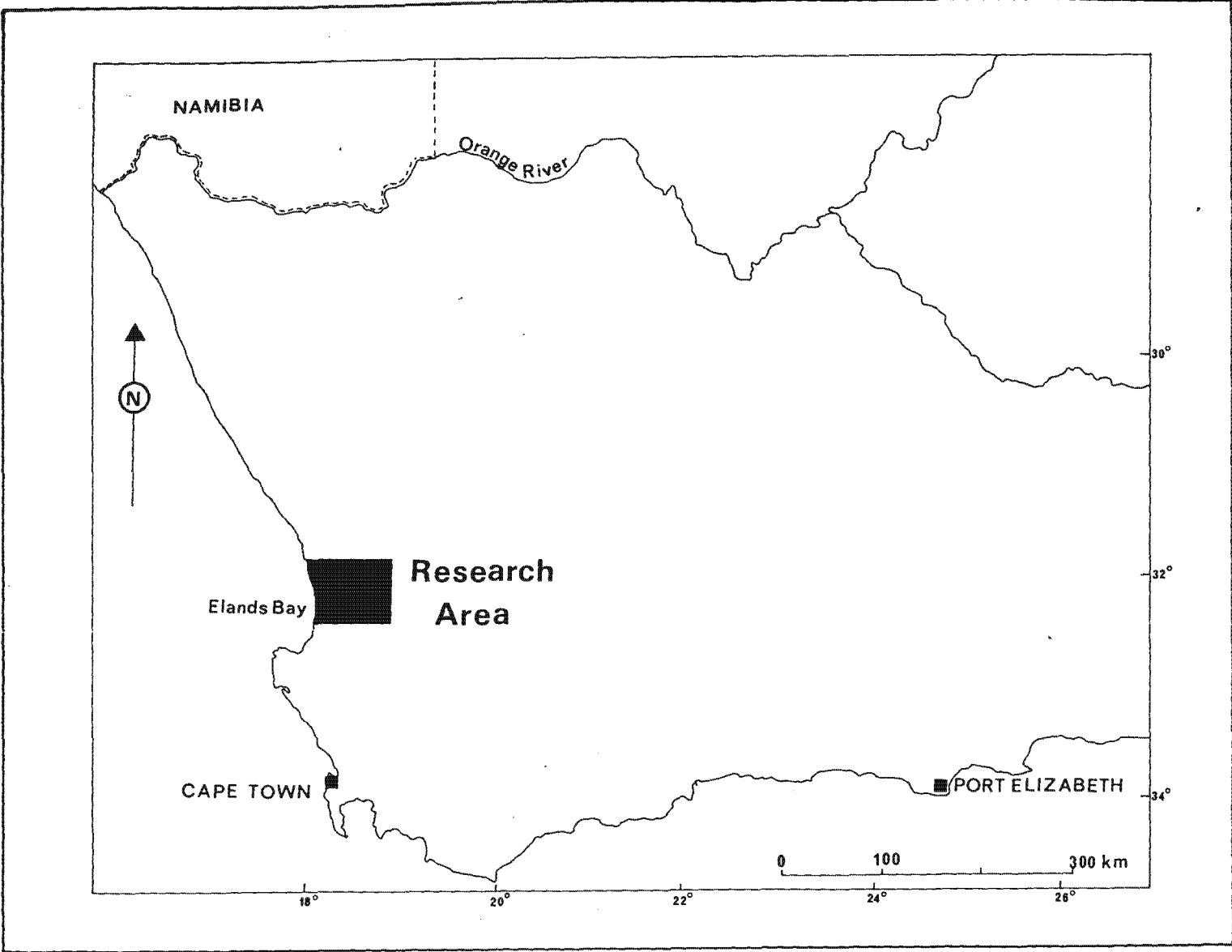


FIG.1:1 LOCATION OF RESEARCH AREA IN SOUTH AFRICA

CHAPTER 2.

BACKGROUND TO LATER STONE AGE RESEARCH IN THE SOUTH-WESTERN CAPE

Stone age research in South Africa may be said to have been formalised in 1929 with the publication of a collection of papers by Goodwin and van Riet Lowe entitled 'The Stone Age Cultures of South Africa'. This endorsed the attitudes of many archaeologists and field workers by advocating the use of a local rather than a European terminology to describe the already burgeoning number of stone age industries. It was proposed that a general scheme for the South African Stone Age, with a threefold division into Earlier, Middle and Later Stone Ages, be adopted. Goodwin (1926) and Goodwin & van Riet Lowe (1929) identified two main cultural traditions within the Later Stone Age (LSA): the Wilton and the Smithfield. These were named after localities in the Cape and the Orange Free State, in keeping with the legacy, inherited from the 19th century, of labelling a culture from the type site where it was first discovered (Inskeep 1967).

Implicit in this newly erected structure of the Later Stone Age was the identification of the microlithic industries of the Wilton and Smithfield with a neo-anthropic group of which the indigenous 'Bushmen' or San were considered a part. The LSA was seen as equivalent, on a broad cultural basis, to the Mesolithic of post-glacial Europe and its origins were sought as far afield as the Capsian of North Africa. It was this adherence to the then popular culture model which governed LSA research for the next three decades and resulted in the application of a migration hypothesis to explain the emergence of new cultural forms.

The term Wilton was used by Goodwin in 1926 to describe the so-called 'pygmy' assemblages found in the southern Cape in which microlithic

elements predominated. The name derives from the excavation by Hewitt (1921) of a rock shelter on the farm 'Wilton' near Alicedale in the eastern Cape where an apparently homogeneous assembly of implements was recovered. This assemblage was characterised by high frequencies of microlithic tools including backed bladelets, small convex scrapers and crescents, the latter being the Wilton token or 'fossile directeur' which typified the industry. Other ingredients recognised as being part of the Wilton milieu were ostrich eggshell beads, shell pendants, bone points and, sometimes, pottery. The term was rapidly adopted and used in various parts of southern Africa to describe similar assemblages although it was, as Inskip (1978: 93) observes:

"applied to almost any industry showing this combination of segments and small scrapers, even though the associated artefacts showed much variation from one site to another."

Regional variants of the Wilton were recognised wherever the basic industry included specialised formal tools and within a few years the officially sanctioned nom de plume appeared on the map in areas as far afield as Zambia and Kenya.

Due to its widespread distribution the Wilton Industry was thought to have originated outside the borders of South Africa. The Smithfield, on the other hand, was considered to be a local development, its presence in the Orange Free State being due to the responses of neo-anthropic groups towards two separate influences. The first was contact with residual MSA groups still inhabiting the area and the second was the exposure to a new raw material source provided by the abundant indurated shale outcrops (Goodwin & van Riet Lowe 1929). The term Smithfield was first used in 1925 to describe an assemblage investigated by Dr Kannemeyer near the town of that name and was subsequently adopted to describe non-Wilton LSA occurrences in the interior of South Africa. Although regarded as a composite industry, the Smithfield was almost entirely limited to surface sites with a distribution centred in the northern Cape and the Orange Free

State. Van Riet Lowe's early fieldwork revealed the existence of three separate Smithfield components which, after some consideration, he labelled A, B and C. His avoidance of the more conventional sequential terminology was (Goodwin & van Riet Lowe 1929: 155) 'due to an entire absence of stratification and the consequent impossibility of definitely establishing sequences'. Smithfield A was considered to be the earliest due to its heavy patination and its resemblance to a Fauresmith assemblage without handaxes. The temporal relationship between Smithfield B and C was, however, more problematic.

As Deacon, J. (1982) notes, the Wilton variants were separated on the basis of specialised formal tools, while the characterisation of the Smithfield variants depended on the size and shape of the scraper element. The Smithfield A assemblages included large circular and concavo-convex scrapers and were restricted to open sites thought to be contemporaneous with local rock engravings. The Smithfield B assemblages lacked the large scraper element and were characterised by smaller tools which included duckbilled endscrapers and notched spokeshaves. The Smithfield C variant was geographically limited to the area of the Caledon and Orange river valleys where assemblages occurred in cave sites often containing rock paintings. The typical implement was the small convex scraper. Later additions to the list of Smithfield variants included the Smithfield N in Natal, characterised by hollow and notched scrapers, and the Coastal Smithfield found along the southern and eastern Cape coast.

A contrasting factor recognised within the Smithfield Industry was the pattern of raw material usage. Indurated shale was the preferred source material for Smithfield A and B while fine grained materials such as chalcedony, chert and agate predominated in the Smithfield C assemblages (Goodwin & van Riet Lowe 1929). In an earlier paper, published before the introduction of the A, B and C variants, van Riet Lowe (1926) explained the differences between the Orange Free State and Drakensberg assemblages as a

function of the raw material available to the toolmakers. Commenting on the variability between Smithfield B and C, Farkington (1984a:96) stresses that 'despite ample evidence of the roles of materials and mode of life in bringing about the patterning, a cultural model was employed'.

The essential factor which distinguished the Wilton from the Smithfield was the possession of the crescent (segment) by the former and its virtual absence from the latter. Van Riet Lowe (1926) drew a line of demarcation between the two industries with a 'crescentic scraper' on one side of the boundary and a digging stone (bored stone) on the other. Wilcox (1956) refers to the Smithfield C as a crescentless Wilton and shows that if the Wilton and Smithfield C are grouped together the geographical continuity of the Wilton complex becomes more logical. Another event which challenged the accepted terminology was Goodwin's excavation of the Dakhurst shelter near George in the southern Cape (Goodwin 1938). Despite being deep in Wilton territory, he chose to refer to one of the levels as Smithfield C on account of the preponderance of small convex scrapers coupled with a decided lack of backed pieces and segments. This layer occurred below a typically Wilton assemblage which graded into a pottery layer near the top of the sequence. The excavation was innovative in that it demonstrated for the first time the patterning of a Wilton assemblage through time. To cope with this new variability the terms Normal, Developed and Pottery Wilton were introduced.

With hindsight several weaknesses are evident in this all embracing structure of LSA cultures and variants. Inskeep (1967: 558) notes:

"too much significance has been given to similarities, and not enough to the differences, and that the adoption of the term Wilton has tended to blanket out the possibilities of defining significant differences".

This was in part due to the research strategies adopted by early workers. Industries and variants were identified on the basis of small and often

selective surface collections and no quantitative breakdown of assemblages was attempted.

Goodwin and van riet Lowe's methodology had a profound influence on subsequent stone age research and it was not until 30 years after the publication of their magnum opus that another major synthesis was attempted. In 1959 the publication of Desmond Clark's 'The prehistory of southern Africa' showed that the intervening years had not produced any major shift towards a new explication of the archaeological record but rather served to fill in gaps in the cultural stratigraphic record. The same cultural divisions were still observed although the boundaries had been stretched, both geographically and typologically, to include several new variants. An example of this process was the identification of the Nachikufan Industry of Zambia, which contained strangulated scrapers similar to those of the Smithfield N in Natal (Clark 1950, 1958a). Clark's response to this type of situation was not to regard the similarities as evidence of a single culture but rather as parallel responses to similar environmental conditions (Clark 1964). This marked a return to a more functional viewpoint in which ethnographic parallels and historical observations were used as indicators to the possible uses of stone tools (Clark 1958b).

An important event in the archaeological calendar of 1965 was the international gathering of archaeologists at the Burg Wartenstein conference. Among the issues under discussion was the use of terminology as applied to the African Quaternary (Bishop & Clark 1967). Kliendienst (1967) presented a detailed critique of the array of cultural terms then in use in stone age nomenclature. She stressed that many archaeological entities that had been given formal names lacked precise definition and that the data on which they were based had never received adequate publication. In response to these criticisms a revised scheme was proposed, based on the hierarchical classification of well defined archaeological units (Bishop &

Clark 1967). Archaeological horizons were accepted as the minimal cultural stratigraphic unit and were grouped into Phases. In turn followed Industries and groups of industries which were termed Industrial Complexes. The Industrial Complex was intended to supersede the term 'culture' but unfortunately the new definitions contained an admixture of cultural, spatial and temporal implications. This is evident in the definition of an Industry as representing 'all the known objects that a group of prehistoric people manufactured in one area over some span of time' (Bishop & Clark 1967: 893).

Two important events followed in the wake of the Burg Wartenstein conference. These were the re-examination of the Wilton type site and the rescue work in the Middle Orange River Basin, the type area of the Smithfield. This marked the beginning of the trend towards in-depth regional studies with the emphasis on quantitative methods and the desire for a more standardised typology.

Garth Sampson's work in the Middle Orange River Basin provided the impetus for his ambitious volume 'The Stone Age archaeology of southern Africa' (Sampson 1974). This attempted to provide a new classification scheme for southern Africa in keeping with the hierarchical system recommended at the Burg Wartenstein conference. In this scheme the LSA is partitioned into three Industrial Complexes labelled Oakhurst, Wilton and Smithfield, with a miscellaneous 'Strandloper' category to deal with coastal left overs. The Oakhurst is regarded as the oldest with a typology based on large flakes marginally trimmed to form scrapers or utilised directly. The Wilton Complex loosely groups together all the Wilton-like assemblages found in South Africa as well as those from further north. Within South Africa two industries, the Coastal and Interior Wilton, are recognised as geographical variants. Four chronological subdivisions, Early, Classic, Developed and Ceramic are introduced as Phases. In

Sampson's scheme the term Smithfield is used to describe only those industries which postdate the Wilton Complex in the interior of South Africa. This differs from van Riet Lowe's conception of the Smithfield, and, of the original variants, only the B, C and N labels are retained. The Smithfield A is relegated to the Lockshoek Industry as part of the earlier Oakhurst Complex.

Both Sampson's rescue work on the Orange River Scheme and Humphreys' excavations in the Middle Orange River area (Humphreys 1972) indicated the presence of a previously unsuspected Holocene sequence in the Karoo which lasted approximately 4000 years. Humphreys (1972) notes that there are no intermediate industries between the LSA and the MSA in the Middle Orange River and, furthermore, that none of the existing LSA assemblages are older than about 4000 years. This latter observation is of interest as it contrasts sharply with other areas of South Africa where LSA assemblages have been dated to 10 000 years ago or even more. In her discussion on the patterning of radiocarbon dates, Janette Deacon (1974) shows that dates are fairly evenly distributed through time over most of South Africa, with the exception of the drier areas of the inland plateau. No dates in this area fall between 4600 and 9500 B.P. and, furthermore, no dates attributable to the Smithfield occur at all during this period. This dearth of early to mid-Holocene occupation of the central Karoo has been linked to changes in the environmental conditions which led to a generally drier prevailing climate (Deacon, J. 1974).

The intensive study of a number of sites in the southern and eastern Cape by Hilary and Janette Deacon during the 1960's and 1970's, did much towards establishing the pattern of stone tool variability within Wilton assemblages as well as providing a basis for understanding the ecology of Holocene populations. The first major excavation was at the Wilton large rock shelter which formed part of the original type site. Hewitt (1921) regarded the original excavated layers as a homogeneous assemblage, whereas

Deacon's analysis (Deacon, J. 1972) revealed changes through time in the relative frequencies of most of the common tools such as scrapers, backed pieces and segments. A second observation was the variation in shape and size of the scraper element throughout the sequence. The patterning through time was gradual rather than abrupt and was explained as the evolutionary development of a single technological theme. It was referred to as an ontogenetic model, similar in many ways to Toynbee's (1972) historical culture model, in which a single system underwent phases of birth, maturity and death (Deacon, J. 1982). A characteristic feature of the Wilton large rock shelter and other sites in the southern Cape is that segments do not occur with the same frequency at all times. They are most common within the time bracket of 3000 to 7000 years ago, being scarce in the early stages of the Wilton sequence and tending to disappear after the climax phase (Deacon, J. 1974).

Excavations at two other key sites, Melkhoutboom and Nelson Bay Cave, both produced long sequences extending back into the late Pleistocene (Deacon, H.J. 1976; Deacon, J. 1982; Klein 1972a, b). The discovery of these early assemblages extended the range of the LSA back at least 18 000 years from the present and led to the establishment of a three stage sequence in the southern Cape. Referred to as the Wilton, Albany and Robberg Industries, they are distinguished on the basis of formal tools and raw materials coupled with sets of faunal remains. The Wilton is the latest in the sequence being preceded by the Albany, an industry dominated by a variety of large scrapers and dated between 8000 and 12 000 B.P. The Robberg Industry falls between 12 000 and 18 000 B.P. and is characterised by the presence of bladelet cores and small blades, often with quartz as the preferred raw material.

Great attention was given to the analysis of the floral and faunal remains from these sites. This step broke away from the tradition of purely

lithocentric studies and introduced the possibility of detailed reconstructions of subsistence strategies. This ecological approach, coupled with general systems theory, led to the development of a model of homeostatic plateaux (Deacon, H.J. 1976). In this system the three LSA industries from the southern Cape reflected periods of stability separated by briefer intervals of accelerated change. The longer periods were regarded as stable economic episodes, while the intervening shifts represented adaptive responses to changing environmental conditions.

In the south-western Cape LSA research has followed a different course and much of the effort since the 1960's has focussed on the differences in stone artefact assemblages and subsistence strategies between the mountains and the coastal areas. In contrast to the southern Cape, there is a dearth of cave sites with long unbroken sequences. This, however, is compensated for by an abundance of open sites, small shelters with occupational debris, shell middens and rock art sites. The open nature of much of the terrain and the lack of dense vegetation, coupled with relatively unobtrusive farming practices, promotes a high degree of ground visibility and provides excellent opportunities for reconstructions of prehistoric settlement patterns. These factors have certainly influenced the direction of research in the south-western Cape and have led to an emphasis on the search for spatial patterning and on functional explanations of inter-site variability. It is safe to say that, apart from the Zeekoe Valley (Sampson 1979), no other region in South Africa has been subjected to an equivalent programme of saturation recording of prehistoric sites. Most of these aspects of south-western Cape research are considered at greater length in the following chapters of this thesis.

The promotion of the south-western Cape from an area known mainly for its shell middens and rock paintings to that of a regional study of the interactions within a system is largely due to the inspiration of John Parkington. Research began in 1968 with the objective of locating a site

with a stratified sequence and resulted in the excavation of two sites in the Pakhuis area near Clanwilliam (Parkington 1984a). The results of these excavations at Klipfonteinrand and, more importantly, De Hangen, suggested a subsistence based on plant foods and small game and, furthermore, that the quotient of gatherable food was greater during the dry summer months (Parkington & Foggenpoel 1971a, b). Support for a summer occupation at De Hangen came from the presence of two species of animal, tortoise and dassie, both of which are common in the vicinity of the cave. The pattern of tooth eruption in dassies showed that the majority had been caught during the summer months whilst tortoises are known to be a summer staple of the Kalahari San. Also the presence of small quantities of marine shell in the deposit intimated some form of contact with the coast. These instances together with information from historic and ethnographic sources led to the supposition that people moved seasonally between the coast and the mountains using a complementary diet of shellfish and plant foods (Parkington 1972; Parkington & Foggenpoel 1971b).

It was partly to test this hypothesis and also to determine the season of occupation that attention was focussed on Elands Bay Cave where a considerable time depth was present in the deposits although only the upper layers corresponded to De Hangen (Parkington 1972, 1976, 1977). The most promising seasonal indicators came from the seal remains, the mortality profiles showing that the vast majority were caught during the winter months. Plant remains were also present in the upper layers but the paucity of edible corms suggested that plant foods were not the *raison d'être* for coastal settlement. The range of animal remains was greater than at De Hangen and marine forms clearly predominated. The abundant shellfish contained another clue to seasonality as the most commonly collected filter feeding bivalves are subject to 'red tide' and as a result are only harvested with safety during winter months. It is evident from these two sites that some kind of scheduling existed and that although De Hangen

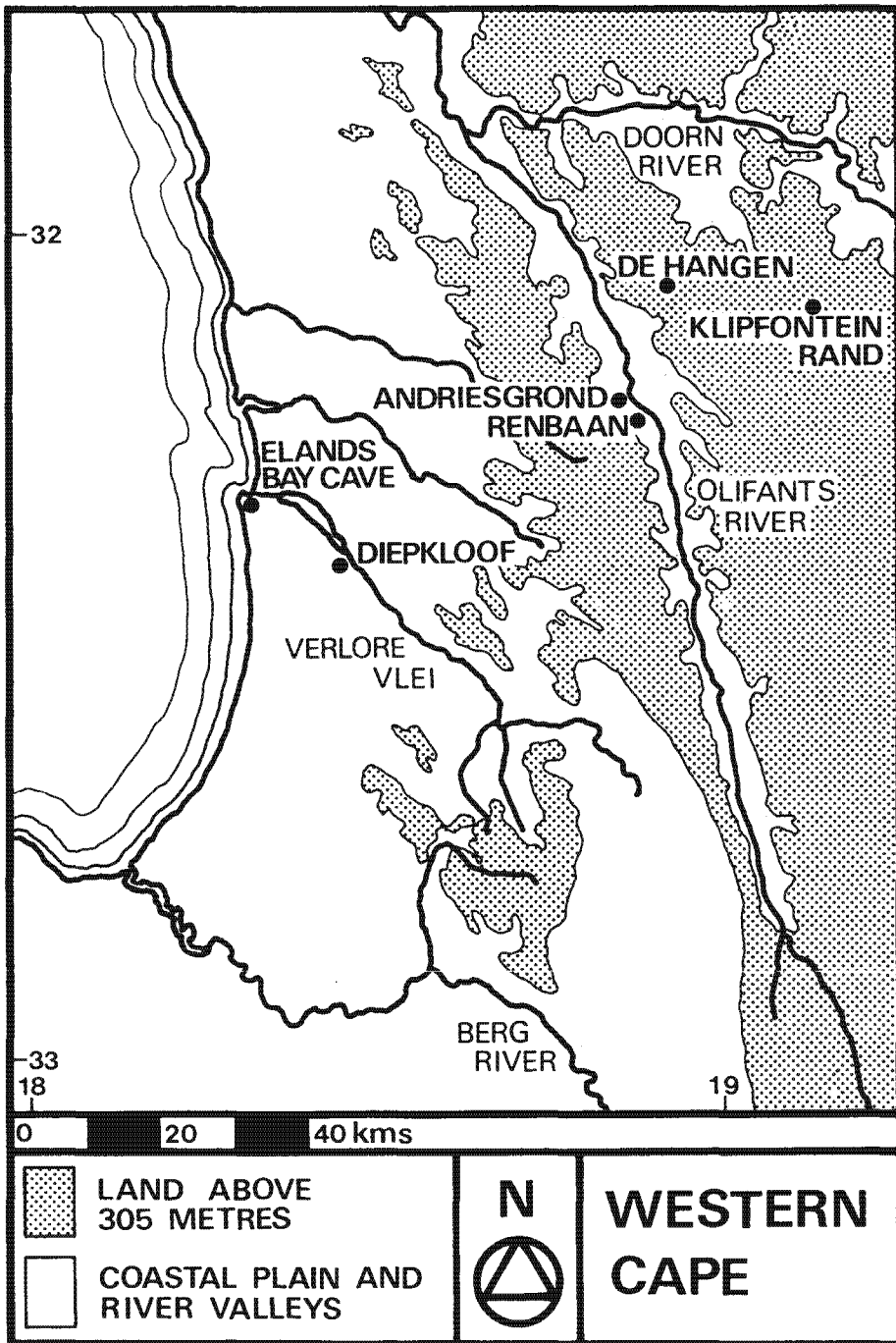


Fig. 2:1 SITES EXCAVATED IN THE WESTERN CAPE

shows a strong summer orientation, Elands Bay Cave may well have been an all year station. The concept of a strict seasonal mobility may well be an over simplification and better seen as part of complex web of movement within a single economic system.

A second and complementary theme in south-western Cape research centres on the observed variability in the distribution of stone artefacts across the landscape. Although not initially viewed as relating to subsistence scheduling, the differences in tool types and frequencies between coastal and inland sites came to be seen as a reflection of subsistence needs with variability explained in synchronic functional terms. In a description of some of the implements associated with shell middens typified by the Sandy Bay site, Rudner, I. & Rudner, J. (1954) noted the high incidence of slugs (adzes) in these assemblages. They explained this adze dominance as a local concentration on one aspect of a generally available toolkit and related the phenomenon to coastal exploitation.

Mazel and Parkington (1978) linked the adze phenomenon to woodworking activities, mainly on the basis of wood shavings and wooden artefacts from Andriesgrond and De Hangen. They showed that adzes were more common to mountainous areas with the orientation being towards fynbos areas rather than explicitly coastal locations. In extending the analysis to include other tool types a number of interesting patterns began to emerge (Mazel & Parkington 1981; Parkington 1980a). Adzes were the most common formal implements in Cape Fold Belt sites while sandveld sites yielded low frequencies. In contrast the sandveld assemblages contained large numbers of backed pieces. As previously noted, and further supported by historical observations, the presence of adzes were linked to the manufacture of wooden artefacts while a possible explanation of the high sandveld backed tool quota was an increase in projectile tip production. Scrapers were

present in some number at all the sites although frequencies varied in relation to other formal tools. This suggested that scrapers are a ubiquitous commodity or a form of 'background noise' and that scraper numbers may remain fairly constant whilst frequencies of other tools fluctuate from area to area.

Another facet of research in the south-western Cape is the study of rock art. The approach differs from that pursued in most other foci in that rock art studies have been incorporated into the general research design. Painted images are treated not only as items of symbolic value but also as a legitimate segment of the archaeological record. Again this approach is to some extent dictated by what one might call the archaeological environment which in the south-western Cape consists of a uniquely integrated pattern of rock art and stone artefact sites.

Early investigations consisted mainly of the location and recording of the more spectacular elements (Johnson et al 1959; Rudner & Rudner 1970) but achieved much of value by exposing the potential present in the art. Pioneering work by Tim Maggs in the Clanwilliam area resulted in the first application of quantitative methods in the south-western Cape (Maggs 1967) and in the use of paintings to assess group size (Maggs 1971). Systematic surveys were carried out in the Olifants River (van Rijssen 1980) and the sandveld (Manhire 1981) from which it became clear that certain motifs were either limited to, or concentrated in, specific areas. It was apparent that the spatial distribution of some of these motifs was related to settlement patterns and could be compared to social issues such as the postulated fission and fusion of San groups (Manhire et al 1983).

It is envisaged that future rock art research in the south-western Cape will proceed along two distinct but related lines of enquiry. The first being a continuation of the search for spatial patterning in which stone artefact and rock art studies will form complementary and mutually

informing aspects of a single discipline. The second, a necessary attempt to get closer to the meaning of the art using the cognitive approach advocated by Lewis-Williams (1981). This in itself will prove a challenging exercise due to the simpler mode of expression inherent in the paintings of the south-western Cape. Also the lack of explicit trance related figures coupled with the paucity of conflated images might well entail some adaptation or modification of the original model.

CHAPTER 3.

THE SANDVELD PAST AND PRESENT

The south-western Cape is divided into a number of well defined geographic regions separated in terms of relief and differences in climate. For the purposes of this study the important habitat zones are the coast, the coastal plain or sandveld, the Cape Fold Belt and the western part of the Karoo. Although only the sandveld is considered in any detail the research area actually stretches from the coast to the foot of the Fold Belt mountains and some mention of the neighbouring areas is necessary for comparative purposes. Parkington (1977) points out that the resource zones of the south-western Cape are aligned north-south whereas any population movements would logically orientate east-west so as to incorporate complementary resource sets. With this in mind, the chapter sets out to describe those aspects of the physical and natural environment considered to have some relevance for prehistoric resource management.

1. PHYSIOGRAPHY, GEOLOGY AND CLIMATE

1.1 Sandveld and Coast

The sandveld is described by Talbot (1947) as a lowland area characterised by gently undulating landscapes interrupted in places by granitic massifs and angular quartzitic ranges, the latter being outliers of the Cape Fold Belt system. This coastal plain is continuous from the Cape Flats in the south to the Namaqualand coast in the north. The average width is 30 to 40 km, reaching a maximum of around 100 km at the latitude of Saldanha Bay.

The research area lies to the north of the granite outcrops and

consists mainly of sand covered plains with relief broken by ridges and fairly mountainous outcrops of Table Mountain Sandstone. There is a steady rise in elevation towards the interior sandveld with a pronounced step near the coast from about 14 metres to 32 metres (Visser & Toerien 1971). In geologically recent times the whole area was covered by a shallow sea from which the quartzitic ranges emerged as islands. Today marine sands underlay the area and the overburden of sand deposits and sandy soils derive mainly from these marine deposits but also in part from aeolian sand and fluvial deposits of past and present drainage systems.

Three permanent rivers cross the research area in roughly parallel courses, the main direction of travel being west and north-west. Whilst not being major watercourses on the scale of the Olifants river, they contain some water all the year round with maximum flow occurring during winter and early summer. Furthest to the north is the Jakkalsrivier which flows from the Uitkomsberge to Lambert's Bay where it terminates in a river mouth playa typical of west coast seasonal rivers (Heydorn & Tinley 1980). Another typical feature is the area of prominent dunefields to the north of the river mouth which, in this instance, have been plant stabilised.

The Langvleirivier, which crosses the centre of the research area, illustrates another type of west coast pattern. Here the alluvial flood plain forms a salt pan at the river mouth complete with specialised halophytic vegetation. The 'estuary' is situated in an episodic flow regime resulting in the formation of an endoreic basin which has no direct links with the sea (Heydorn & Tinley 1980). The railway embankment carrying the Sishen-Saldanha line passes over the salt pan bisecting the floodplain into two unequal and, to all intents, separate units. The positioning of the embankment across this ecologically sensitive zone is undesirable and may have a negative effect on the long term integrity of the salt pan.

By far the largest river in the research area is the Verlorevlei (see



Plate 1 : Verloreviert.



Plate 2 : View across "Death Valley" deflation area.

Plate 1) which has its main catchment area located in the relatively high rainfall area of the Piketberg. The river flows into the vlei of the same name forming a large body of permanent water which drains into the sea via a sinuous marshy tract over 2 km long. The vlei has a maximum depth of about 5m at a distance of more than 7 km from the sea (Miller 1981). Termed a blind estuary or estuarine lagoon it has only intermittent access to the sea although high seas frequently wash over the beach barrier creating hypersaline conditions near the mouth. Both the Langvleirivier and the Verlorevlei are flanked by strips of alluvium which in places, exhibit some depth of black, plant-rich material (Visser & Toerien 1971). Large expanses of dunefields lie to the north of the Verlorevlei mouth. The transverse dunes close to the beach reflect the pattern of seasonal winds operative in this area. The dune crests have south facing slipfaces due to winter north and north-west winds while the dune bases show dominance of formation by the southerly winds prevalent during summer (Heydorn & Tinley 1980). Here again the siting of the Sishen-Saldanha railway line, this time in the extremely sensitive ephemeral hummock dune zone, is unfortunate as it separates the active dunefields from the beach deposits.

Whilst the sandy deposits in the research area are geologically recent, being of Tertiary origin, most of the visible rock formations are part of the considerably older Table Mountain Series. The major constituents of the series are white to reddish brown, moderately coarse grained sandstones (Du Toit 1954). Conglomerate is plentiful and not confined to any particular part of the series although most noticeable in the basal portion where thick lenticular bands occur with pebbles of vein quartz. The Table Mountain Sandstones are in basal contact with the Malmesbury Series over most of the area. Exceptions include an unconformity along part of the Verlorevlei where Klipheuvel beds intervene. The Klipheuvel formation comprises brightly coloured beds of sandstone alternating with shale and grit (Visser & Toerien 1971).

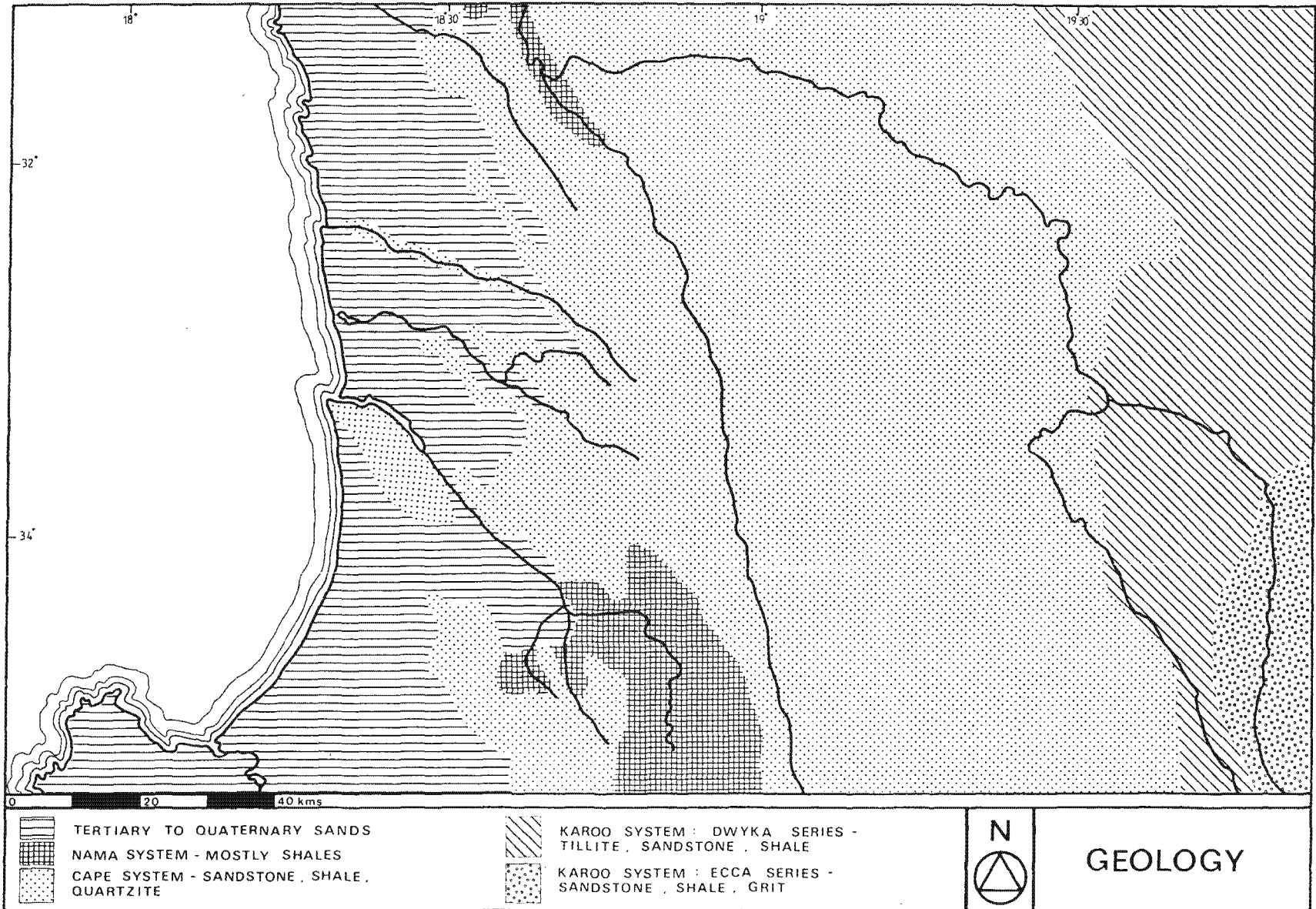


FIG. 3:1 GEOLOGY OF THE SOUTH-WESTERN CAPE

1.2 Coast and Climate

The cold Atlantic waters of the west coast influence not only the coastal environment but also have a profound effect on the climate and biotic communities of the coastal hinterland. The major influence is the Benguela Current flowing northwards from the south Atlantic, the key feature of the system being the upwelling of subsurface water which occurs from the Cape Peninsula as far north as the Angolan coast (Heydorn & Tinley 1980). The cold upwelled water, brought to the surface by the combined effects of wind and the earth's rotation, are rich in nutrients which promote the high productivity characteristic of the Benguela Current system.

The prevailing west coast winds follow the general alignment of the shoreline but blow from opposite quadrants according to the season, as well as responding to periodic fluctuations caused by the incursion of polar fronts. Thus the west coast experiences mainly south to south-east winds in summer and north to north-west winds during winter. The upper layers of the sea tend to move in the same direction as the prevailing wind but are also affected by Coriolis forces which in the southern hemisphere deflect a body of moving water to the west. The net effect is that the surface layers of the Benguela Current are driven almost parallel to the coast by southerly winds whilst Coriolis forces deflect the surface water away from the coast allowing the deep cold waters to rise to the surface. Hence the upwelling phenomenon.

These deep waters from beneath the euphotic zone are rich in nutrients which only become available when the upwelling brings them into the sunlight. When this happens dense blooms of phytoplankton develop to form the first link in the food chain which gives rise to the abundant marine life characteristic of the west coast (Branch & Branch 1981). From the human viewpoint this renders the coastal strip an extremely attractive

proposition for easy exploitation of the abundant food resources. This is reflected archaeologically by the dense shell midden accumulations near the shoreline and the high marine component at sites such as Elands Bay Cave and Tortoise Cave. The marine resources are, however, not evenly distributed along the coast but tend to be concentrated at the rocky spurs and reefs intermittent along the shoreline. On the west coast rocky shores represent less than 10% of the coastline (Miller 1981) and it is these rock/sea interfaces which provide environments suitable for shellfish and for the large kelp beds where crayfish thrive. Predators are also attracted to these areas and include birds such as gannets, gulls and cormorants. Apart from being a focus for marine resources the rocky spurs also offer opportunities for habitable shelters and are the most likely places for fresh water as the sandveld streams invariably exit to the sea at these points. This combination of shelter, freshwater and marine resources 'recurs a number of times along the west coast and may have been a focal point in prehistoric settlement' (Parkington 1977:32).

Whilst the cold upwelling promotes a rich marine biomass it has a somewhat different effect on the coastal hinterland. Rainfall is inhibited by the creation of a rain-shadow effect with moisture from inshore winds being condensed by the cold surface waters. This phenomenon contributes to the arid conditions existing on the coastal plain. The climate of the sandveld is one of mild winters and hot, dry summers. In summer the mean temperatures are moderated by the relatively cool air brought in over the ocean by the prevalent southerly winds. The hottest month is February when average temperatures range between 24 to 32 degrees centigrade. In contrast, temperatures in the vicinity of the Cape Fold Belt can exceed 40 degrees centigrade in mid summer (Talbot 1947). In winter the opposite pattern is experienced with sandveld winters being notably mild as compared to inland. The overall effect of cold water proximal to the coast is to reduce maximum summer temperatures and raise minimum winter temperatures.

Frost is common inland during winter months but is virtually unknown on the coastal plain.

The sandveld is part of the winter rainfall system and, as is usual in these latitudes, the rainfall is mainly cyclonic in origin (Talbot 1947). The weather is dominated by sub-tropical anticyclones and it is the change in position of these high pressure cells that creates the seasonal rainfall patterns of the south-western Cape (Fuggle 1981). The south Atlantic anti-cyclone is located over the ocean during winter but in summer moves southward and landward bringing the south-western Cape under the influence of this high pressure cell. This largely accounts for the extreme summer aridity as well as for the presence of strong southerly winds. The winter rainfall occurs when the high pressure cell retreats northward allowing the low pressure cells or cyclones to penetrate further north. These depressions travel in a general easterly direction at all seasons but in summer follow paths too far south to affect the south-western Cape. Thus, summer rainfall is exceptional especially in the months of December, January and February.

Within the research area 80% of the rainfall occurs between April and September (Heydorn & Tinley 1980) but the total amount is never great and much of the area receives less than 300 mm per annum (Sinclair 1980). One factor which does ameliorate the aridity in near coastal areas is the prevalence of sea mists during the summer. These advective sea fogs are characteristic of the whole west coast although the greatest frequency is to the north with a mean of 146 fog days being recorded at Fort Nolloth (Heydorn & Tinley 1980). The beneficial effect of this extra water source on the coastal fynbos has not been quantified but condensation of water droplets has been frequently noted (Taylor 1978).

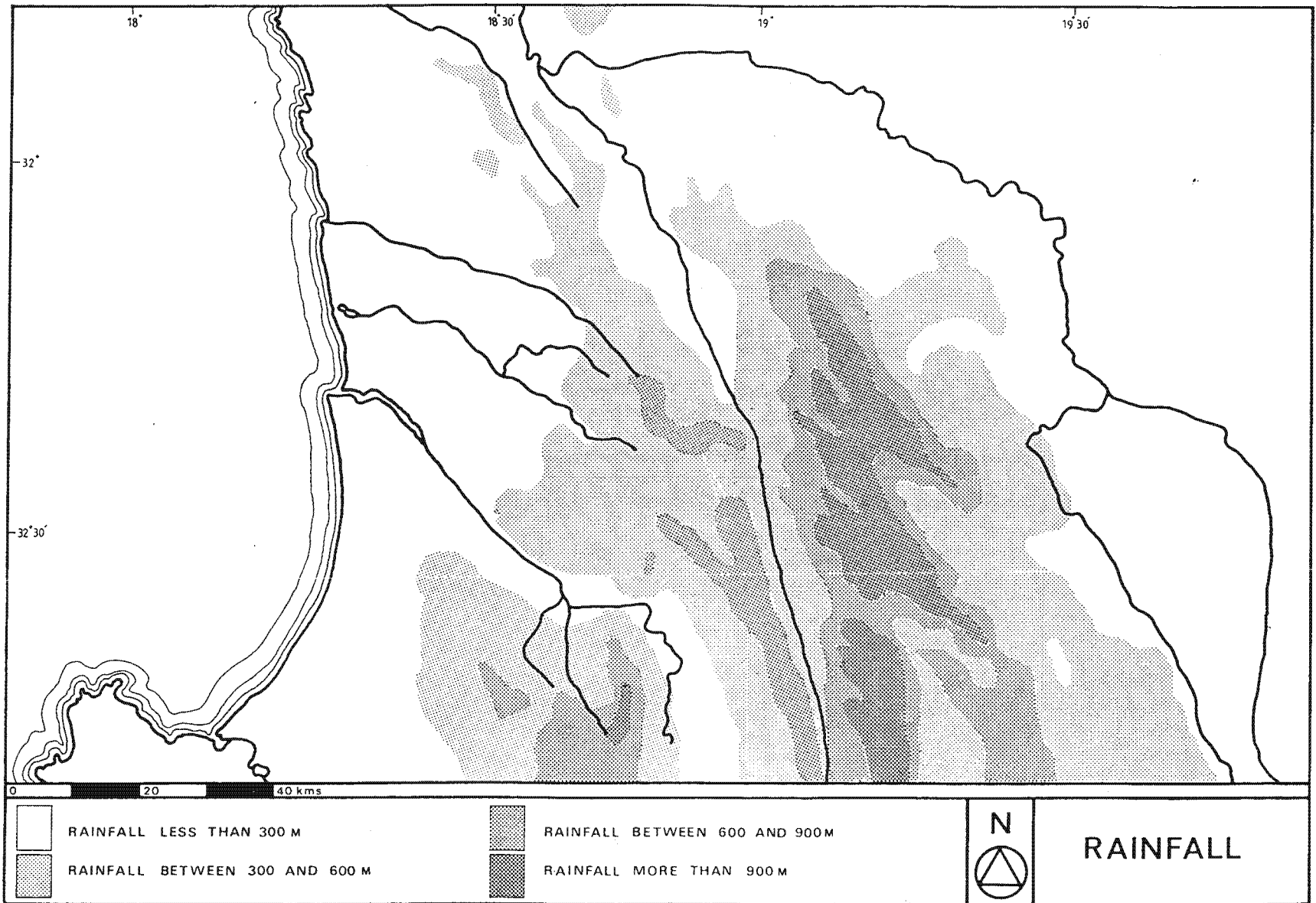


FIG. 3:2 RAINFALL IN THE SOUTH-WESTERN CAPE

2. FLORA

The Cape Floral Kingdom is concentrated in the region known as Capensis, the western part of which has a distinctly mediterranean-type climate and is bounded to the north and east principally by the Karoo-Namib region. The Capensis vegetation is divided into two main formations: the heathlands, on oligotrophic soils, which are called fynbos and the mediterranean-type shrublands and scrub, found on more fertile soils, which are known as renosterveld and strandveld (Boucher 1981). Within the research area, travelling west to east from the coast across the sandveld to the Cape Fold Belt mountains, the following three main veld types are distinguished (Acocks 1975):

(1) Strandveld	Acocks No. 34
(2) Coastal Fynbos (Coastal Macchia)	" 47
(3) Mountain Fynbos (Macchia)	" 69

Coastal Renosterveld (Acocks No. 46) also occurs in the sandveld but to the south of the research area and is a veld type more typical of the shales and granites of the swartland. The fynbos biome is an exceptionally rich and varied community with many endemic animals and a flora of more than 1200 recorded species. Many of the plants are habitat specific with a limited distribution and it is regrettable that a large proportion of recent extinctions, as well as currently endangered plants, are fynbos species. In a recent conservation survey of western Cape lowland fynbos (Parker 1982) it was estimated that only 14.7% of the vegetation remains in a reasonably natural state.

2.1 Strandveld

Acocks' Veld Types often pose some problems of definition as they are essentially agro-ecological units and are by no means structurally uniform. This is particularly true of the Strandveld where the term has been used to

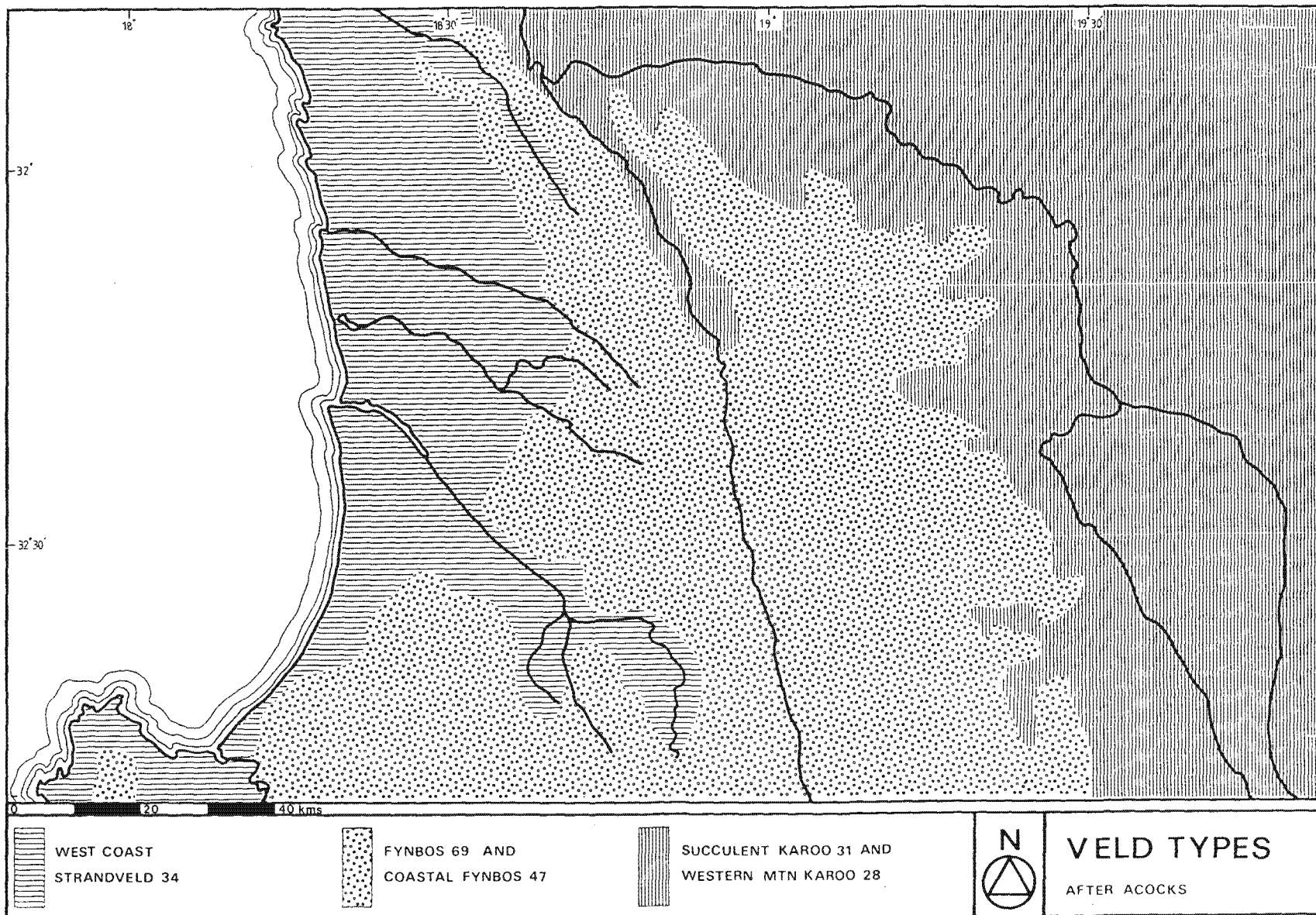


FIG. 3:3 VELD TYPES IN THE SOUTH-WESTERN CAPE

describe a wide variety of concepts ranging from landscapes to transitional zones (see Taylor 1978). It is used geographically to cover the vegetation of the lower parts of the sandy western Cape coastal plains which receive less than 300 mm of rain per annum (Acocks 1975). Structurally it is commonly referred to as broad-leaved sclerophyllous scrub of the type usually associated with dunes near the coast (Boucher 1981).

Strandveld vegetation is variable but shrubs, dwarf-shrubs with succulent leaves and deciduous-leaved geophytes are common. Scattered clumps of Restionaceae, such as Willdenowia striata and Thamnochortus spp., occur with increasing abundance as the distance from the sea increases along with marginal fynbos species such as Nylandtia spinosa. Ericaceae and Proteaceae are not normally considered to be part of the Strandveld spectrum. Grasses are not usually dominant but can become plentiful if given the opportunity as demonstrated by the Nortier Reserve near Lambert's Bay (Acocks 1975).

2.2 Coastal Fynbos

This heathland vegetation occurs on leached acid soils or wind blown sands. Altitudes vary from 0 to 300m and rainfall from 300 to 500mm per annum (Boucher 1981). The typical form of this veld type is dominated by ericoid evergreen shrubs and rhizomatous hemicryptophytes. Annual herbs and geophytes occur but not to the same extent as in the Strandveld. The low canopy treeless profile makes it very susceptible to invasion by alien trees and tall shrubs such as Acacia spp., Eucalyptus spp. and Leptospermum spp.. In its pristine state Coastal Fynbos is typified by Proteaceae and Restionaceae and by ericoid-leaved shrubs although not by Ericaceae.

2.3 Mountain Fynbos

Mountain Fynbos is the largest and most important unit of Capensis

vegetation and occurs in two blocks, western and eastern. Only the western block (Acocks' Macchia), which extends from Cape Agulhas to beyond the Cedarberg, is of concern here. It covers mountain ranges with a roughly south-north trend which receive more than 250mm of rain per annum, at least half of which falls during the winter months (Taylor 1978).

Mountain Fynbos is characterised by the dominance of Proteaceae, Ericaceae and Iridaceae and by the relative scarcity of Gramineae as compared to the lowland veld types. Beyond this it is difficult to generalise due to the diversity of environments and influencing factors such as soil structure, moisture and altitude which determine the type of climax vegetation that develops. Coastal Fynbos is far more uniform in composition than the mountain variant due to the uniformity of the sandy plain in contrast to the great variety of niches present in the Fold Belt mountains. There is, however, a degree of vertical zonation discernible as one ascends a mountain slope with gradual changes in structure, plant form and floristic composition. On the foothills and lower slopes the climax vegetation is principally tall proteoid shrubs. On the upper slopes shorter ericoid forms are prominent while restioids often dominate the exposed ridges, peaks and specialised habitats.

The proteoid zone of the Cape Fold Belt is of particular interest as, apart from having a more complex structure than any other fynbos type, it contains the highest proportion of edible plants. In a well developed community the following three layers are common (Taylor 1978). An upper, usually discontinuous, overstory of proteoid shrubs maximising at about three metres, a dense middle layer of ericoids and small-leaved proteoids and a ground layer of small shrubs, herbs and geophytes. The proteoid zone seldom extends to altitudes exceeding 1000m. At higher altitudes, in the ericoid-restioid zone, rainfall increases and temperature decreases concomitant with a reduction in overstory height. It is interesting to note

that during rock art surveys of the Olifantsrivierberg and the Cedarberg (personal notes) it was found that most of the sites fell within the lower altitude range and, hence, in the proteoid zone.

Another feature of the proteoid zone is the presence of trees. Isolated examples of Maytenus oleoides and Heeria argenticia sparsely dot the hillsides and in rocky areas are joined by forest trees such as Podocarpus elongatus and Olea africana to form a closed scrub forest averaging 7 to 8m in height. Due to disturbance by man and the introduction of alien woody species these areas of indigenous forest are no longer common but still exist in the more inaccessible kloofs.

2.4 Fire in Fynbos

When Vasco da Gama rounded the Cape of Good Hope nearly 500 years ago he coined the term 'Terra de Fume' on account of the columns of smoke visible from the sea (Wicht 1945). Even today the frequent recurrence of veld fires in the dry season is one of the striking features of the Cape. There seems little doubt that much of the south-western Cape is a fire-climax regime, the important question being whether regularly induced veld burning has significantly altered the natural vegetation structure. Wicht (1945) suggests that any cover can be expected to burn naturally every 30 to 40 years. Reports by early visitors to the Cape (eg. Sparrman 1785; Thom 1954) show that fires were intentionally started by indigenous people to promote new growth. Subsequent to their settlement in the Cape, some 300 years ago, European farmers continued this practice in a more or less uncontrolled fashion despite early legislation against the habit (Boucher 1981).

Whilst most fynbos types are to some extent fire adapted those forms with underground perennating organs, notably Liliaceae, Amaryllidaceae, Iridaceae and Orchidaceae, have a survival advantage due to the insulating

properties of the soil. Thus regular burning would favour these so-called fire geophytes as well as annual grasses which would benefit from the absence of competition from woody shrubs. This would promote a state of affairs advantageous to both hunter-gatherers and pastoralists alike, although one might predict a mountain fynbos focus for the former and a lowland orientation for the latter. The evidence of veld type characteristics discussed above would support this notion.

In the light of contemporary Kalahari studies (eg. Lee 1968; Tanaka 1980) it has been established, at least for comparable environments, that hunter-gatherer societies rely heavily on collected plant foods. The use of corm-bearing geophytes as prehistoric food staples has been attested to both historically (Barrow 1801) and archaeologically (Deacon, H.J. 1976; Parkington 1977). It would seem likely that Cape Fold Belt settlement would have been geared towards optimisation of this resource. Parkington (1977) has shown that iridaceous corms are most abundant and palatable in summer and autumn months and suggests that occupation of the mountains would be scheduled for these months of the year.

To return to the question of the long term effects of an artificially induced fire regime, the Strandveld, Coastal Fynbos and Coastal Renosterveld all appear to be types that have been exposed to a relatively short interval fire regime and to heavy grazing. Mountain Fynbos, at least in parts, has retained a fire climax vegetation suggestive of a longer regeneration period. It is postulated (Boucher 1981) that the present treeless state of the lowland areas is an unnatural phase related to short interval veld burning. The success of acacia, pine and eucalyptus in the Coastal Fynbos suggests, however, that where this vacant niche has been recolonised it has been at the expense of the indigenous tree flora.

3. FAUNA

It is a sad fact that there are no longer wild large mammals in the south-western Cape today although all groups, with the exception of the giraffe, were represented before the advent of European colonialism (David 1981). A large and diverse fauna is known historically to have occupied the coastal lowlands and the major river valleys (Ansell 1968; Skead 1980). Of the larger antelope, eland (Taurotragus oryx), red hartebeest (Alcephalus caama) and Cape buffalo (Syncerus caffer) were frequently sighted. Other large mammals encountered included elephant, zebra, black rhinoceros and hippopotamus.

Support for these sightings comes from the rock art, as all the above animals occur in the painted record of the south-western Cape. As such the incidence of the paintings gives a good indication of the large animals likely to be found in the area, although this is not to suggest an a priori justification for the art. An interesting exception to the historical records is the case of the wildebeest. Although present in the art, neither the black wildebeest (Connochaetes gnu) nor the blue wildebeest (Connochaetes taurinus) was ever recorded historically anywhere near the south-western Cape. Paintings of wildebeest are admittedly rare but do occur both in the sandveld and the Cedarberg.

The species diversity amongst smaller mammals is probably much the same as before European settlement, although habitat disruption must have affected distribution and population densities. An exception is the dassie (Procavia capensis) which is more numerous due to the persecution of its natural predators. Also abundant today is the bat-eared fox (Otocyon megalotis) which is thought to be a recent arrival in the south-western Cape (Stuart 1981).

Three species of small antelope, steenbok, duiker and grysbok, are present today in the sandveld. All are non-gregarious and are principally

browsers with small territorial ranges. Typical of open veld locations are the steenbok (Raphicerus campestris) and the grey duiker (Sylvicapra grimmia). The ability of these animals to maintain their numbers in the face of human and other pressures is unique in antelope species and is the main reason for their current wide distribution (Pienaar 1974). The Cape grysbok (Raphicerus melanotis) is less frequently encountered as it exploits a more limited environment and is endemic to fynbos bush. The Vaal rhebuck (Pelea capreolus) is probably no longer extant in the research area although it certainly occupied the hummocky plateau areas within living memory (sandveld farmers, pers. comm.). Along with the klipspringer (Oreotragus oreotragus) it still thrives in parts of the Cape Fold Belt.

Among the smaller animals dassies and tortoises abound in both the lowlands and the mountains and in prehistoric times were probably the most readily available alternative to plant foods. Other small animals common in the sandveld include the Cape hare, small carnivores, such as the mongoose and several species of rodent, including the dune mole rat and the porcupine. Snakes and lizards are also common. It seems unlikely that any of these were exploited on anything other than a casual basis.

In terms of seasonal availability both dassies and tortoises are procurable throughout the year although numbers vary and desirability may alter according to the prominence of other resources. Dassies, along with certain rodents, show an annual fluctuation in numbers due primarily to a restricted breeding season and are most numerous in summer (David 1981). Tortoises are traditionally regarded as summer fare, being active and visible at this time of the year, and also by virtue of their exclusivity as a summer resource in the case of the Gwi San (Silberbauer 1972). They are, however, equally collectable in their dormant winter condition when they seek minimal shelter beneath bushes. One negative result of veld burning is the reduction in tortoise numbers. This is well illustrated by

the virtual elimination of the geometric tortoise (Psammobates geometricus) from the tortoise reserve at Elandberg due to the effects of an unfortunate veld fire (Comrie Greig 1982).

The small antelope maintain strict territories throughout the year and are equally available in summer or winter although only as single or paired animals. The only exception is the Vaal rhebuck which tends to be gregarious, particularly during the breeding season when a master ram may gather up a party of up to 30 females and young (Dorst & Dandelot 1972). With the larger antelope the tendency towards migratory behaviour, rather than the observance of territorial imperatives, makes them an unpredictable resource. Within the south-western Cape, Robertshaw (1979) suggests the coastal foreland or swartland as a prime focus for the larger grazing animals on account of the fertile soils and rich grasses. The sandveld is less attractive in this respect, being more suited to browsing forms, while the mountains, with the exception of the major river valleys, are very poor terrain for grazing. The remaining option is the Tanqua Karoo where brief winter rains provide a rich, albeit short lived, grazing regime. In historical times this was taken advantage of by large herds of migratory game, notably the springbok (Antidorcas marsupialis).

In summary, hunter-gatherer exploitation of the south-western Cape would seem to revolve around three main variables, namely, plant foods, marine resources and large grazing animals. These would be held in balance by the seasonal influence of temperature and rainfall as well as the need for fresh water. Following Parkington (1977) and Robertshaw (1979) it is predicted that inland occupation would be centred on the seasonal availability of plant foods. The exploitation of this particular resource would be scheduled for summer in the Cape Fold Belt and on the coastal foreland and for early winter and late spring in the sandveld. Fresh water is not considered a limiting factor in the mountains but may have localised settlement in the sandveld. The presence of migratory game in the Karoo may

well have attracted hunter-gatherers in the winter months, but the lack of water and extreme temperatures argue against longer period settlement. Robertshaw (1979) suggests that shortage of water in the coastal foreland during summer would have caused large game to aggregate near perennial water sources. Thus riverine settlement would offer possibilities of big game hunting as well as the options of fishing and the pursuit of waterfowl. A similar scenario may be predicted for the Olifants River valley. Coastal settlement is deemed to centre mainly on the exploitation of marine resources. Parkington (1977) suggests that marine molluscs took the place of plant foods as dietary staples and that the exploitation of this resource set took place mainly during winter.

4. PALAEOENVIRONMENTS

Evidence, accumulated primarily from the long sequence at Elands Bay Cave but also from the general vicinity of Verlorevlei, has been used to reconstruct the major environmental changes which occurred during the late Pleistocene and Holocene in the south west Cape (Parkington 1980b, 1984a). The terminal Pleistocene levels at Elands Bay Cave contain a fauna dominated by large grazing animals including the extinct Cape horse (Equus capensis) and the extinct giant buffalo (Pelorovis antiquus). The situation at about 18 000 B.P. reflects a period when the sea level was an estimated 140m lower than at present and the shoreline approximately 37km west of its position today. This exposure of the continental shelf would have vastly increased the grazing potential of the region. At this point in time Elands Bay Cave would have been an inland site located adjacent to an fresh water Verlorevlei.

The period 12 500 to 8000 B.P. is marked by a rise in sea level which brought the coastline to within an exploitable distance from the cave. This is registered by the appearance of marine forms in the faunal assemblage,

concomitant with the replacement of large grazing species by smaller browsing animals. From 8000 B.P. until after 4000 B.P. no occupation is apparent at Elands Bay Cave. An occupational hiatus of similar dimensions has recently been confirmed at Tortoise Cave (Robey 1984). The reasons for this relative lack of interest in the coast during the mid-Holocene are undoubtedly complex but it is generally assumed (Miller 1981) that a combination of aridity and a higher sea level resulted in adverse conditions and a lack of fresh water. The postulated rise in sea level during this period would have created full lagoonal conditions in Verlorevlei with tidal influence reaching perhaps 20km upstream. This tidal incursion is reflected in a slope break, at about 3m above present sea level, clearly visible along the lower reaches of the vlei. The rise in sea level would have rendered Elands Bay Cave incommodious for occupation due to salt water spray reaching into the catchment basin of the cave. The presence of extensive gypsum evaporate introduced post-depositionally into the earlier layers qualifies this notion. Although this factor would not preclude residence at Tortoise Cave the drowning of the productive intertidal areas would severely affect an economy harnessed to marine exploitation.

Habitation recommenced at Elands Bay Cave at about 3700 B.P. with fairly extensive deposits prevailing until about 300 B.P. The faunal remains reveal an essentially modern spectrum suggesting that no major climatic or environmental changes occurred during the late Holocene in the south west Cape. A similar pattern ensues at Tortoise Cave except for a slightly earlier reoccupation date (Robey 1984). Subsequent to 4000 B.P. coastal and near coastal occupation proliferated in the Elands Bay area with a notable intensification of shellfish predation commencing around 3000 B.P. The latter event is well documented in the impressively sized shell middens at reef and dune sites along the coast. These patterns are to some extent mirrored by events in the interior sandveld where late Holocene

occupation centred on open sites, usually in low lying sandy areas near to water, and on rock shelters in sandstone outcrops, koppies and semi-mountainous massifs. This theme is explored at greater length in subsequent chapters.

CHAPTER 4.

THE RESEARCH AREA: SURVEY & SAMPLING.

1. THE RESEARCH AREA

The area selected for the fieldwork programme comprises a segment of the landscape stretching inland from the coast at Elands Bay to the foothills of the Uitkomsberge which mark the beginnings of the Cape Fold Belt. The area was chosen for two main reasons. Firstly, it provides a wide spectrum of sites across a virtually uninterrupted section of the sandveld between the coast and the mountains. Secondly, it lends continuity to the several allied projects already embarked upon in the area. It was in fact the challenge of testing and extending the arguments arising from previous investigations (Mazel 1978; Mazel & Parkington 1978, 1981; Parkington 1977, 1980a) that provided the initial impetus for the project.

For the sake of convenience the limits of the research area were drawn to coincide with the four 1:50,000 maps (index 3218) covering Elandsbaai, Lambert's Bay, Graafwater and Redelinghuys. The resulting area is contained between latitudes $32^{\circ} 00'$ and $32^{\circ} 30'$ south and between the coast and longitude $18^{\circ} 45'$ east. The area is dauntingly large, covering nearly 2500 sq. km, but compensatory factors are the large expanses of fairly open country and the high degree of site visibility engendered by the low scrub vegetation. More time consuming, in terms of locating sites, are the koppies and mountainous ridges which rise to a maximum height of 360m in this part of the sandveld.

To facilitate data handling the research area was sub-divided into a number of zones. Zones 1 to 6 cover the areas to the north and south of each of the three main river systems while zone 7 covers the sandveld/mountain interface to the east. Although introduced for reasons of

convenience the zones do approximate to the natural geographic boundaries of the research area. The sites included in Appendices 1 to 5 are listed according to these zones.

2. SURVEY

The objective of the survey was, quite simply, to locate and record all the prehistoric sites in the research area. Obviously with the time and resources available this was not possible or even feasible but saturation coverage was achieved in many parts and all areas received some attention. Particular attention was focussed along the major river courses, the coast and the most prominent koppies. Most of the fieldwork was undertaken during the period November 1981 to September 1983, with much of the initial survey benefitting from an earlier rock art project carried out in roughly the same area (Manhire 1981). This serves to underline the usefulness of a preliminary rock art reconnaissance as the depth of coverage necessary to locate painted sites virtually ensures the discovery of all other types of site.

The method employed was mainly systematic ground survey although the recently published Government Survey Department 1:10 000 orthophotos greatly facilitated the location and plotting of deflation areas. Technically it was a combination of reconnaissance and survey, in that sites were not only located but also evaluated in terms of artefactual content. Walk paths were recorded after each exercise not only to indicate areas covered but also to distinguish unsearched areas from negative or blank areas on the map where no evidence of occupation was found.

Fig. 4:1 gives a generalised picture of the search patterns employed during the survey. At the scale in which the map is drawn it is not possible to include all the detailed transects undertaken in areas of complex topography but it does indicate the main areas of search. The

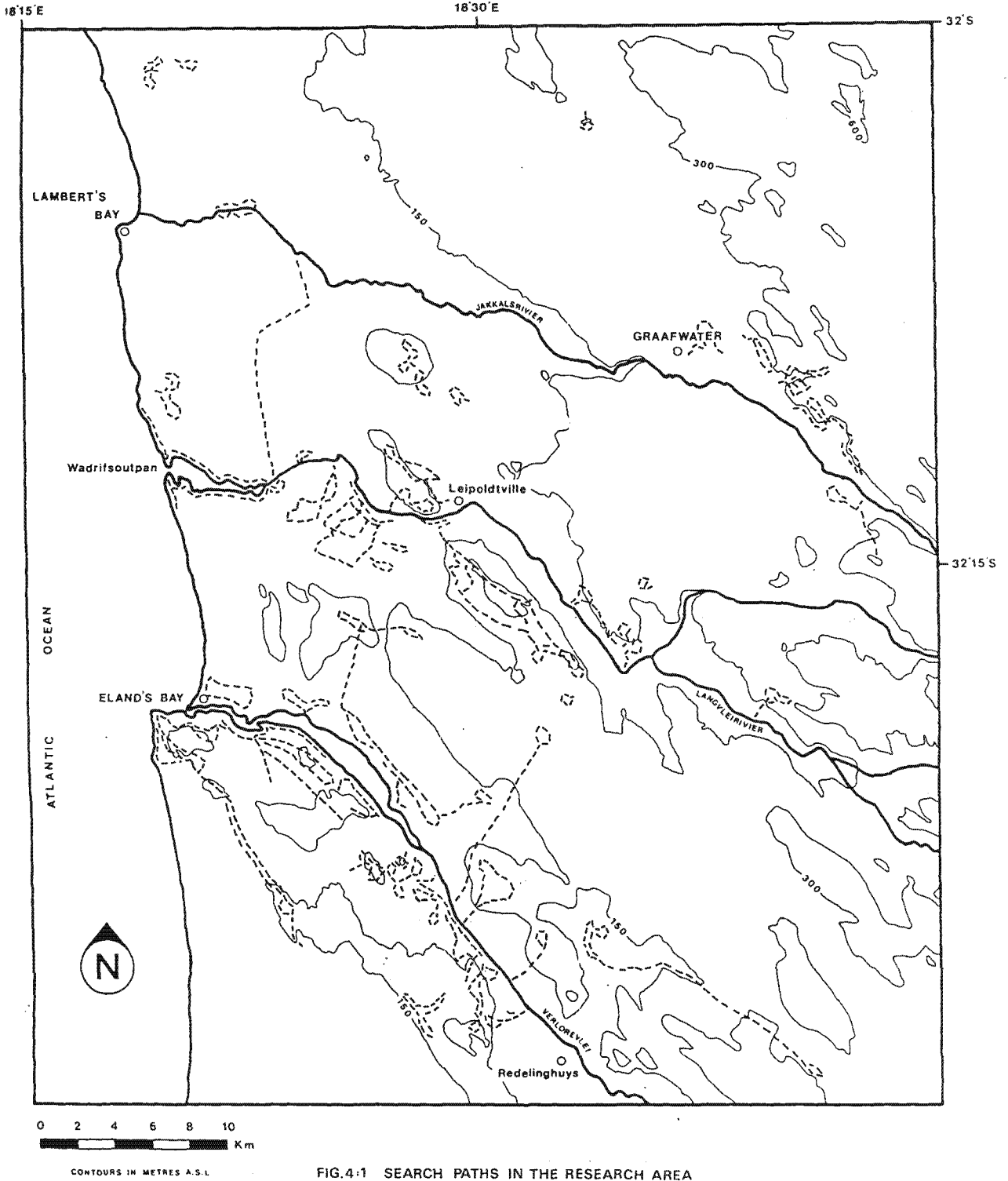


FIG.4:1 SEARCH PATHS IN THE RESEARCH AREA

survey was admittedly directed towards obvious features in the landscape such as rock outcrops and sandy deflation areas which were separated by large areas of featureless veld. Although several transects were undertaken in these areas they were singularly unrewarding and to date we have not been able to define a site in areas lacking an obvious focus. What is clear, however, is that, whilst sites probably do occur in these tracts of featureless veld, prehistoric occupation was largely focussed towards rock outcrops, deflation areas and coastal reefs.

Site recording varied according to the type of site but at a minimal level included the completion of a site record form combined with locational mapping, sketches and photographs. Contextual details such as water catchment basins, site aspect, geology et cetera were noted along with features from the natural environment. The aim of the data acquisition phase was to collect sufficient information at each site to allow for the compilation of a data nomenclature system suitable for inter-site comparisons. A second and equally important function of this data base was to select sites for sampling at a later stage in the fieldwork programme.

3. THE SITES

The precise definition of a site is often problematic especially when dealing with locations ranging from the ephemeral to the substantial, let alone with artefact types as diverse as rock paintings and stone tools. To help overcome this problem the site content was divided into a number of separate categories to describe the artefacts, ecofacts and occasional features variably present at sites. Thus a site may be described in terms of its location and also categorised by what may be called site attributes. The following site categories were used in the survey:

- (1) Rock art
- (2) Deposit (depth greater than 10 cm)
- (3) Stone scatters

(4) Shell middens/shell scatters

(5) Cairns

All the known sites in the research area are listed in Appendix 1 and qualified under these categories. As can be seen these categories are not mutually exclusive, for example a rock art site can also house a shell midden or be associated with a stone scatter.

One of the dilemmas was how to quantify the ephemeral presence of a few shell fragments or a minimal quantity of lithic waste. The approach, or perhaps compromise, adopted in the site lists was to introduce a secondary or ancillary category to describe these occurrences. The ancillary category consists of:

(1) Pottery

(2) Shell

(3) Stone

(4) Deposit (less than 10 cm)

Inevitably the cut off point between the main and ancillary categories is rather arbitrary and Appendix 1 is perhaps best viewed as a master list which indicates the major and minor site attributes. The need to conserve space predicates against lengthy site descriptions and the appendices represent a digest of the full site reports which occupy five lengthy tomes.

4. DISTRIBUTION OF SITES

Site distribution is summarised under the following categories:

4.1 Rock Art Sites

To date, a total of 523 rock art sites have been recorded within the research area. They are listed in Appendix 2 with distribution shown in

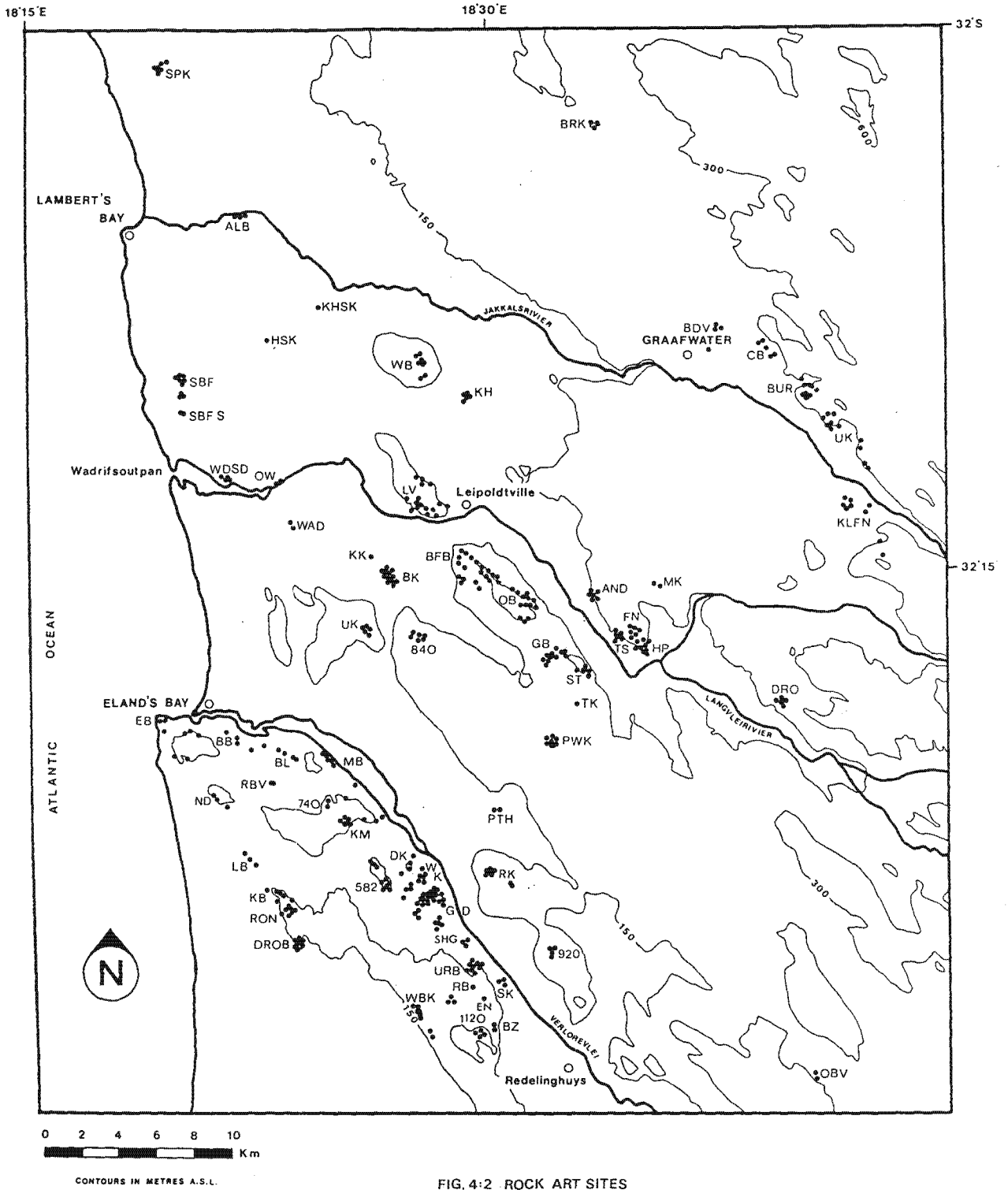


FIG. 4:2 ROCK ART SITES

Fig. 4:2. The problem of site definition becomes less intense with rock paintings as any discrete locality which bears pigment traces is deemed to be a rock art site. As rock art falls outside the scope of this thesis, no attempt has been made to analyse the paintings and comments are restricted to site context and distribution.

In the south-western Cape the distribution of rock art sites is virtually coterminous with that of stone scatters, a correlation which only breaks down in areas lacking rock surfaces large enough to house paintings. Although rock paintings do exist in isolation there are in fact very few painted sites totally lacking in debitage. The majority of rock art sites are small to medium sized caves, recessed shelters and overhangs. Exceptions are exposed rock walls and isolated boulders which are sometimes used as painting surfaces. Very large caves, several of which exist in the area, were seldom used as rock painting locations. Unlike the Cape Folded Belt no altitude delimitation is encountered in the sandveld although painted sites with occupational debris tend to fall within the lower to middle altitude range. The only areas completely neglected as painting locations are the steep escarpments of the mountainous ridges. The local topography appears to be the main determinant in the positioning of sites although there is a tendency for north-west facing shelters to be ignored. This may be of note as the prevailing winds blow from this quadrant in winter.

4.2 Stone Scatters and Sites with Deposit

The distribution of these two categories has been grouped together for obvious reasons. Sites with deposit and/or stone scatters are listed in Appendix 3 and mapped in Fig. 4:3. In this instance the stone scatters refer only to those swards associated with rock shelters or at least with a rock focus. A distinction has been made between this type of occurrence and the open scatters found in deflation situations which are listed

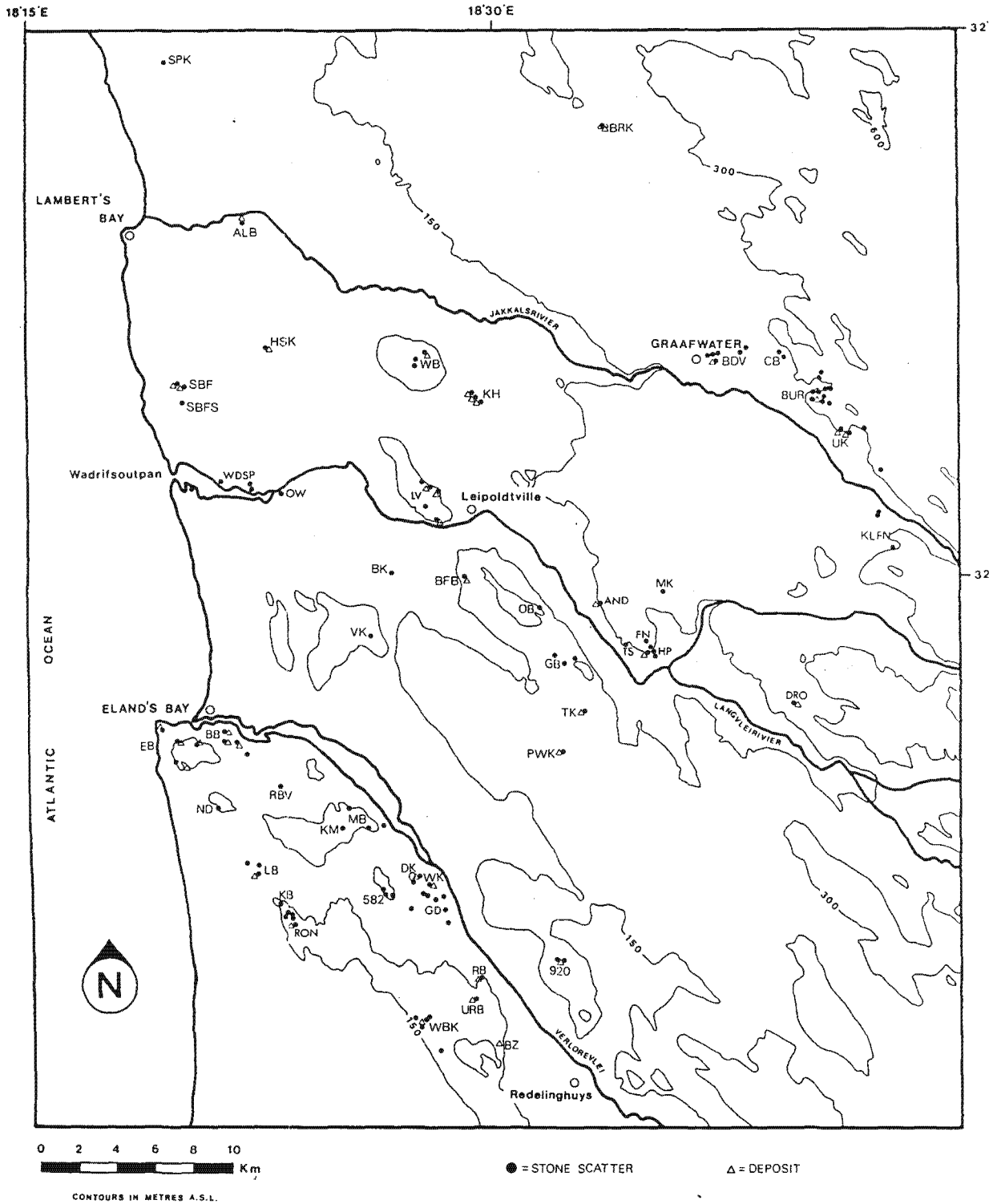


FIG.4:3 STONE ARTEFACT SCATTERS AND SITES WITH DEPOSIT

separately.

A total of 42 sites, containing what is considered to be a significant amount of deposit, have been located within the research area. An interesting pattern is evident here as the only sites with deep deposits are at coastal or near coastal locations. Furthermore these large sites are all shell midden deposits. The inland pattern is one of the repeated occurrence of small sites with shallow deposits, talus scatters and, usually, rock paintings. An exception to this rule are the deep deposits found at Diepkloof Cave, located approximately 18 km inland on the south bank of Verlorevlei, but here again the Holocene deposits are shallow and overlay substantial Pleistocene MSA horizons (Parkington 1977).

A total of 118 stone scatters are listed in Appendix 3 as representing assemblages with a reasonable number of stone tools or a sizable accumulation of flakes. These scatters grade off into lower orders of stone occurrences and again the distinction between a significant and a background event is relative rather than absolute. The complex interplay of raw materials, artefact frequencies and locational details evident at these sites is dealt with at some length in chapter 6.

4.3 Deflation Hollows

The majority of deflation hollows or bays are located in low lying areas adjacent to the main river courses. Typical situations are the banked sand dune areas in near coastal regions. Other hollows occur in sand bodies associated with rock outcrops and koppies. These hollows form a persistent focus for stone tool assemblages and despite systematic ground surveys no stone scatters, and in fact very few stone artefacts at all, were found in open veld situations other than in deflation bays.

A total of 236 deflation hollows were examined in some detail within the research area. They are listed in Appendix 4 with distribution shown in

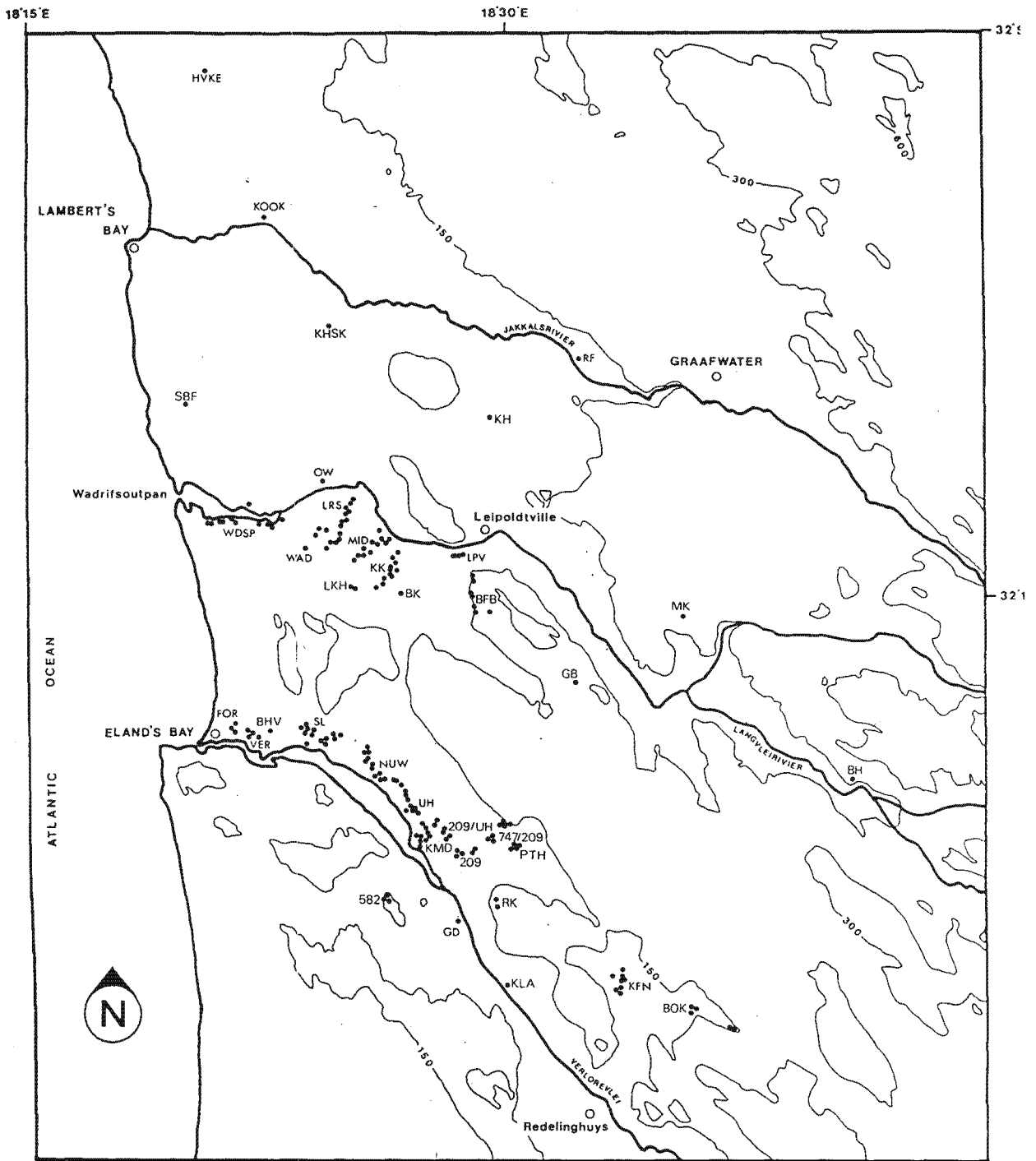


FIG. 4:4 DEFLATION HOLLOWS

Fig. 4:4. The list includes all hollows reconnoitred, irrespective of whether or not they contained artefacts, although in practice very few hollows were totally sterile. As a working guide to formal tool density a 1 to 10 scale was introduced to provide a relative rating for each hollow. This was termed the Aron scale in honour of the pioneering work of Mazel (1978).

4.4 Shell Middens and Shell Scatters

A distinction was made between shell middens which showed some depth of accumulation and shell scatters which were often extensive but lacked a sub-surface component. Both are listed in Appendix 5 and mapped in Fig. 4:5. The marine shell element in the research area falls into two neat sectors. The shell midden/shell scatter zone extends a maximum distance of 7 km inland from the coast. Beyond this point many sites still contain shell but never in any great quantity. It is suggested (Buchanan, pers. comm.) that it is not cost effective in terms of energy expended, to carry large amounts of shell beyond this limit. Contact with the coast, however, is attested to by the persistent presence of shell throughout the research area.

5. SAMPLING

Implicit in the overall research design was the need to determine the composition of stone tool assemblages of open sites in order to assess inter-assemblage variability. To this end it was necessary to devise a sampling strategy that would provide a representative sample of the whole surface scatter and, at the same time, inflict as little damage to the site as possible. A further consideration was that the strategy must be cost effective in terms of obtaining the desired sample in the least possible time. Previous strategies employed in the sandveld (Mazel 1978) involved the setting up of a small grid in a purposely selected area of a site and

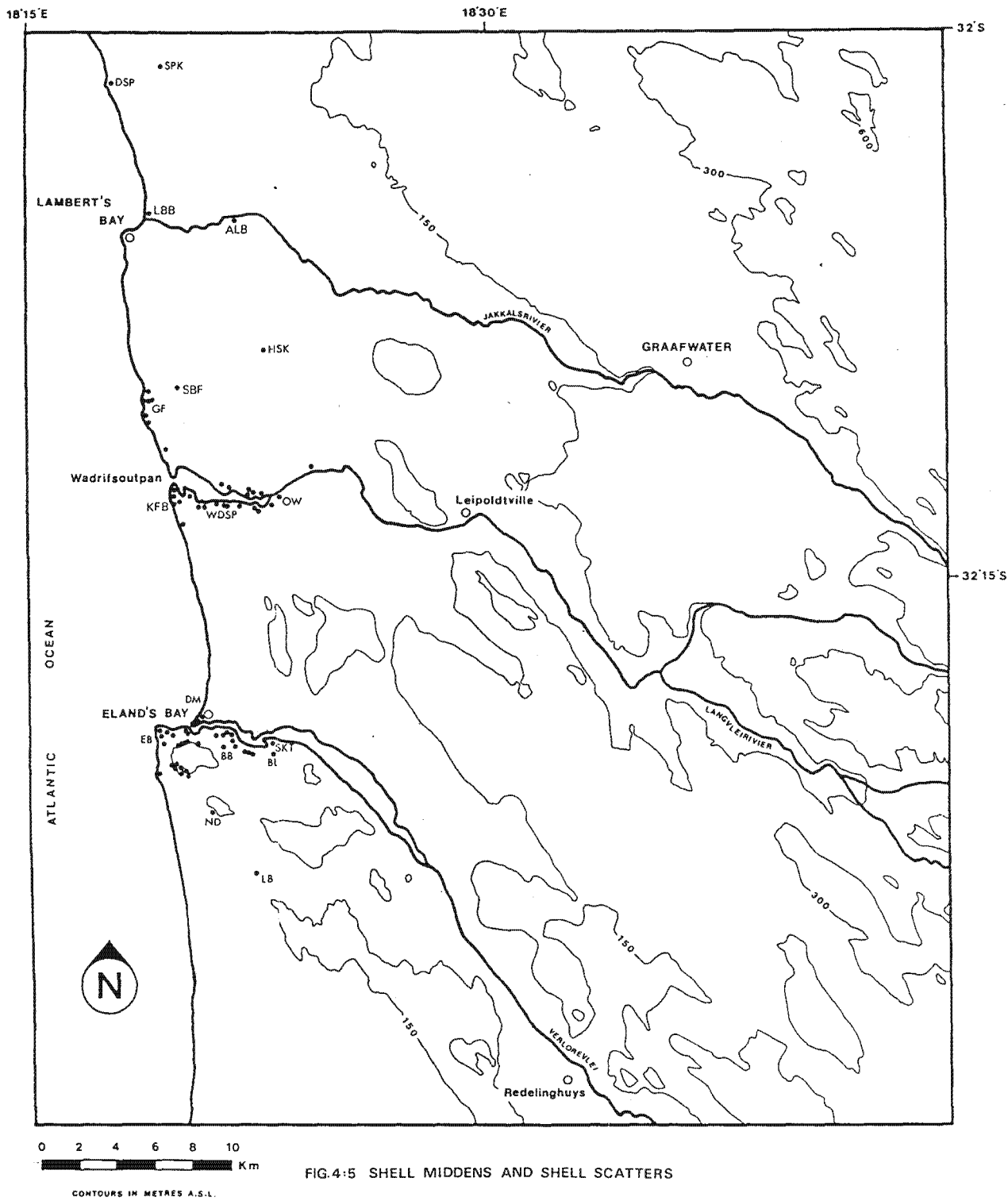


FIG.4:5 SHELL MIDDENS AND SHELL SCATTERS

CONTOURS IN METRES A.S.L.

collecting all the material within the confines of the grid. In retrospect this method is considered unsatisfactory for two reasons. Firstly, there is no way of determining if the sample is representative of the whole site and, secondly, the removal of a portion of the assemblage creates serious difficulties for any subsequent investigator.

After some experimentation the method adopted was a modified version of the systematic unaligned design described by Haggett (1965) and tested in an archaeological situation by Plog (1976). This composite system combines the theoretical advantages of randomisation with the regular interval spacing of systematic methods.

The first operational step was to determine the extent of the surface scatter within the deflation hollow. This area was effectively divided into a regular checkerboard grid by placing wooden stakes at 3m intervals around the perimeter of the scatter. The long axis (x-axis) gave a series of columns and the short axis (y-axis) a series of rows. To draw quadrats for sampling, the x co-ordinate was kept constant while the y co-ordinate varied according to computer generated random numbers. In this way a set of 3x3m quadrats was generated across the site with the columns providing a systematic framework and the rows the random factor. An example of a sample grid is shown in Fig. 4:7.

6. MONITORING OF DEFLATION AREAS

The study of deflation hollows is an unenviable task as, apart from having to contend with the usual problems inherent in open sites, there is the added complication of an unstable driftsand environment. In the sandveld the ubiquitous association of surface scatters with deflation areas raises some intriguing questions regarding prehistoric settlement. The major problem with these sites is the lack of chronological control. The deflation process reduces all the artefacts to a single horizon which

may represent numerous visits over an extended time period. A further complication is the erosive action of wind blown sand which tends to remove all traces of organic material. Despite being of archaeological concern these problems relate more to the dynamic processes which control the movement of sand bodies and it was to study these aspects that a monitoring programme was instigated.

The objectives of the programme were to determine the rate of sand movement and to attempt to ratify the suspected seasonal nature of the deflation/aggradation process. The experiment was set up with the assistance and guidance of Nick Lancaster from the Dept. of Environmental Studies at the University of Cape Town. Three hollows, all of which had been previously sampled, were selected in areas where the chances of interference were low. One was close to the northern shore of Verloreylei and the other two were situated in the extensive dunefields south of the Langvleirivier which are known colloquially as "Death Valley" (see Plate 2).

The experiment is simple in essence and consisted of implanting metal fence droppers in two rows to coincide with the long and short axes of each hollow. Thereafter the height of each pole was measured at approximately monthly intervals in order to gauge the degree of sand movement as registered in the vertical plane. The experiment was set to run for a year and although, at the time of writing, only half the period had elapsed the seasonal trends are already well established. As all three hollows showed essentially the same results only plots from one site are included. Fig. 4:6 shows a plan view of the hollow KK/H while in Fig. 4:7 the sample grid is included. A profile of the hollow is drawn in Fig. 4:8. Figs. 4:9 to 4:13 trace the changes in height recorded over the first six months of the monitoring programme. Two series of histograms are included. The upper (a) series show the monthly increments, while the lower (b) series show the

cumulative changes in the level of the sand floor. Only the results metered for the long north-south axis are included as very little change was registered across the short east-west axis.

It is evident from a perusal of the histograms that the alternation of wind direction has a seasonal effect on the morphology of the hollows. During winter the prevailing north-west winds remove sand from the base of the active dune front with deposition occurring just over the dune crest and, to a lesser extent, over the surface of the hollow. In summer the situation is reversed with some deflation occurring in the basin of the hollow but with most activity again focussed on the dune front (see Plate 3). This process appears to be a major factor in the dune formation process observable in the open areas of Death Valley. The dunes here are typical deflation forms with a flat-hairpin shape stemming from an active dune front (Heydorn & Tinley 1980).

At this stage two questions have to be asked. Firstly, is this deflation pattern of recent origin? Secondly, do the conditions we see today resemble those existing during the period of prehistoric occupation? Neither of these questions can be answered definitively but some informative clues are present in the Death Valley dunefields.

Recent studies (Goudie 1977) show that sand movement will not generally take place through aeolian activity so long as there is good vegetation cover. Observations of currently developing dunes furthermore suggest that vegetation only becomes effective in restricting sand movement when annual precipitation totals exceed about 100 to 300 mm (ibid.). This places the sandveld dunefields in that highly sensitive zone which Heydorn & Tinley (1980) refer to as a homeostatic equilibrium where erosion is balanced by accretion. These areas are often erroneously referred to as stable, whereas unconsolidated sands fixed by plants are highly vulnerable to any factors which disturb vegetation cover. Walsh (1968) considers the



Plate 3 : View of deflation hollow KK/I with stakes used in the monitoring program. Active dune front in the foreground.



Plate 4 : An example of sand movement in the centre of the "Death Valley" dunefields showing a fence buried by driftsand.

main causes of driftsand movement to be the disruption of the natural vegetation by factors such as burning and grazing.

Evidence suggests that much of the dune activity in Death Valley is of fairly recent origin (Lancaster, pers. comm.). The inner dunefields are characterised by large blow-out dunes which tend to swamp vegetation and any other obstacles in their path. An excellent example of this is the submerged fence shown in Plate 4. It seems highly likely that the cause of this activation is due to the recent disturbance of the sand-fixing grasses and shrubs. Walsh (1968), in a historical appraisal of the Bredasdorp area, considers that rapid advance of sand took place within the last 130 years due to bad veld management which disrupted the vulnerable bush-covered sand dunes.

A similar opinion was expressed by one of the local sandveld farmers, Mr Louw of "Louwsrus", whose family records date back to 1783 when the property was first ceded to Jacobus Louw. At that time the farm boundaries stretched all the way to Verlorevelei and included the whole of the dunefields in question. Apparently early farming practice centred around livestock grazing with large flocks of sheep being the rule. The denes or sandy tracts were long regarded as a problem area and from early on attempts were made at reclamation. Some degree of success has been achieved particularly near the Langvleirivier where some hollows have been completely filled in and are now ploughed fields, albeit very sandy ones. The position of the original hollows can still be charted by the stone artefacts, pottery and shell which are ploughed up to the surface.

Using these data a cycle of events may be postulated. Prior to European settlement the dunefields were in a plant stabilised condition. With the advent of farming in the area, about 200 years ago, repeated burning, grazing and cutting of wood reduced plant cover to such a degree that sand movement was activated. This caused the hollows to be deflated to

a level below that of prehistoric occupation. This is shown not only by the reduction of all the artefacts to a single horizon but also by the way this horizon follows the curve of the side walls of many of the hollows. The condition of the dunes at this stage is malleable, rather than unstable, in that some continuity is maintained by the alternation of the winds but a susceptibility to change is also present. Reclamation is possible at this point and is achieved by a two stage operation. Firstly, cut branches are laid over the whole of the hollow to curtail deflation. Next, the dune crests are stabilised by the planting of marram grass or similar sand-fixing species. During this process the artefact horizon rapidly becomes a sub-surface phenomenon. All these phases are currently visible at different places within the Death Valley dunefields.

This leads back to the second question of what the hollows were like in prehistoric times. The cycle outlined above indicates that the hollows were not the inhospitable sandy basins we see today but rather a focus for plant growth. The nearest approaches to a pristine hollow are probably the bushed-in riverside depressions which have been mainly recolonised by alien vegetation. As discussed in the last chapter this process of occupancy of a vacant niche by alien species is a common occurrence in coastal fynbos areas. Despite the apparent aridity of Death Valley the water table is in fact only 1 to 2 metres below the surface in many places. This knowledge is used to advantage by many of the farmers who maintain seepage dams to water livestock. Although plants tend to be stifled by the rapid build up of sand they can survive if they manage to establish themselves fairly quickly. Alien species seem to be at an advantage as several hollows contain dense coppices of acacias and eucalypts which can exploit the water table with their long roots.

A further possibility is that this kind of cycle could have been initiated by the incursion of pastoralists long before the arrival of European farmers in the sandveld. The question of the period of occupancy

of the deflation hollows is considered later but the debilitating effect of large numbers of grazing animals on a marginal environment is one of the possible causes which led to their abandonment.

FIG. 4:6 Plan of Site KK/H showing position of sample grid

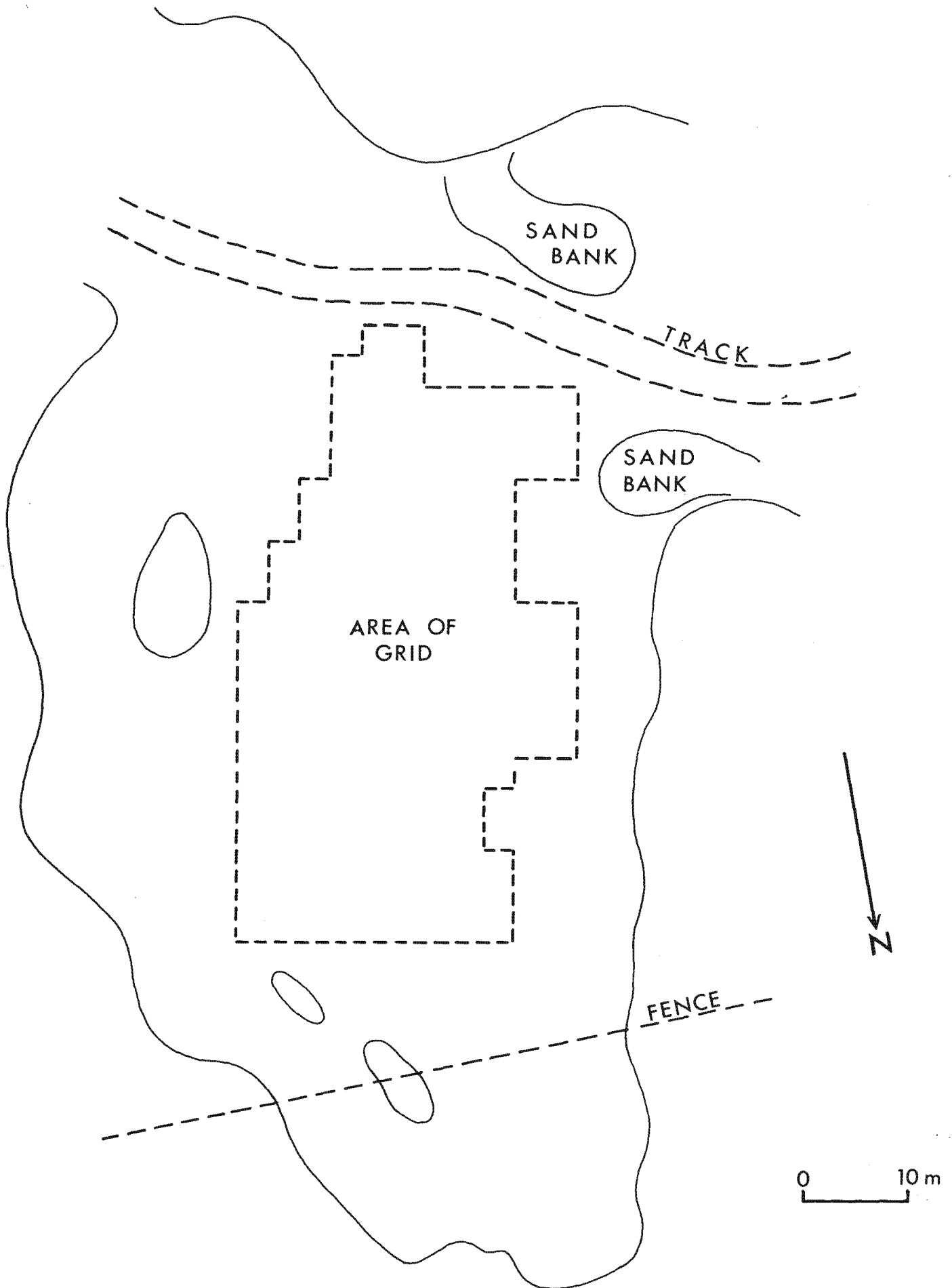


FIG. 4:7 Site KK/H : Grid layout showing quadrats sampled.
The dotted line shows the extent of the surface scatter.

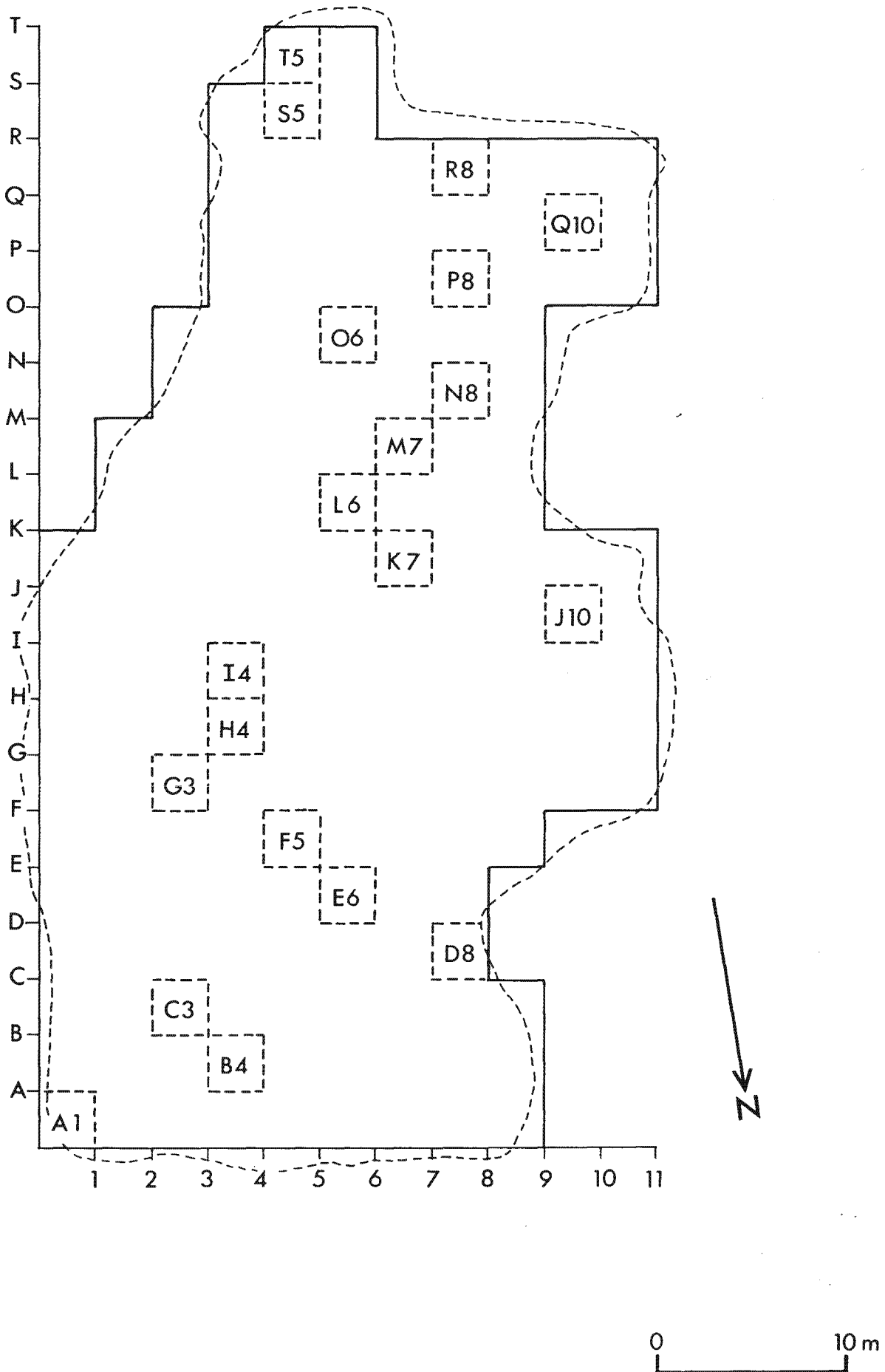
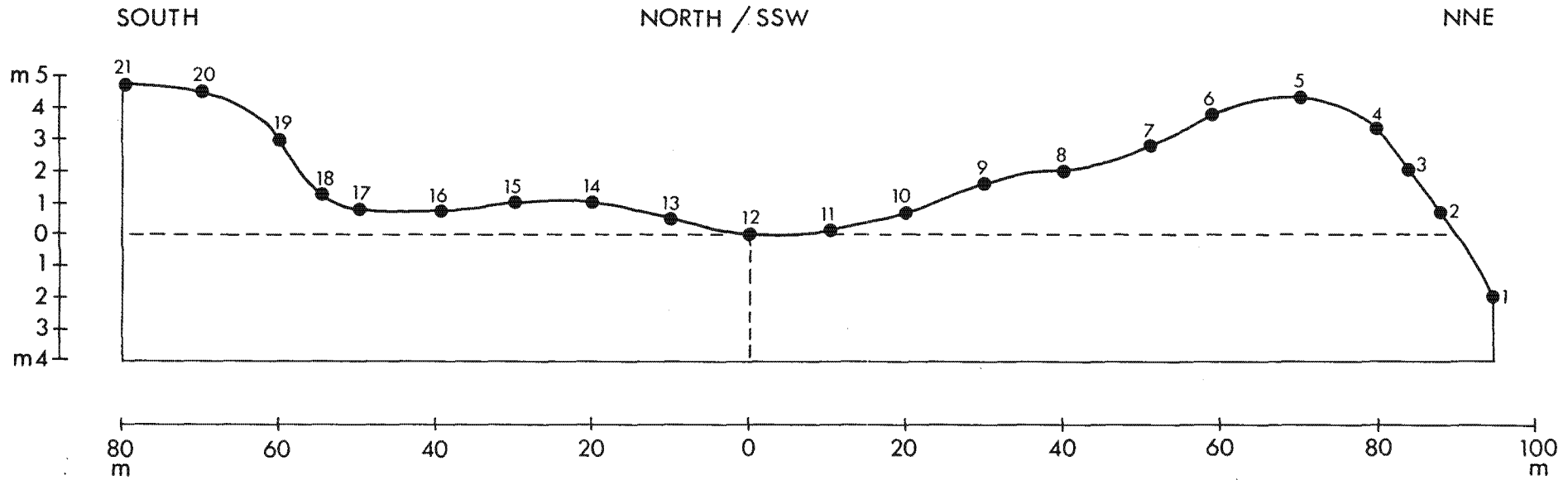
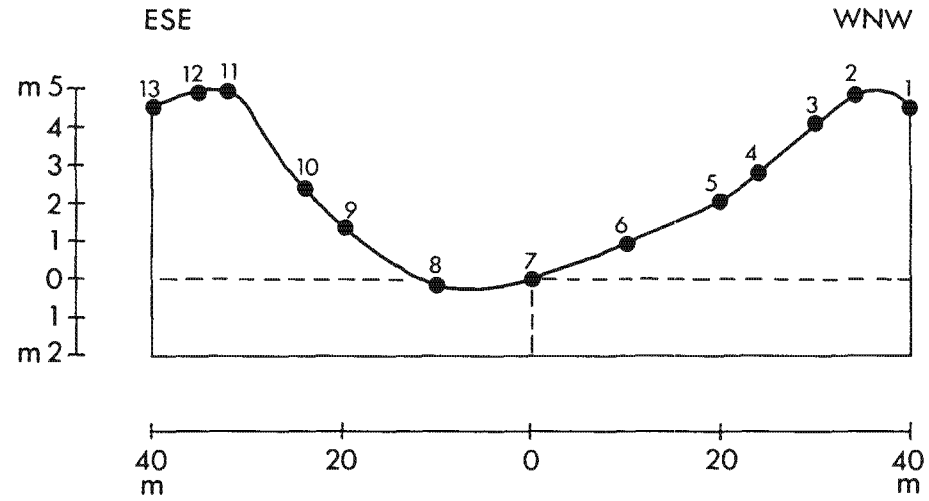


FIG. 4:8 Profiles of Site KK/H.
The numbers indicate measurement points.



KEY TO FIGS. 4 : 9 - 13

The diagrams show the amount of deflation / aggradation which occurred at site KK/H over a period of six months.

The numbers along the horizontal axes represent the stakes placed across the hollow as measurement points.

The histograms show the amount of deposition and removal of sand by wind action at each measurement point. The vertical scale is in millimetres.

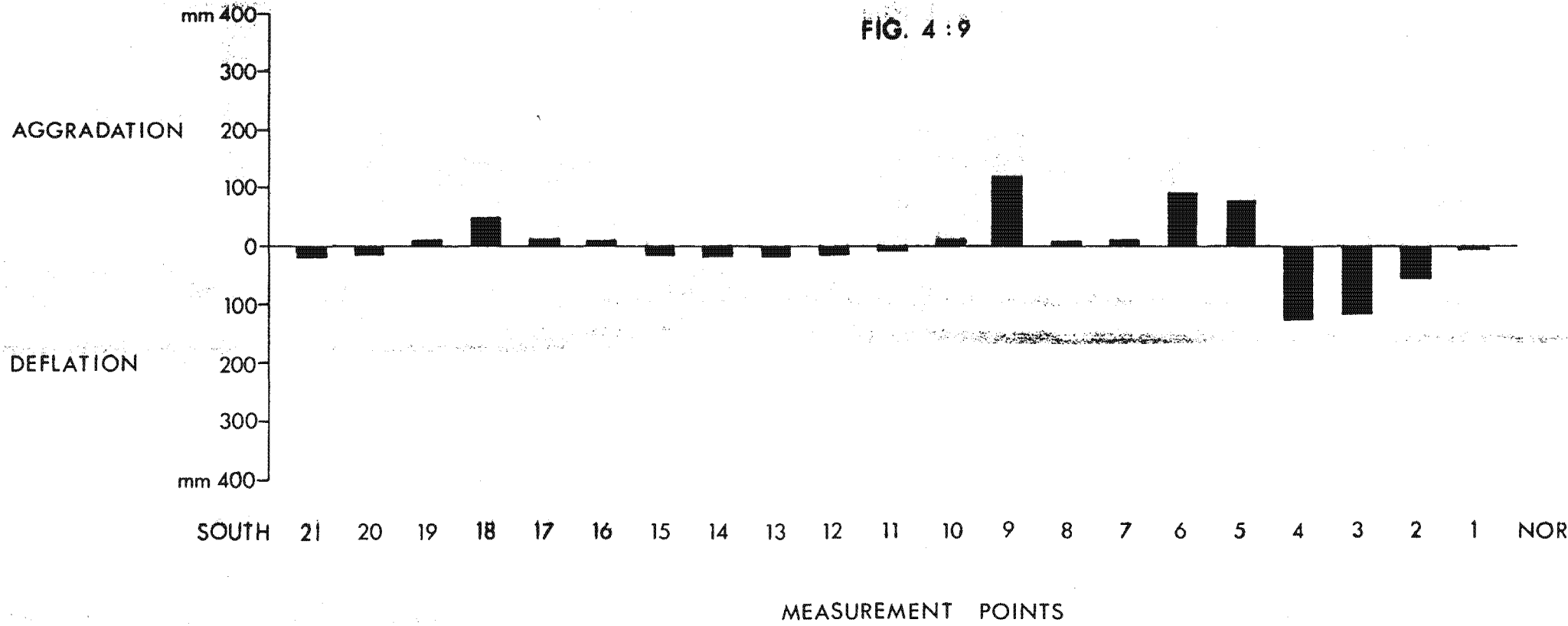
The upper figures (series a) show the amount of change as registered in the vertical plane, at approximately monthly intervals.

The lower figures (series b) show the cumulative change.

The experiment was set up on 27/6/83 and the site was monitored on the following occasions :

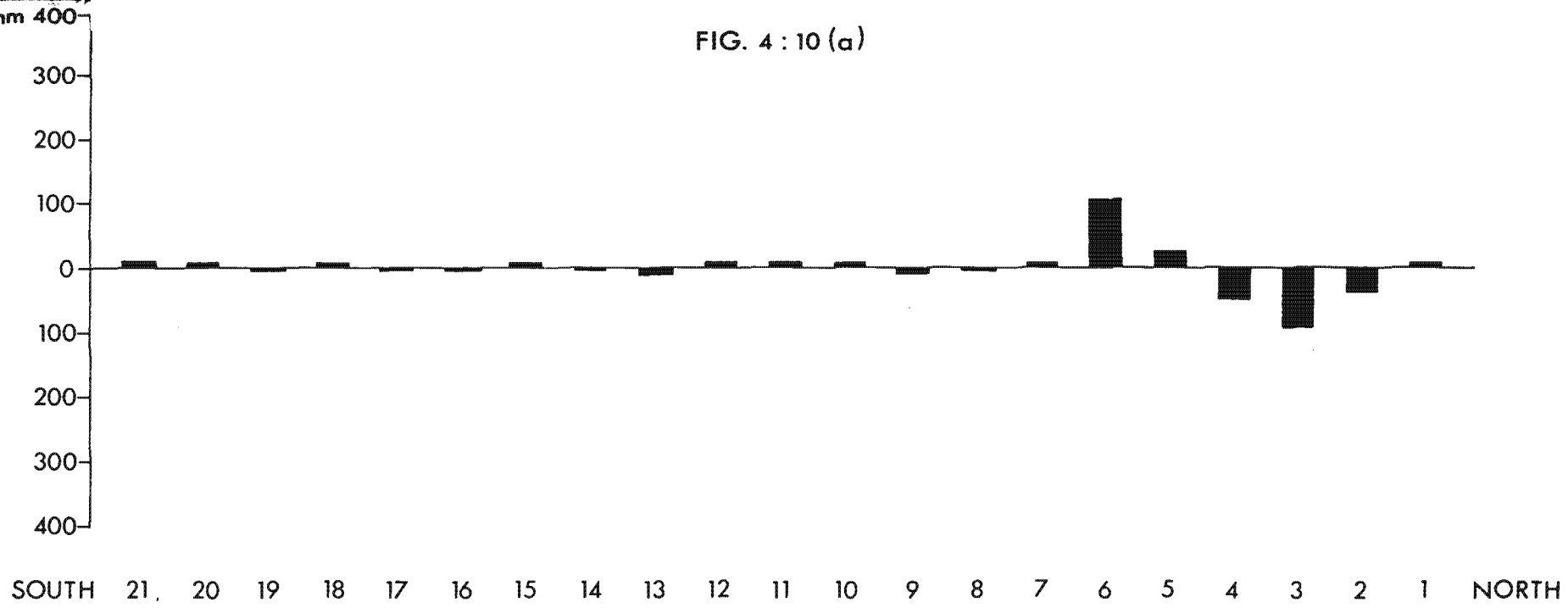
Fig. 4 : 9	7/8/83
Fig. 4 : 10	4/9/83
Fig. 4 : 11	25/9/83
Fig. 4 : 12	10/12/83
Fig. 4 : 13	28/1/84

FIG. 4 : 9



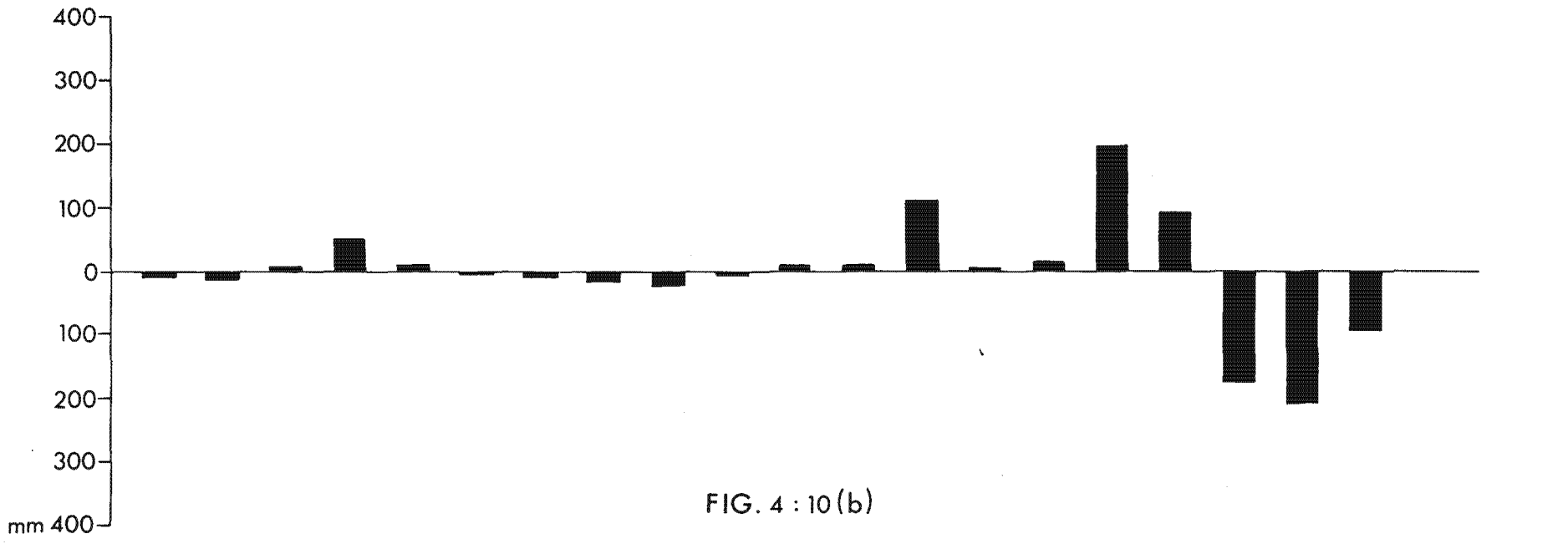
mm 400

FIG. 4 : 10 (a)



mm 400

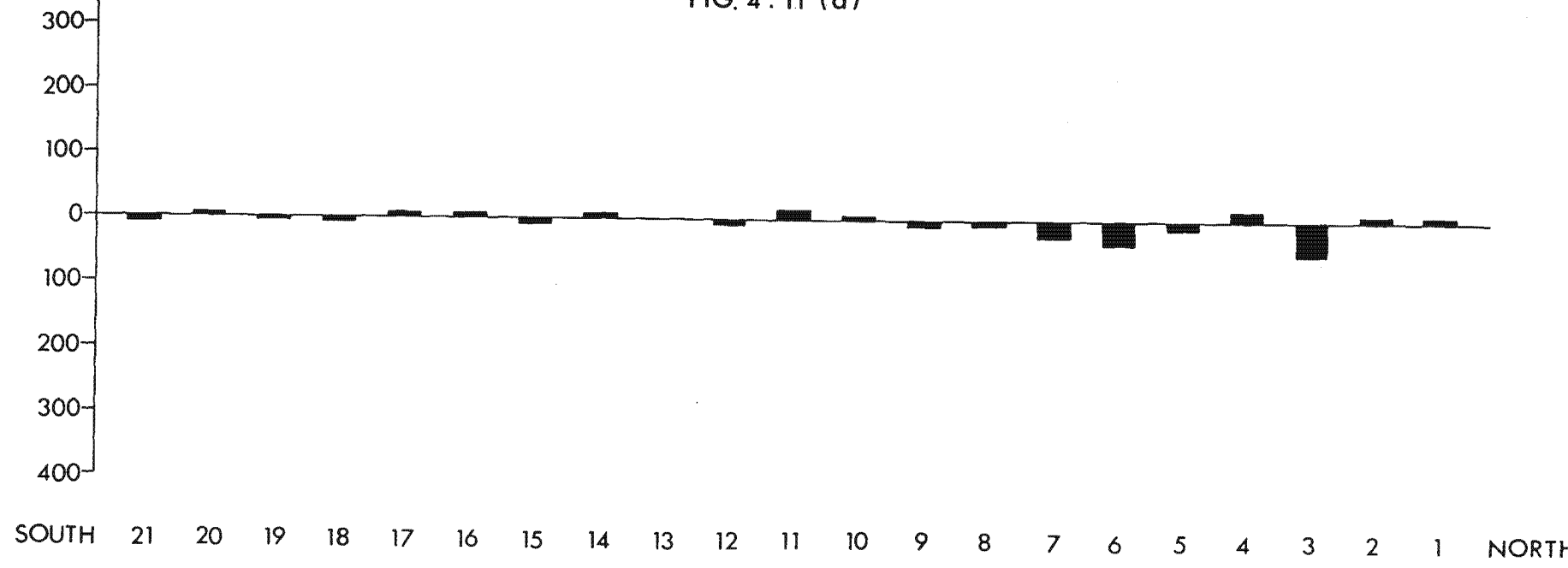
FIG. 4 : 10 (b)



mm 400

mm 400

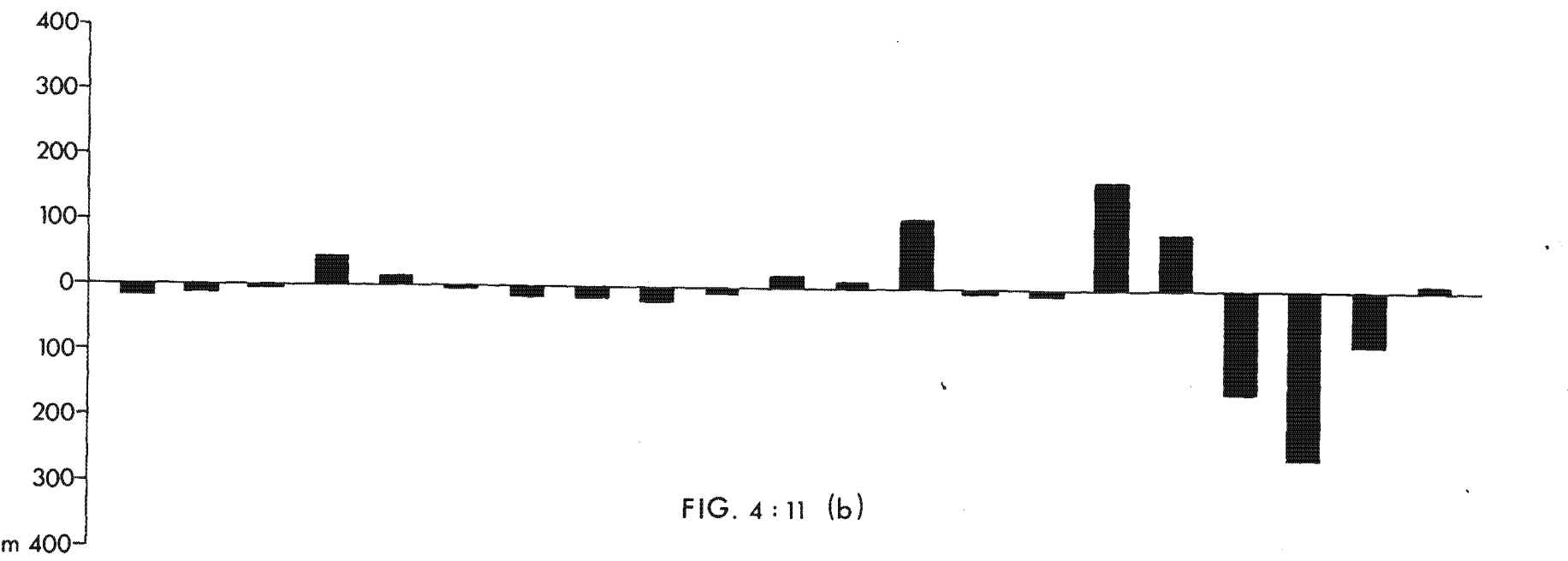
FIG. 4:11 (a)



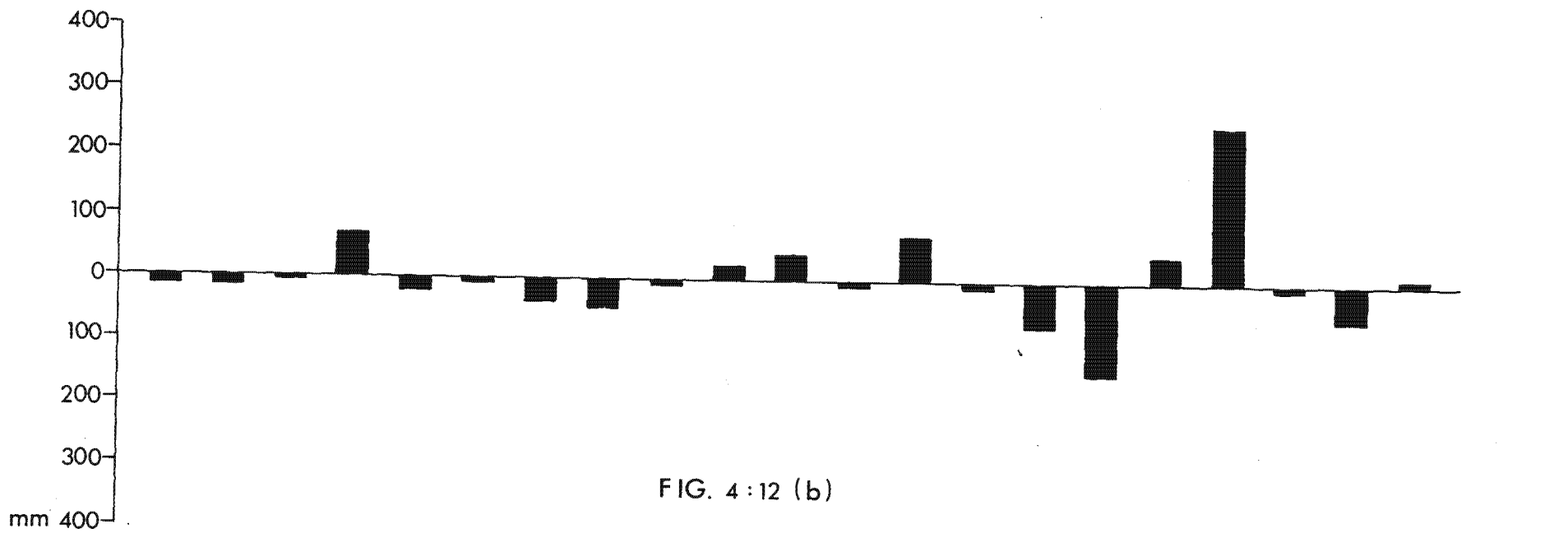
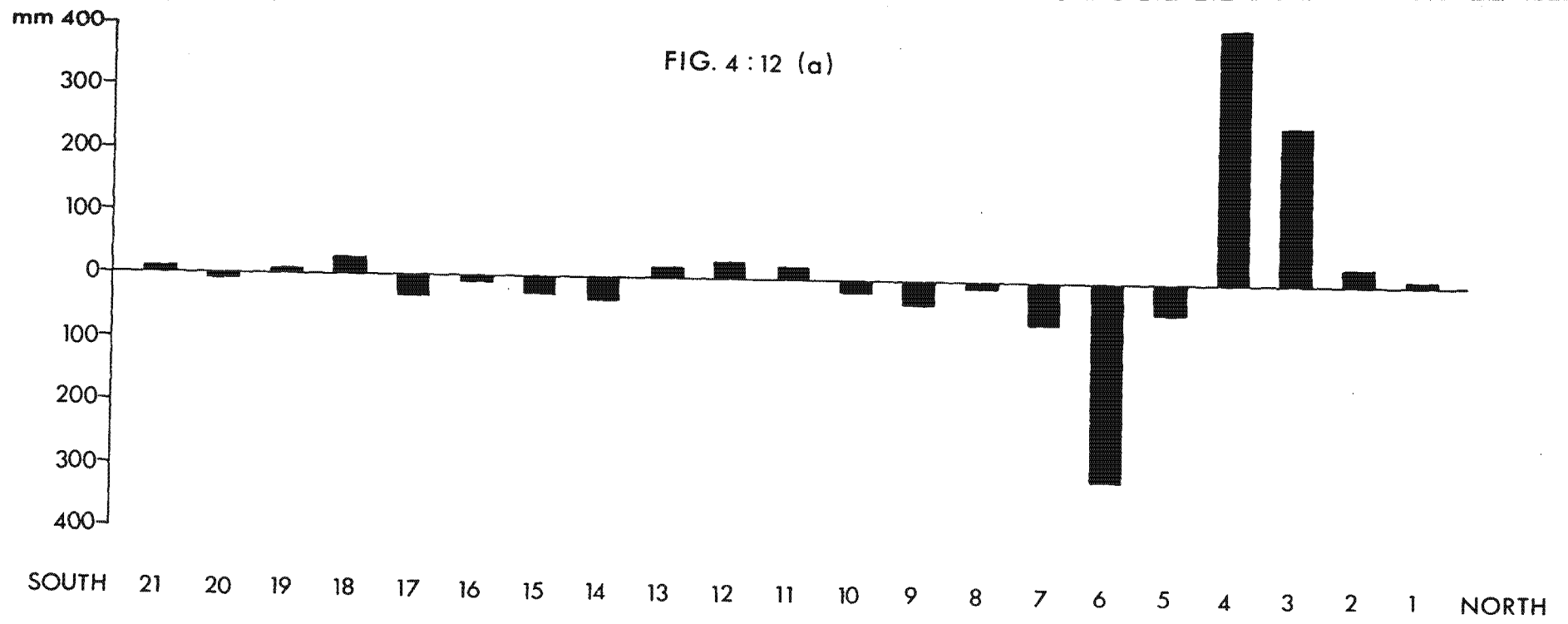
SOUTH 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 NORTH

mm 400

FIG. 4:11 (b)



mm 400



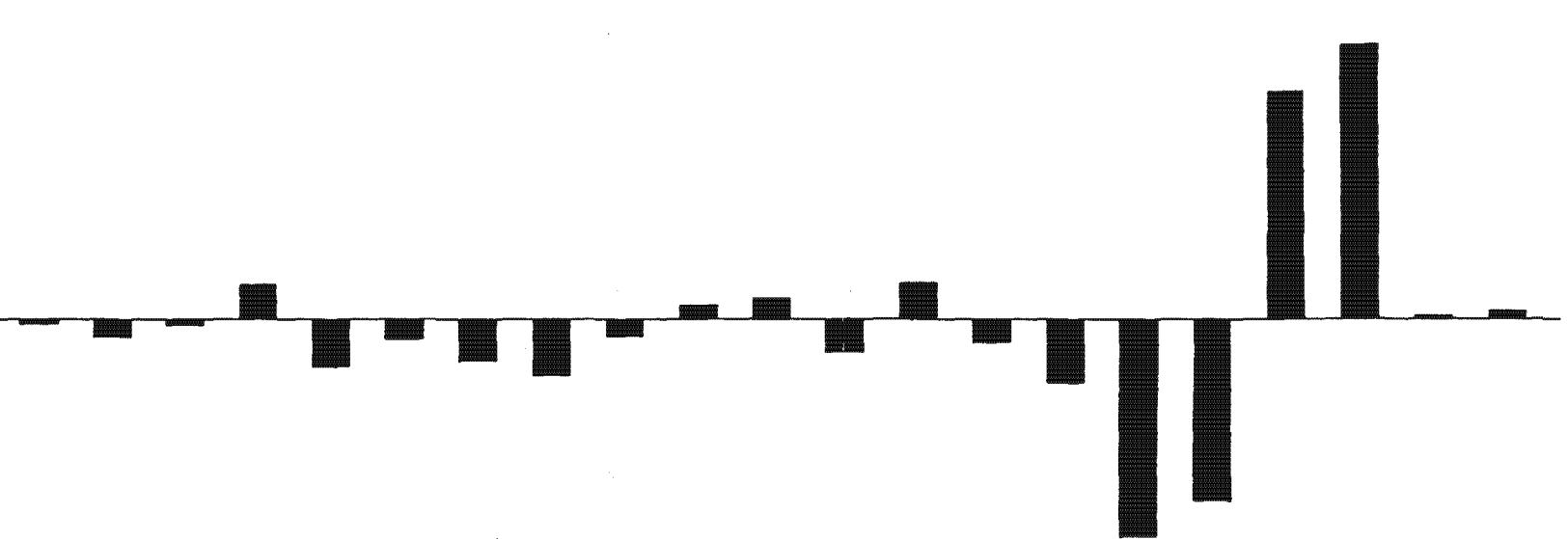
mm 400
300
200
100
0
100
200
300
400

FIG. 4 : 13 (a)

SOUTH 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 NORTH

mm 400
300
200
100
0
100
200
300
400

FIG. 4 : 13 (b)



CHAPTER 5.

SITES, ARTEFACTS AND RAW MATERIALS

1. THE SITES

Conceptually this project follows Binford (1964) in distinguishing only two basic sampling universes in fieldwork: the region and the site. Alternative strategies (Thomas 1975) adopt the cultural item as the minimum spatial unit and ignore the site concept altogether. Whilst acknowledging the validity of this approach in situations where applicable, the orientation of the project was towards the location and examination of artefact clusters rather than individual items. Isolated tools, flakes and potsherds do exist in the sandveld as also do large amorphous scatters, which are difficult to define spatially. In general, however, discrete clustering can be discerned and for this reason the traditional site concept has been retained as a *modus operandi*.

Altogether, more than 30 sites were sampled within the research area, using the methods outlined in the previous chapter. This involved the examination, classification and recording, in the field, of some 35 000 stone artefacts. The decision as to which sites to sample was essentially nonprobabilistic although the final choice was influenced by certain factors. The first was the need to sample rich assemblages in order to record a sufficiently high formal component to validate inter-site comparisons. The second requirement was to spread the samples over a sufficiently wide area to cover the various contexts and habitat zones in which sites were found. Thirdly, an attempt was made to exploit some of the impressions gained during the survey period by sampling what appeared to be a very different type of assemblage, peculiar to certain koppies.

In practice these aims were not always complementary. The deflation

hollows presented the least drawbacks in terms of sample size as a wide choice of sites was available. More problematic were the talus slopes and open scatters in rocky areas. Here the choice was more proscribed and small samples had to suffice in several instances. Inevitably the problem of logistics came into play in that on-site recording needs a team of people well versed in the tenets of stone tool identification and willing conscripts were not always available. Also some locations were only accessible with four-wheel drive transport which often limited the time spent at the site.

The sites fall naturally into three groups. Although the divisions were made initially on the basis of the context in which the sites occur, the terms used are synonymous with the three major types of open site assemblage found in the sandveld. The groups are as follows:

- 1) DEFLATION HOLLOW SCATTERS. These are surface artefact scatters located in well defined, wind deflated sandy hollows. They are commonly found within the large tracts of open sand dunes typical of near coastal and lowland riverine settings.
- 2) TALUS SLOPE SCATTERS. Assemblages found on the surface and talus zones of small, deposit-containing caves and shelters. Located on koppies and semi-mountainous massifs throughout the sandveld.
- 3) OPEN KOPPIE SCATTERS. Large, low density surface scatters found on the slopes and plateaux of sandveld koppies. These do not seem to be tied to overhangs or shelters.

A total of 21 sites were selected for detailed analysis. They are listed in Table 5:1 with the site codes used in the text and figures. The distribution of these sites within the research area is shown in Fig. 5:1. The numerical analysis of this sample set forms the main theme of the next

TABLE 5:1

SITES SAMPLED IN THE RESEARCH AREA

1. DEFLATION HOLLOWES

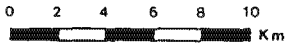
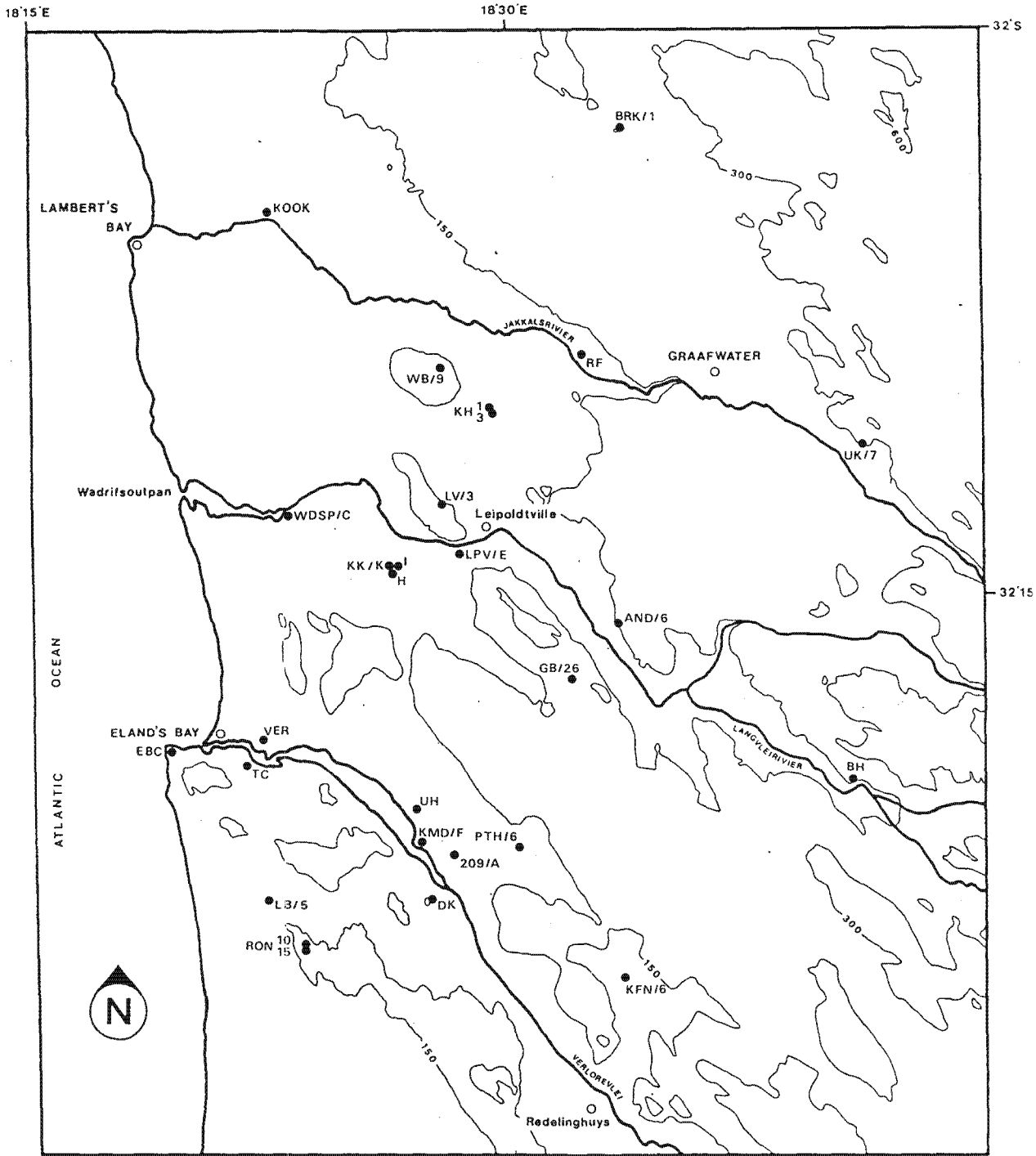
Koopmansdrif	KMD/F
Point 209	209/A
Leipoldtville	LPV/E
Klein Klipheuwel	KK/H
Klein Klipheuwel	KK/K
Klein Klipheuwel	KK/I
Wadrifsoutpan	WDSP/C
Pepper Tree Hill	PTH/6
Grootberg	GB/26
Kruisfontein	KFN/6
Het Kruis	HK/2

2. TALUS SLOPES

Langvleiberge	LV/3
Andkop	AND/6
Rondeberg	RON/15
Langberg	LB/5
Klipheuwel	KH/1
Uitkoms	UK/7

3. OPEN KOPPIE SCATTERS

Rondeberg	RON/10
Klipheuwel	KH/3
Wolfberg	WB/9
Bruinkop	BRK/1



CONTOURS IN METRES A.S.L.

FIG. 5:1 SITES SAMPLED IN THE RESEARCH AREA

chapter.

2. ARTEFACT CLASSES

This section is devoted to a brief description of the way artefact categories and classes were defined for the purposes of the fieldwork programme. The basic outline follows the classification scheme proposed by Janette Deacon (1982) although a degree of simplification and modification was necessary to compensate for the difficulties of identification in the field. Cognizance was also taken of the criteria employed by Mazel (1978) and Davis (1980). Three main artefactual categories were designated: waste, utilised and formal tools.

2.1 WASTE CATEGORY

2.1.1 Chips, Chunks, Flakes and Blades

The waste category accounted for by far the largest number of pieces and included all the unretouched debitage generated by the process of artefact manufacture. Chips are pieces less than 10mm in maximum dimension either of flake or chunk origin. Chunks are pieces of non-flake origin with a minimum dimension of 10mm. These divisions represent an arbitrary but widely used convention. Flakes are untrimmed with no visible utilisation or secondary retouch. Blades are defined as flakes with a length greater than twice the maximum width. Bladelets are not distinguished from blades in the general analysis but where mentioned in the text refer to blades less than 25mm in length.

2.1.2 Cores

Cores are defined as pieces with three or more negative flake scars. Four main core types were recognised as the most commonly occurring forms.

- (1) Irregular cores
- (2) Bladelet cores - usually with a single platform from

which parallel-sided flakes of bladelet dimension have been struck.

- (3) Bipolar cores - usually of quartz. A core with damage in the form of crushing or splintering at opposed ends. Bipolar cores are distinguished from pièces esquillées and core reduced pieces by visible flake scars associated with one or more platforms.
- (4) Rice grain cores - a sub-type of bipolar cores exclusively of quartz. Cylindrical in shape.

Other core types infrequently encountered included regular cores and flat bladelet cores.

2.1.3 Lithic Manuports

The term lithic manuport is used here to describe any large piece of unworked stone introduced to a site. They are a notable feature of deflation hollows and are included in the waste category as they grade from large boulders to smaller broken pieces that could be regarded as an extension of the chunk class. They pose an interesting problem in transport logistics as many large blocks are found in deflation hollows that are situated a considerable distance from any possible raw material source. A number of them were weighed and it was not uncommon to record quartzite lumps averaging 10 to 15kg, while some of the larger sandstone boulders exceeded 20kg.

2.2 UTILISED CATEGORY

2.2.1 Utilised Flakes and Chunks

These are artefacts which show utilisation damage which is less sustained than deliberate retouch and does not correspond to any repeated pattern. Utilisation damage is far more common on flakes than on chunks.

2.2.2. Pièces Esquillées

Pièces esquillées are flat rectangular pieces with crushing or splintering along the striking platform. Similar attrition is often visible at the opposing end. In the sandveld they are most commonly of quartz and in this material the dividing line between pièces esquillées and core reduced pieces is often arbitrary. Their correct placement is something of a problem and they are included in the utilised category to facilitate comparisons with other inventories although it is tacitly assumed that they often represent core by-products rather than utilised pieces.

The recent study of the De Hangen lithic material (Yates 1983) has shown that much of the quartz debris at that site is related to bipolar working. High incidences of both bipolar cores and pièces esquillées occur and of note is the observation that almost all of the latter exhibit crushing at both ends. The implication is that quartz pièces esquillées function as scalar cores rather than chisel-like artefacts. A similar conclusion is reached by Vanderwal (1977) concerning the so called 'fabricator' of Australia and Papua New Guinea.

2.2.3. Grindstones

Both upper and lower grindstones were recorded. Lower grindstones, commonly of quartzite, display smoothing of one or more surfaces. Upper grindstones or rubbers normally include only one smoothed facet and may exhibit pitting. Broken grindstones and smoothed debris were included as grindstone fragments.

2.2.4 Hammerstones and Anvils

These are self explanatory terms often applied to natural pieces of stone used in an ad hoc manner. Quartzitic pebbles are often used as hammerstones while any large piece, including a lower grindstone, can

function as an anvil.

2.3 FORMAL TOOLS

2.3.1 Scrapers

Scrapers are usually flake tools. They are characterised by a flat ventral surface and a convex retouched working edge. The angle of retouch between the ventral surface and the working edge is variable but usually falls between 30° and 90°. Two main types were distinguished: convex scrapers and backed scrapers.

2.3.2 Backed Pieces

The regularly backed pieces have a sharp edge along one margin with abrupt retouch on one or more opposing margins. Four types of backed tool were identified.

- (1) Backed blades - a blade with two straight margins. The cutting edge is opposed by a line of abrupt retouch or backing. Although termed blades they are frequently of bladelet proportions.
- (2) Backed points - usually triangular in shape with the sharp margin and the long backed margin culminating in a point. Backing is also present on the base of the tool.
- (3) Segments - crescentic in plan form. The arc is backed with abrupt retouch while the chord is a straight sharp edge.
- (4) Miscellaneous backed pieces - these are pieces lacking a uniform shape or design but exhibiting backing retouch.

2.3.3 Adzes

Adzes vary considerably in shape but the classic form is an oblong piece with retouch along one or both laterals. There is a tendency for the working edge to show concavity. Adze retouch is steep and characterised by step flaking.

2.3.4 Drills

Drills or borers are small pieces backed along both margins to create a blunt tip. The tip often shows signs of polish which probably reflects their use as instruments for perforating materials like ostrich eggshell and leather (Humphreys 1979).

2.3.5 Miscellaneous Retouched Pieces (M.R.P.)

This is a heterogeneous class which includes all those pieces that show sustained retouch but are not consistently shaped and thus fall outside the normal range of classifiable types.

3. RAW MATERIALS

Five basic categories of raw materials were recognised: quartz, silcrete, cryptocrystalline silicate, indurated shale and quartzite. An extra or 'other' category was also included to deal with any materials, such as the occasional piece of shale, which fell outside of this set.

3.1 QUARTZ

Quartz is readily obtainable throughout much of the research area in the form of conglomerate pebbles and, less commonly, as vein quartz. Much of the conglomerate quartz is of poor quality, being brittle and fibrous, and accounts for most of the abundant quartz debitage. Hydrothermal quartz veins occur in quartzitic rock and are the most likely source of the occasional quartz crystals found on surface sites.

3.2 SILCRETE

Silcrete can occur naturally under a variety of conditions but is commonly of fluvial origin or formed by percolating ground waters which redeposit siliceous material into a matrix of quartz grains and silica. It

occurs in the western Cape in the form of beds or rafts generally close to the surface (Hamilton & Cooke 1965). Fine grained silcrete fractures conchoidally and is an ideal material for the production of stone tools. The predominance of silcrete formal tools in the sandveld suggests that it was the most readily available of the fine grained raw materials. Despite its apparent prehistoric abundance, however, no sources of good quality silcrete have so far been located in the sandveld. Silcrete is reputed to occur to the north of the research area in the lower reaches of the Olifants River where silicification of coastal bedrock is widespread (Visser & Toerien 1971). The varied spectrum of different silcrete types which are present at almost all sites suggests that the raw material originated from a number of separate sources, possibly outside of the research area. If the source was local to a particular site one would expect a high degree of textural uniformity amongst the silcrete pieces.

3.3 CRYPTOCRYSTALLINE SILICATES (CCS)

This is a composite category used to describe the several microcrystalline varieties of quartz used by prehistoric toolmakers. It includes the various chalcedonies such as agate and jasper as well as cherts of marine origin. Cryptocrystalline silicates form a small but persistent element at many sites.

3.4 INDURATED SHALE

Indurated shale refers to those shales or mudstones altered by metamorphism. Common forms are hornfels and lydianite typically formed as a result of contact metamorphism by intrusive dolerite dykes and sills. Despite its occasional presence at sites in the research area, indurated shale does not occur naturally in the sandveld. The nearest localities are to the east of the Olifants River and in the region of the Malmesbury Series to the south (Mountain 1968).

3.5 QUARTZITE

This is a metamorphic rock formed from quartz sandstone by heat and pressure which cause the silica present in the sandstone to crystallise. It is a common ingredient of the Table Mountain Series. It is seldom used for microlithic tools but often employed for larger, heavier pieces and is the material from which grindstones are normally fashioned.

4. METRICAL ANALYSIS

As all the recording of artefacts was carried out in the field, with no material being collected, only a limited metrical study was possible. The results are included here in a brief section independent of the main artefact analysis which is the theme of the next chapter.

The objective of the metrical analysis programme was to control for the variation in size of artefacts at the various sites sampled and to establish if any significant differences in the size of specific artefacts existed between assemblages found in contrasting contexts. A secondary objective was to establish if any correlation existed between the size of waste flakes and the range of formal tools encountered at any one site.

The only attribute measured during this exercise was artefact length. The lengths of all formal tools, excepting broken specimens, were recorded as well as the lengths of whole flakes which showed no traces of utilisation damage or secondary retouch. A simplified version of the method advocated by Deacon (1982), suitable for on-site recording, was employed throughout. The lengths of the various artefacts discussed hereinafter were measured as follows:

Untrimmed flakes: Maximum dimensions measured from the butt or striking platform.

Scrapers: Taking the working edge as the point of reference, the maximum dimensions measured at right angles to the working edge.

Adzes: Maximum dimensions measured parallel to the working edge.

Backed blades: Maximum dimensions measured from the butt or striking platform. In practice this was invariably parallel with the backed margin.

All the artefacts were measured to the nearest millimetre using vernier callipers. The frequency distributions of a representative cross section of sites are shown in Figs. 5:2-10 with descriptive statistics tabulated in Tables 5:2-4.

Untrimmed quartz flakes feature strongly at all the sites in this sample set with the majority falling within the 10-15 mm length range. Only at Uitkoms UK/7, a small cave site situated in the foothills of the Cape Fold Belt mountains, is there a preponderance of small quartz flakes less than 10 mm in length. Apart from this site the quartz flake lengths cluster fairly tightly with mean length varying from 12.6 to 15.1 mm. The reason for this size delimitation is probably related to the wide availability of conglomerate quartz in the sandveld, usually in the form of small pebbles which have been flaked using bipolar techniques.

Silcrete flakes show a greater variation in size with a maximum length exceeding that recorded for quartz flakes. The majority, however, fall within the 10 to 20 mm length category. The mean length varies from 13.2 to 18.5 mm, apart from the UK/7 sample which has a smaller mean length of 12.0 mm.

Scrapers are the only formal tool class present in consistently high numbers at the majority of sites irrespective of context. The length measurements included herein refer only to small to medium sized convex scrapers. Backed scrapers and the occasional large scrapers are not

included.

Quartz scrapers from all the sites analysed are remarkably constant in size with the vast majority ranging in length between 10 and 20 mm. The mean lengths are tightly clustered between 12.3 and 12.5 mm, with the exception of KFN/6 (10.4 mm) and UK/7 (13.7 mm).

The silcrete scrapers also form a homogenous size group throughout the sample set. As with quartz the majority of silcrete scrapers fall within the 10 to 20 mm length category although the arithmetic means are slightly larger, varying from 12.8 to 15.0 mm. The Uitkoms UK/7 sample is once again atypical with a larger mean length of 16.9 mm.

This consistent size patterning of both quartz and silcrete scrapers may relate to the optimum dimensions required by hafting techniques and also to the degree of retouch which is feasible for a hafted tool before it is discarded.

Whilst scrapers are common to all of the sites sampled, the frequency of backed pieces and adzes tends to vary inversely. As a general rule either backed pieces or adzes tend to characterise an assemblage and seldom occur in sizable numbers at the same site. Adzes are consistently larger than other common tool types with a length usually exceeding 20 mm. At the sites analysed the mean lengths range between 24.7 and 27.4 mm. Backed pieces are included here as representing the most common backed tool. They vary considerably in size but length seldom exceeds 25 mm or falls below 10 mm.

The results of the metrical attribute analysis demonstrates that a remarkably consistent size patterning exists between the various assemblages in the sample set. On the basis of waste flake and formal tool lengths no significant differences could be established between deflation hollow assemblages, talus slope scatters and the large open koppie

scatters. Only at Uitkoms UK/7, situated on the eastern boundary of the sandveld, was there an observed tendency for smaller flake size coupled, paradoxically, with larger than average scraper size.

With the observed homogeneity of length attributes there appears to be no predictive value in the size of untrimmed flakes as determinants for the size or type of formal tools found at any particular site. There is, however, a close correspondence between the mean size of flakes and scrapers in both quartz and silcrete. Silcrete backed blades are on average larger than silcrete flakes although they fall well within the overall size range (it should be noted that as blades were not common they were not separated from flakes in this analysis). This data suggests that both scrapers and backed blades were manufactured from the set of raw materials at the sites.

With adzes, however, this does not appear to be the case. Adzes are consistently larger than the mean size of silcrete flakes and at two of the sites the range for adze lengths exceeds the range recorded for silcrete flakes. This suggests that adzes were not manufactured at the sites but may have been introduced as finished tools or as tool blanks. The implications of this suggestion are considered in the following chapters.

TABLE 5:2

Length Statistics : Untrimmed Flakes

SITE	f	RANGE mm	MEAN mm	STANDARD DEVIATION mm	STANDARD ERROR mm
<u>QUARTZ</u>					
LPV/E	281	5-37	12.74	4.40	0.26
KK/H	307	5-29	14.33	4.41	0.25
KK/I	184	5-34	13.78	5.14	0.38
GB/26	33	11-26	15.06	3.57	0.62
KFN/6	284	4-29	12.89	4.39	0.26
RON/15	121	7-29	14.60	4.10	0.37
UK/7	67	4-23	10.48	4.10	0.50
RON/10	68	6-31	12.63	4.71	0.57
WB/9	42	10-20	14.76	2.32	0.36

SILCRETE

LPV/E	409	4-39	13.15	5.96	0.30
KK/H	344	4-54	13.31	6.72	0.36
KK/I	218	4-66	14.07	8.50	0.58
GB/26	50	9-36	16.20	5.28	0.75
KFN/6	338	4-45	14.25	7.14	0.39
RON/15	17	6-36	18.53	8.49	2.06
UK/7	52	4-23	11.98	4.82	0.67
RON/10	10	7-35	15.90	8.44	2.67
WB/9	106	10-27	16.89	4.08	0.40

TABLE 5:3

Length Statistics : Scrapers

SITE	f	RANGE mm	MEAN mm	STANDARD DEVIATION mm	STANDARD ERROR mm
<u>QUARTZ</u>					
LPV/E	72	5-28	12.42	4.57	0.54
KK/H	75	7-22	12.52	3.16	0.36
KK/I	33	8-18	12.52	2.51	0.44
GB/26	12	9-16	12.25	2.05	0.59
KFN/6	108	4-21	10.39	3.50	0.34
HK/2	32	5-25	12.34	4.33	0.77
UK/7	7	11-16	13.71	1.70	0.64
<u>SILCRETE</u>					
LPV/E	101	5-31	13.70	5.07	0.50
KK/H	124	7-24	13.41	3.74	0.34
KK/I	103	6-27	12.80	4.27	0.42
GB/26	27	9-31	14.96	4.85	0.93
KFN/6	63	6-28	12.86	4.48	0.56
HK/2	6	8-21	14.50	5.05	2.06
UK/7	27	9-30	16.93	5.29	1.02

TABLE 5:4

Length Statistics : Adzes and Backed Blades

SITE	f	RANGE mm	MEAN mm	STANDARD DEVIATION mm	STANDARD ERROR mm
<u>ADZES (Silcrete)</u>					
LPV/E	6	19-38	26.67	7.34	3.06
KFN/6	35	6-36	24.74	5.41	0.92
UK/7	27	15-37	26.78	5.01	0.96
RON/15	18	21-41	27.44	4.71	1.11
HK/2	9	20-40	27.11	5.93	1.98
LV/3	10	11-39	26.70	7.10	2.25
<u>BACKED BLADES (Silcrete)</u>					
LPV/E	34	6-26	15.12	4.48	0.77
KK/H	23	6-27	18.48	5.98	1.25
KK/I	10	9-22	14.20	4.44	1.40
GB/26	6	13-23	17.50	3.89	1.59
KFN/6	10	15-24	18.50	3.50	1.11

FIG. 5:2 FREQUENCY DIAGRAMS OF UNTRIMMED FLAKE LENGTHS (QUARTZ)

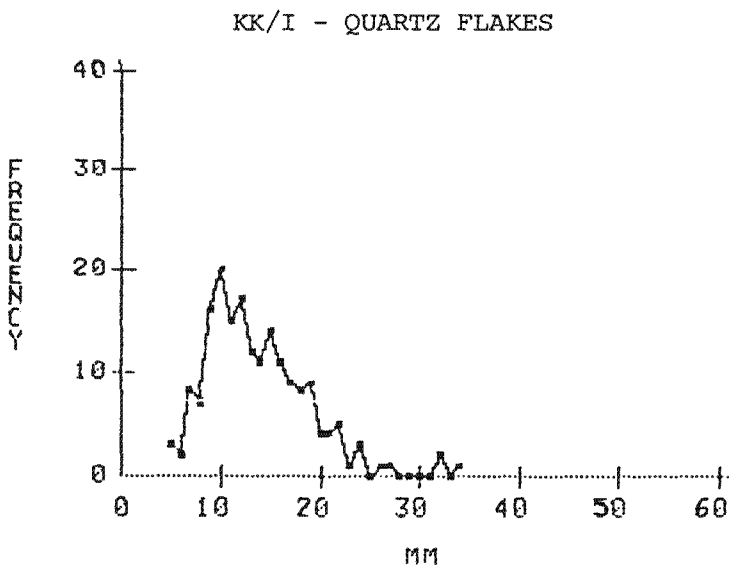
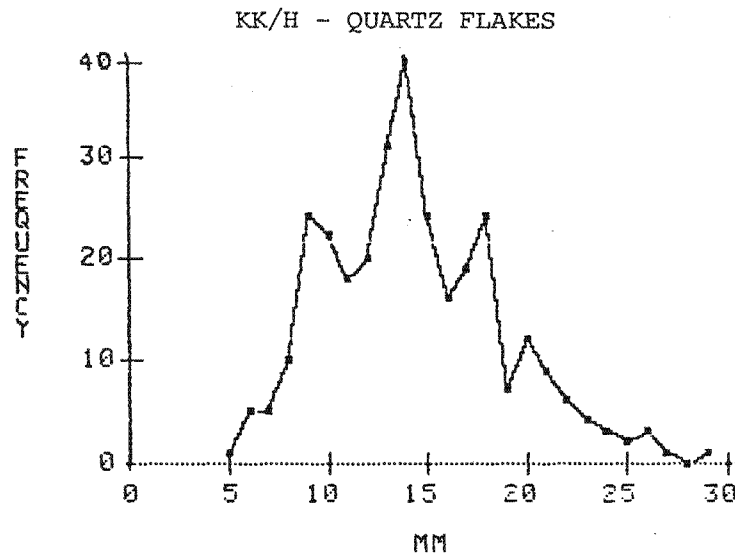
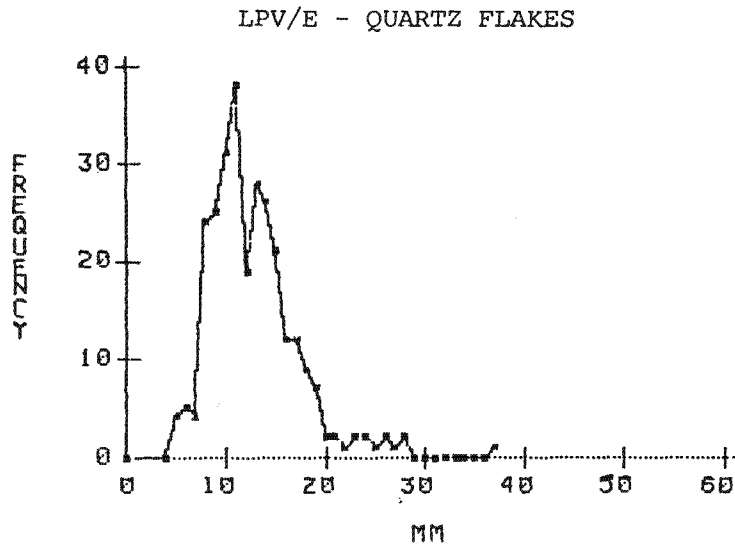


FIG. 5:2 contd.

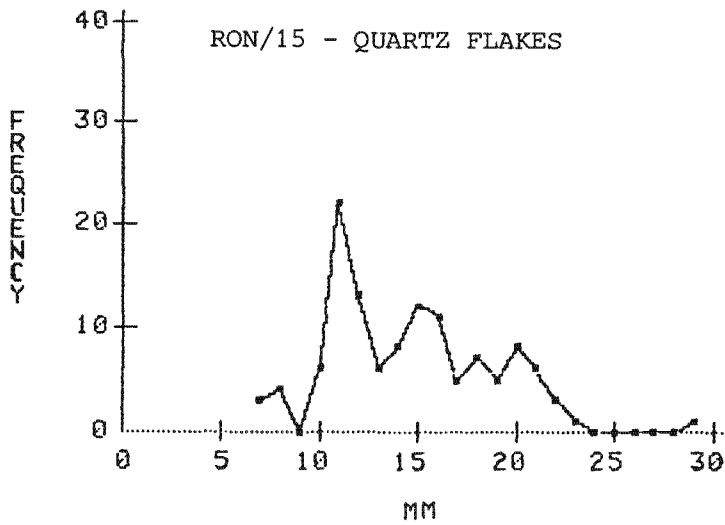
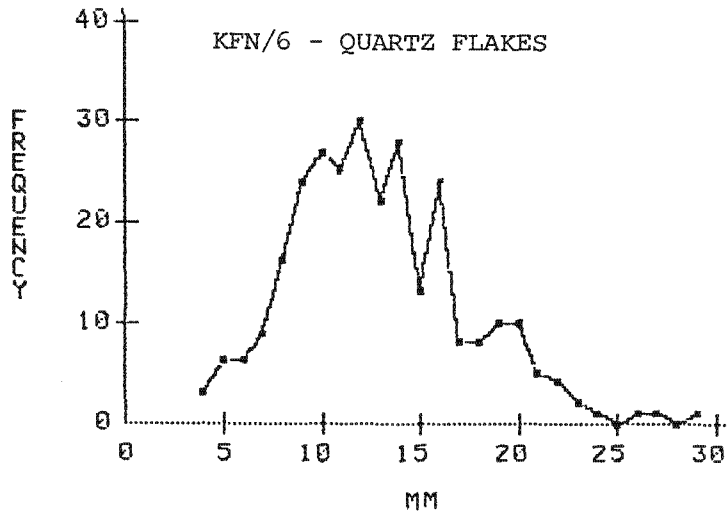
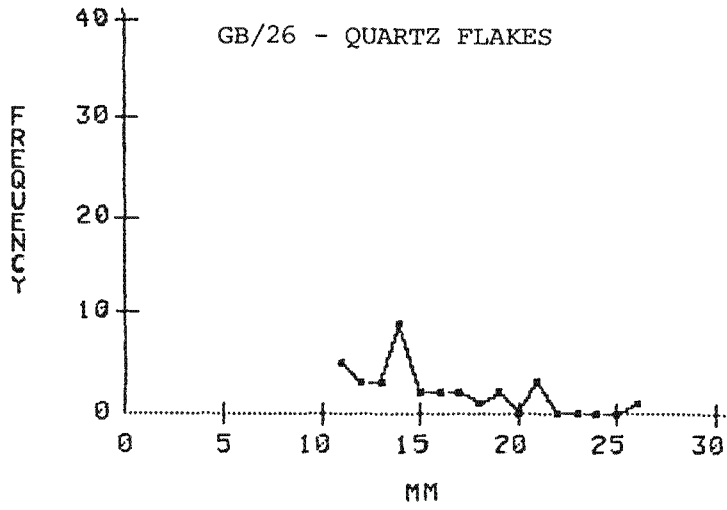


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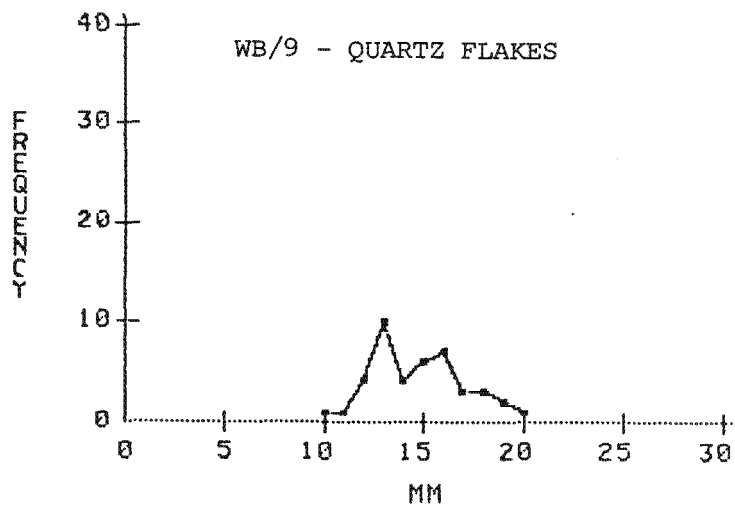
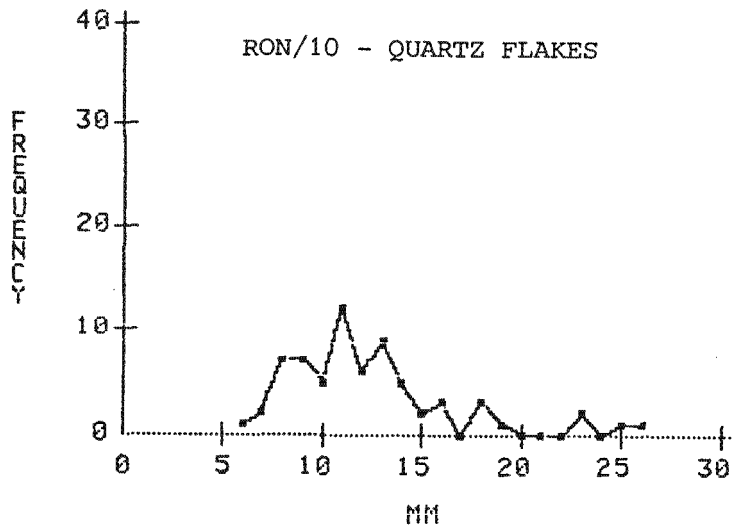
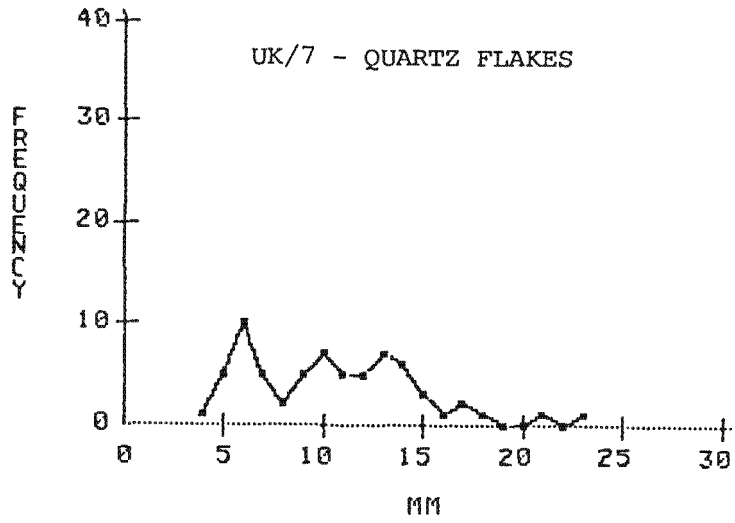


FIG. 5:3 FREQUENCY DIAGRAMS OF UNTRIMMED FLAKE LENGTHS (SILCRETE)

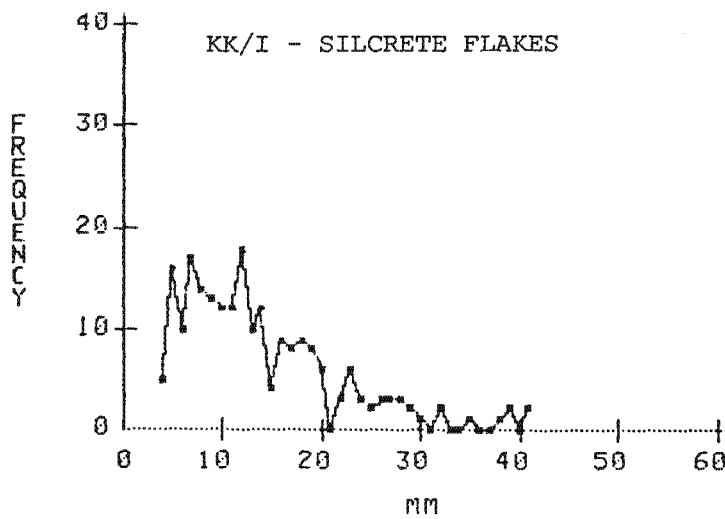
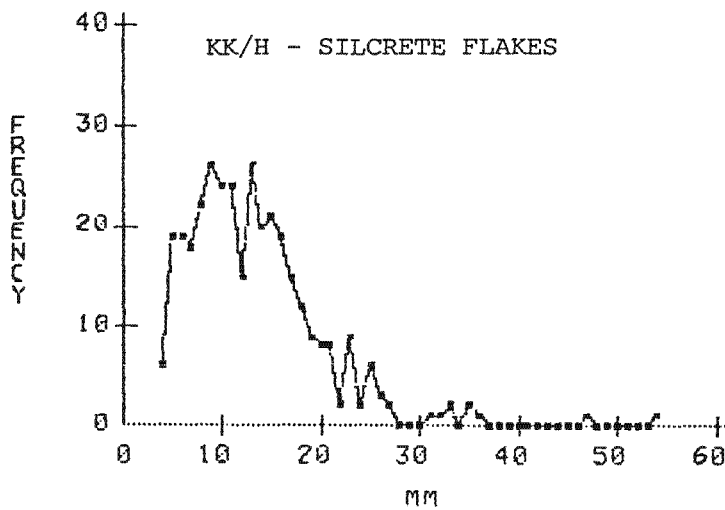
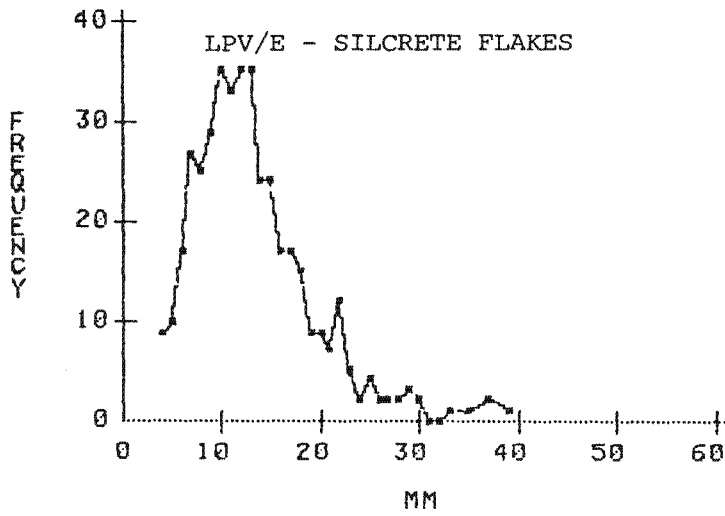


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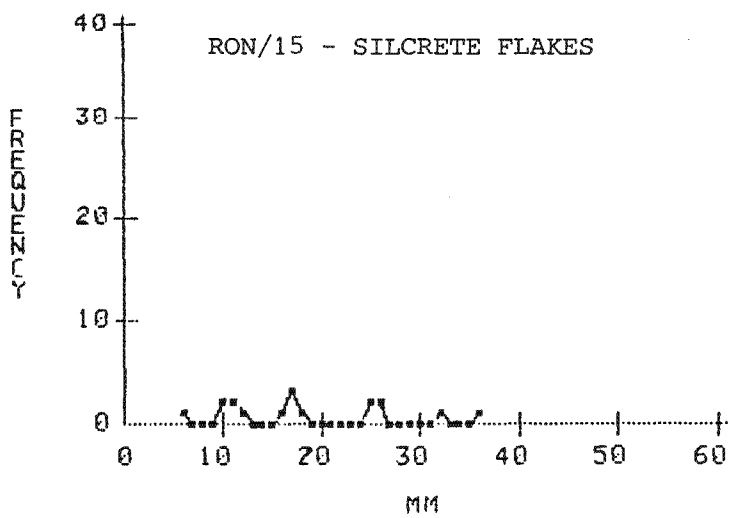
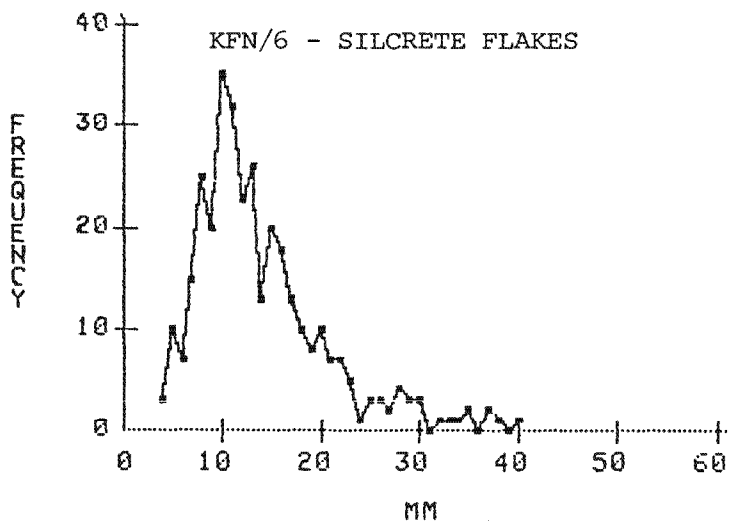
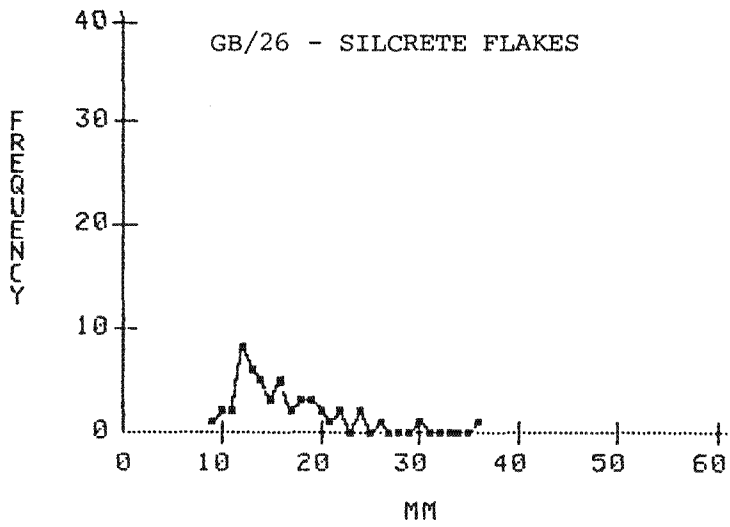


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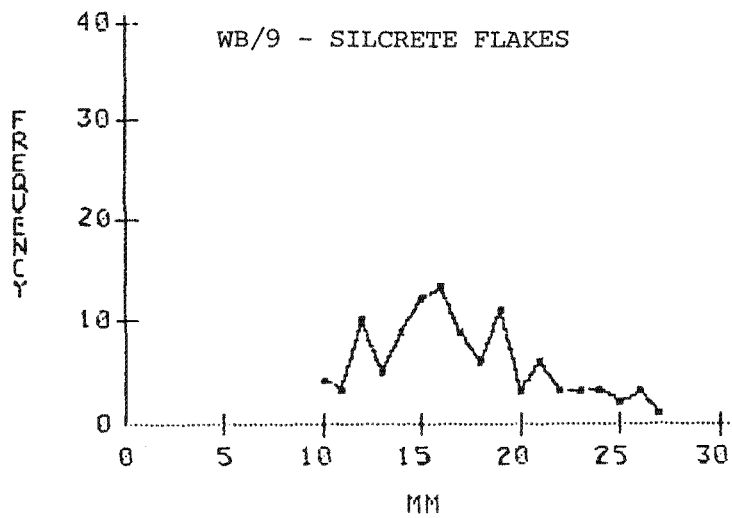
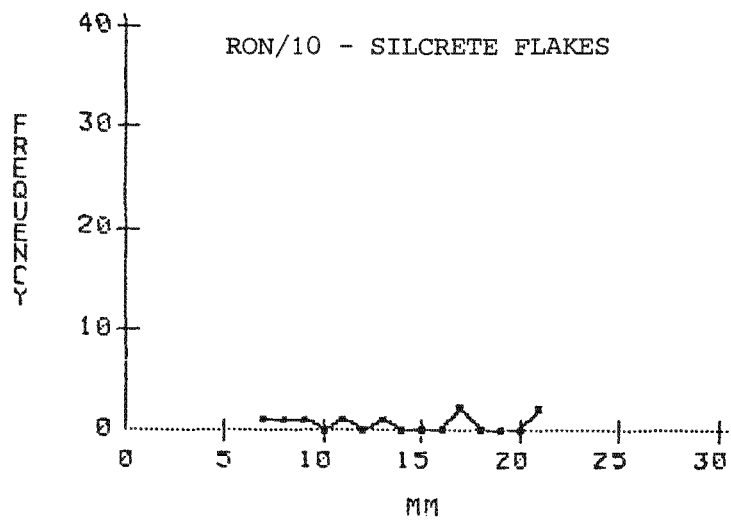
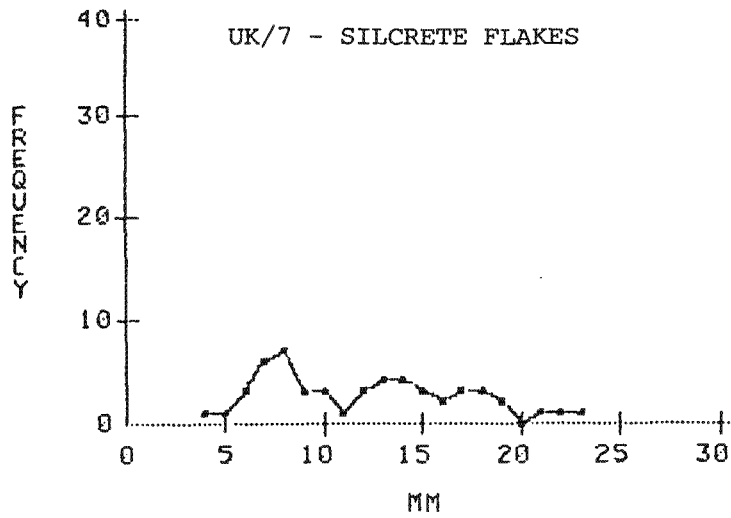
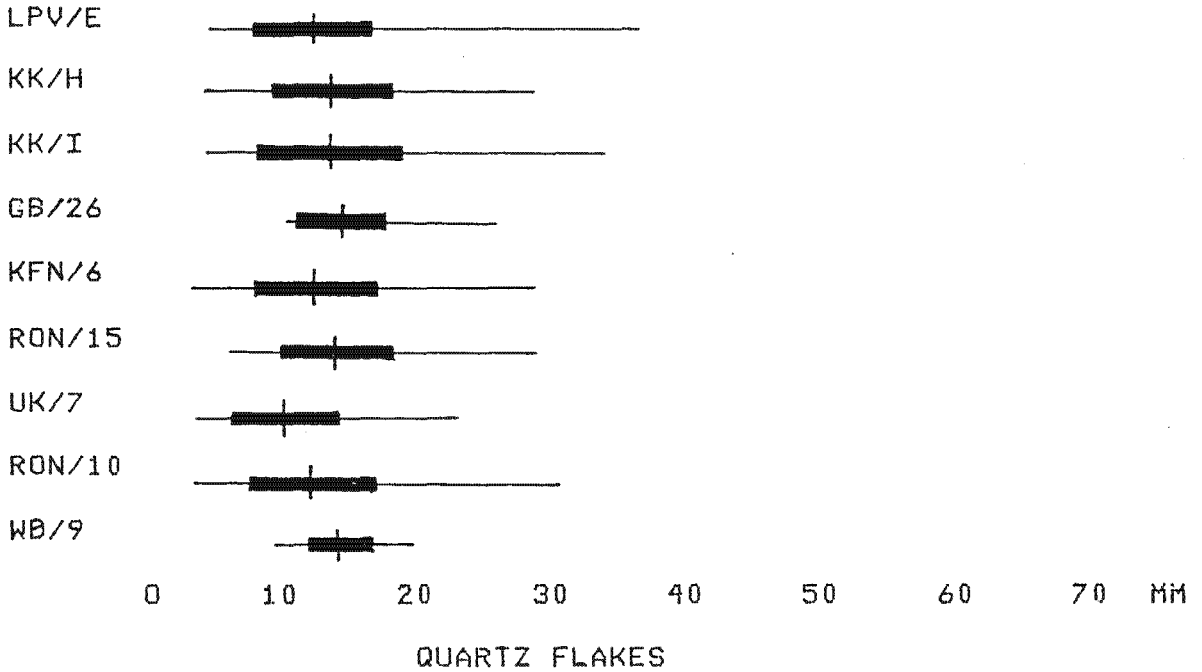


FIG. 5:4 LENGTH MEASUREMENTS OF UNTRIMMED FLAKES

SITE: RANGE, MEAN, STANDARD DEVIATION.



SITE: RANGE, MEAN, STANDARD DEVIATION.

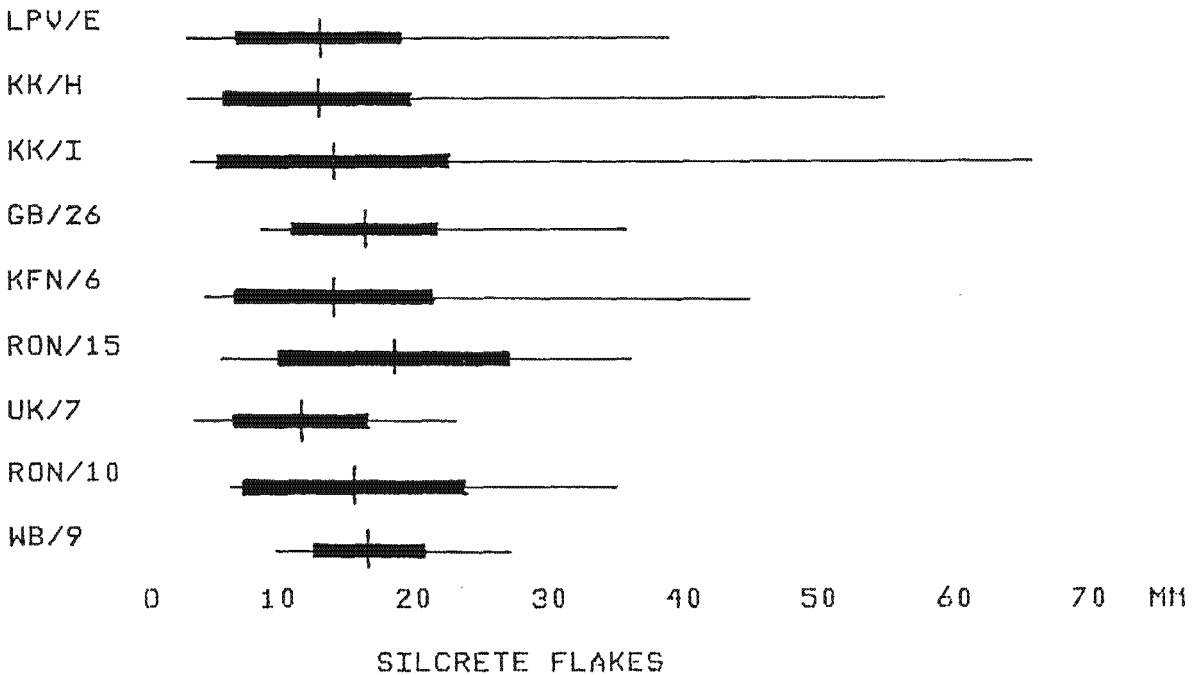


FIG. 5:5 FREQUENCY DIAGRAMS OF SCRAPER LENGTHS (QUARTZ)

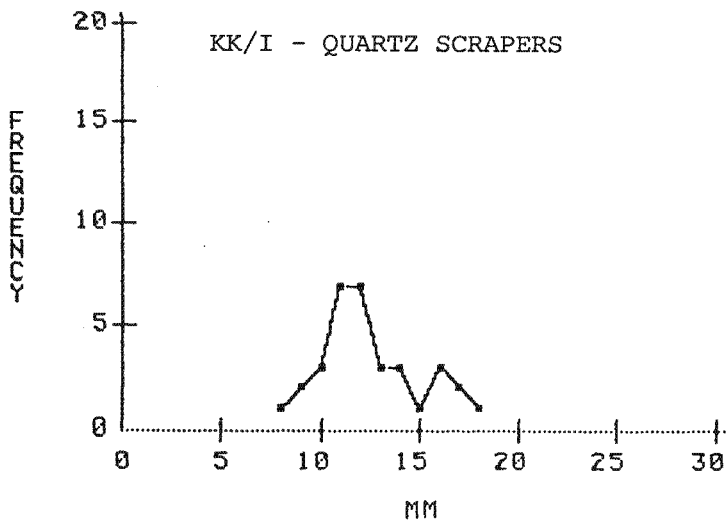
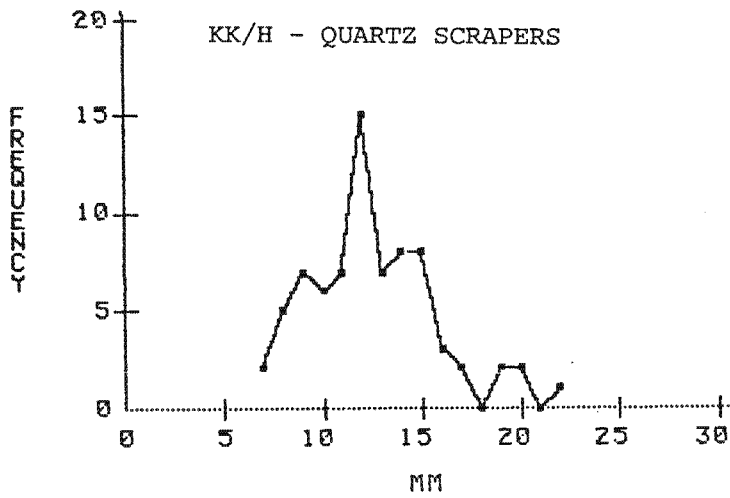
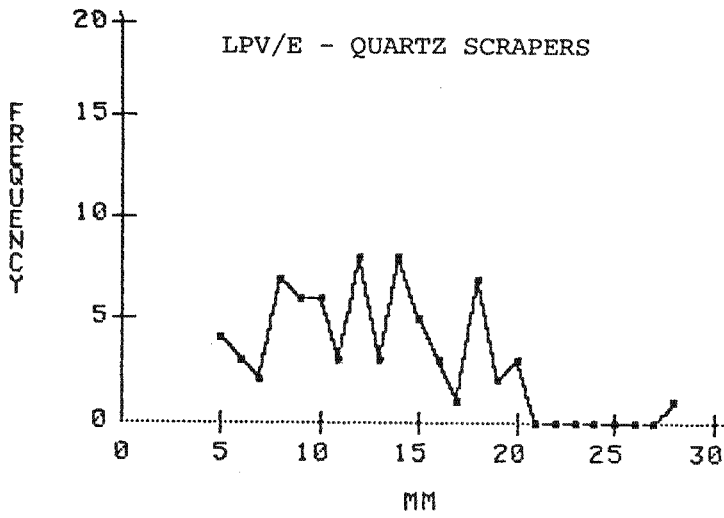


FIG. 5:5 contd.

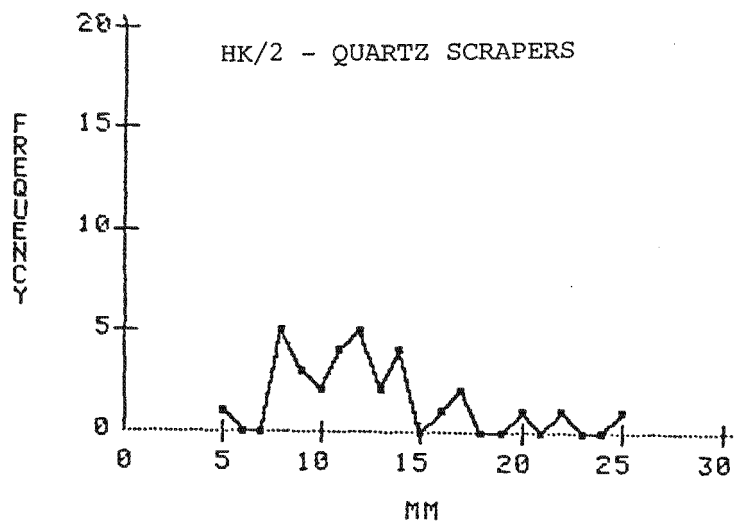
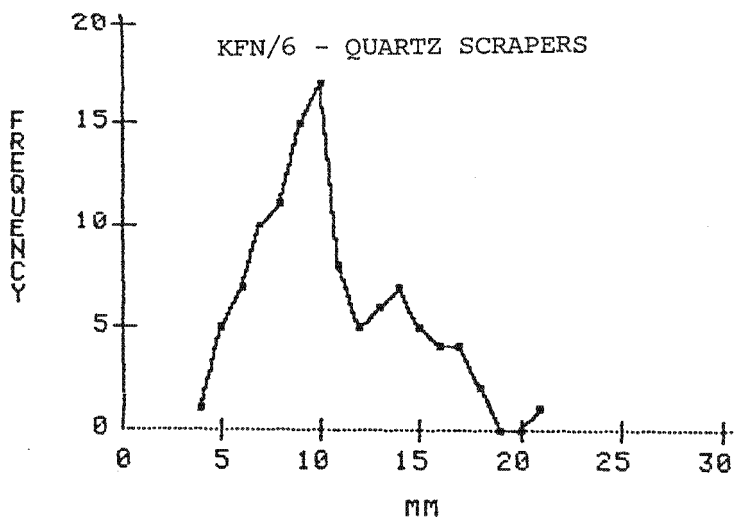
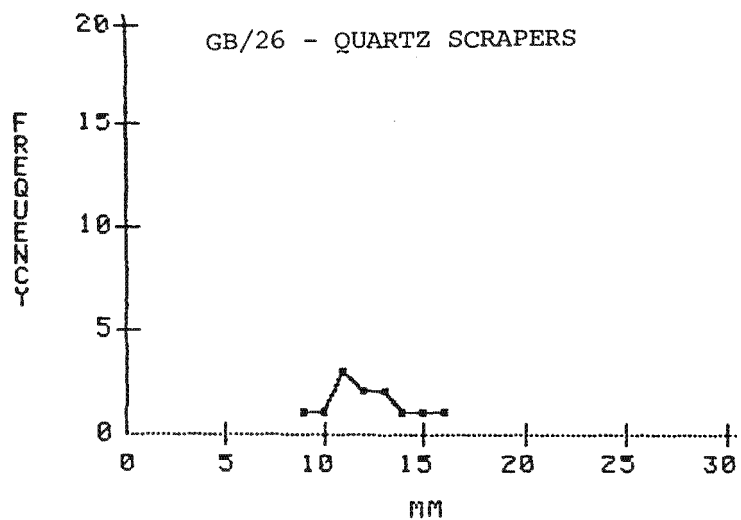


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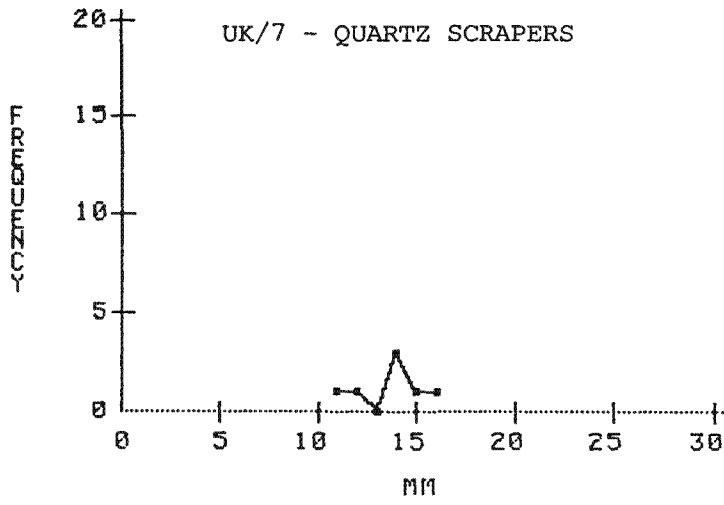


FIG. 5:6 FREQUENCY DIAGRAMS OF SCRAPER LENGTHS (SILCRETE)

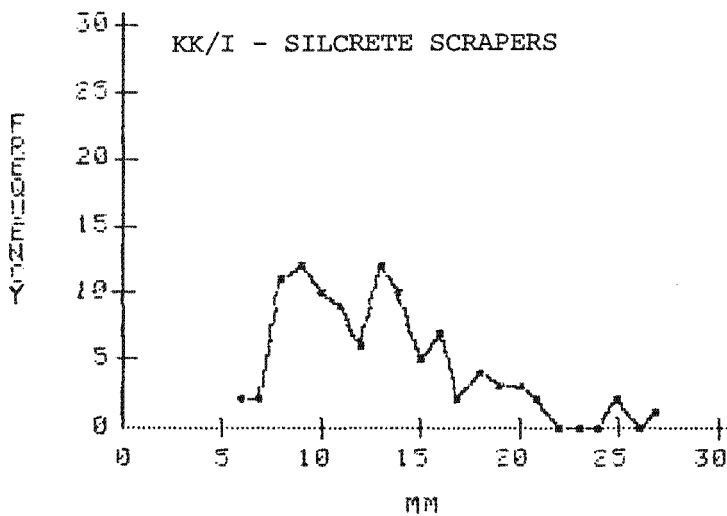
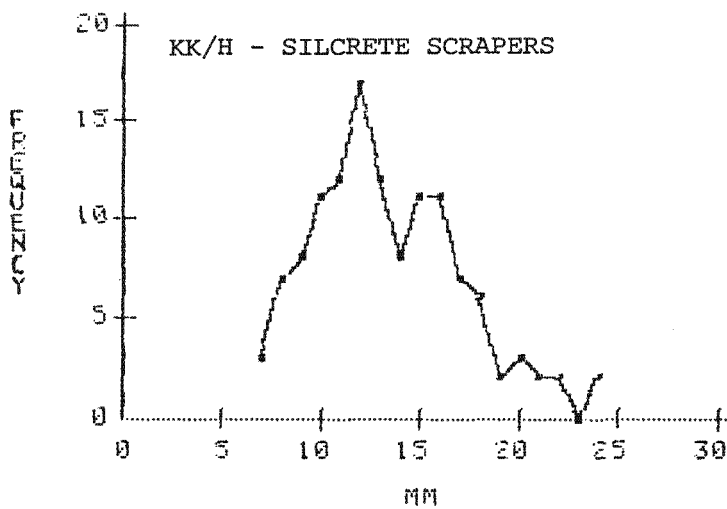
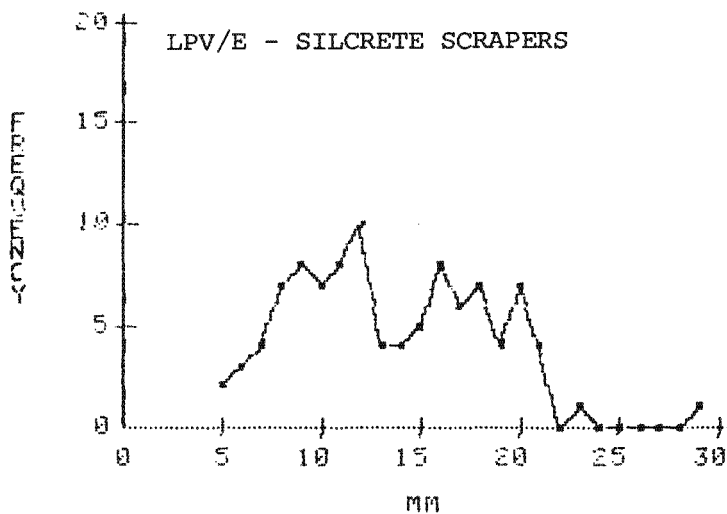


FIG. 5.6 contd.

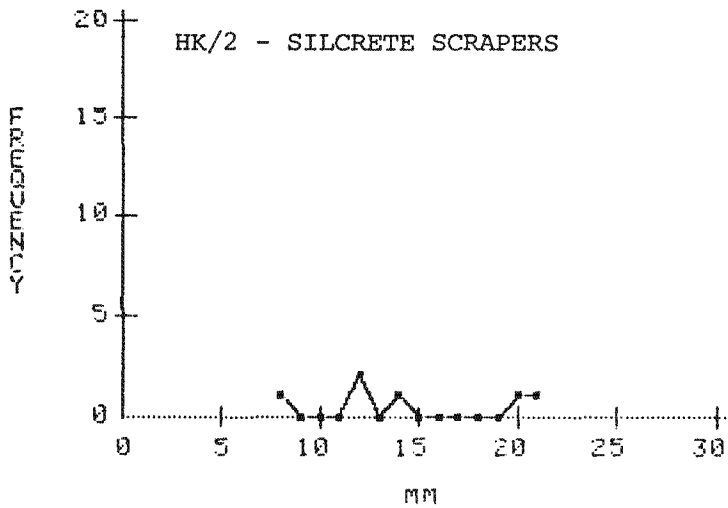
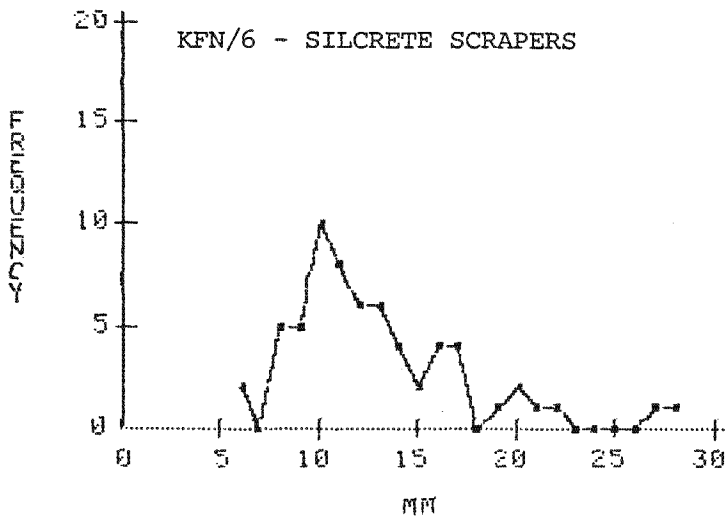
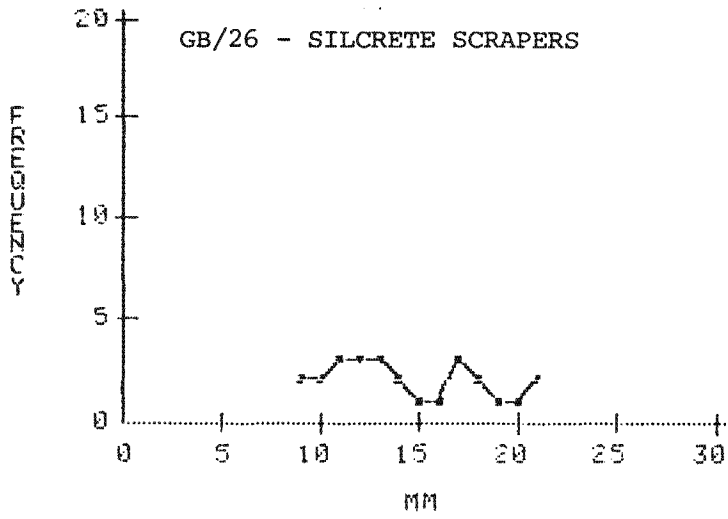


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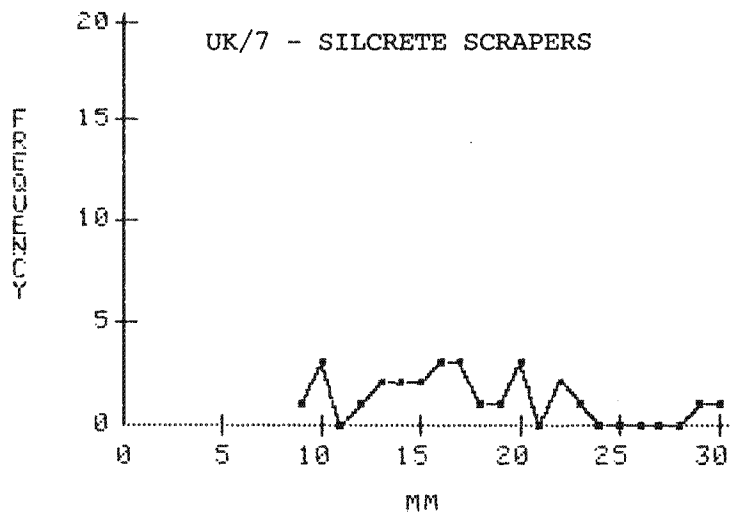


FIG. 5:7 LENGTH MEASUREMENTS OF SCRAPERS

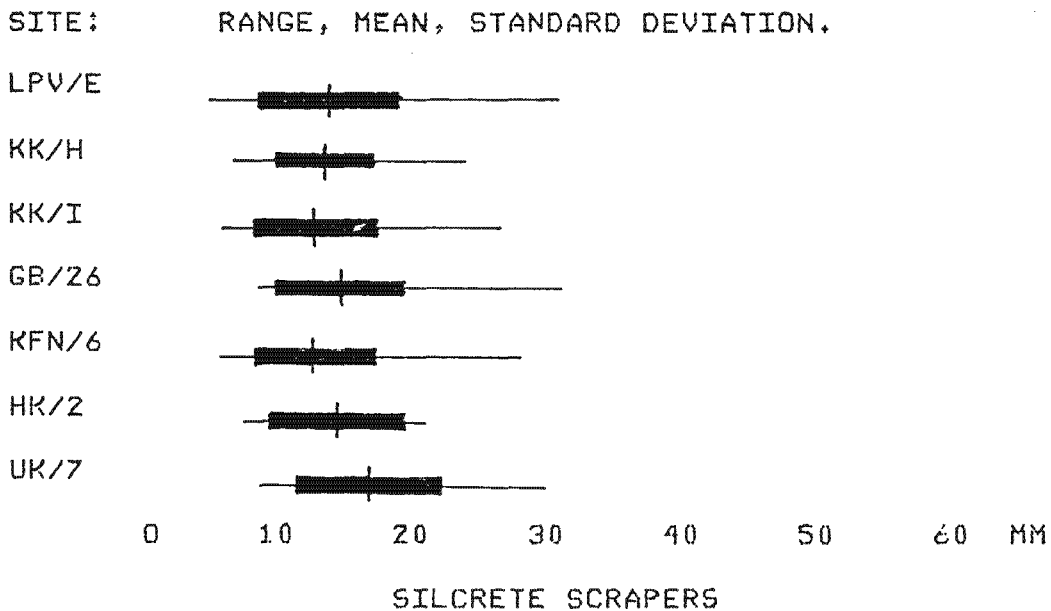
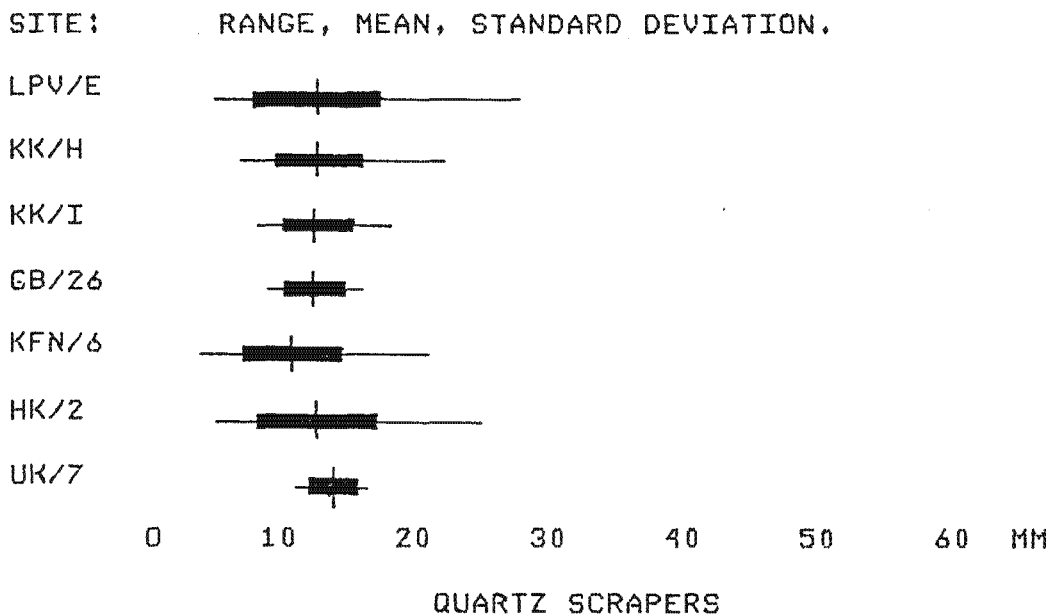


FIG. 5:8 FREQUENCY DIAGRAMS OF ADZE LENGTHS (SILCRETE)

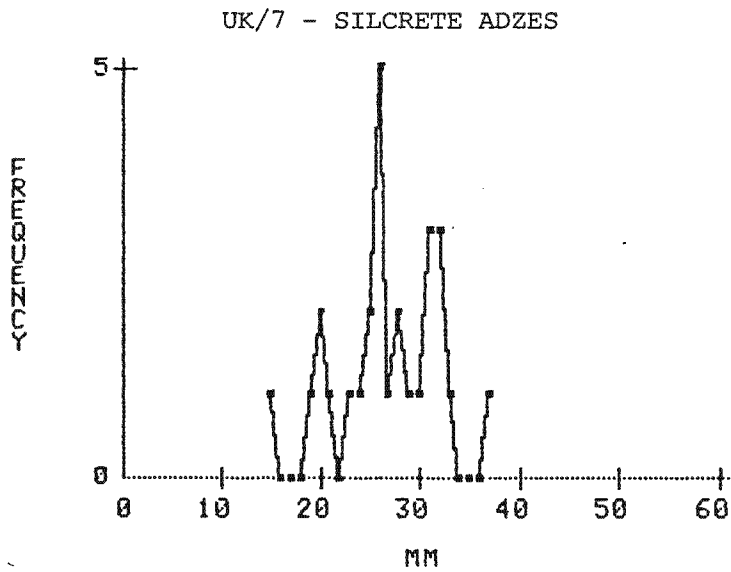
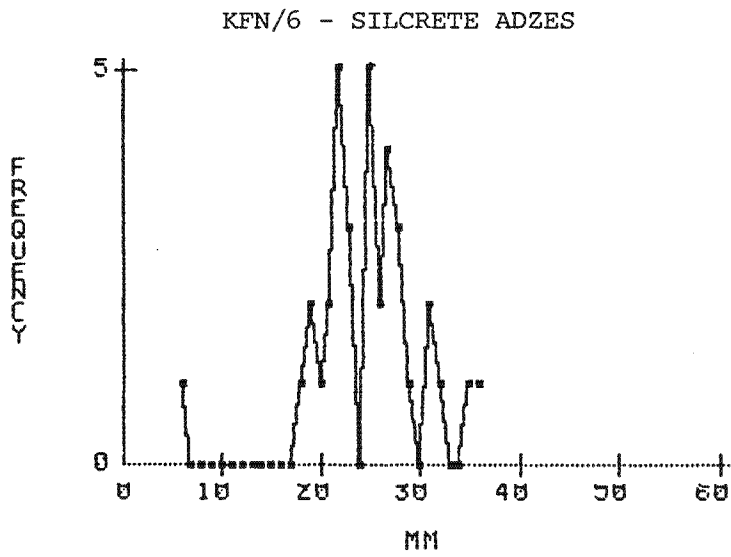
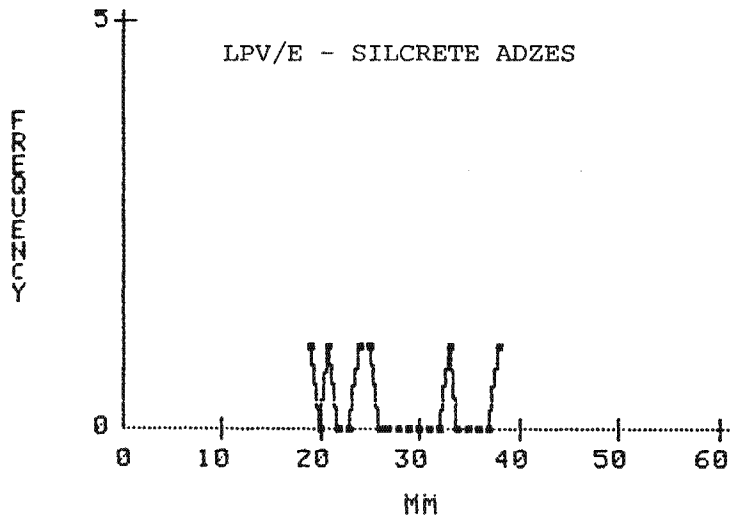


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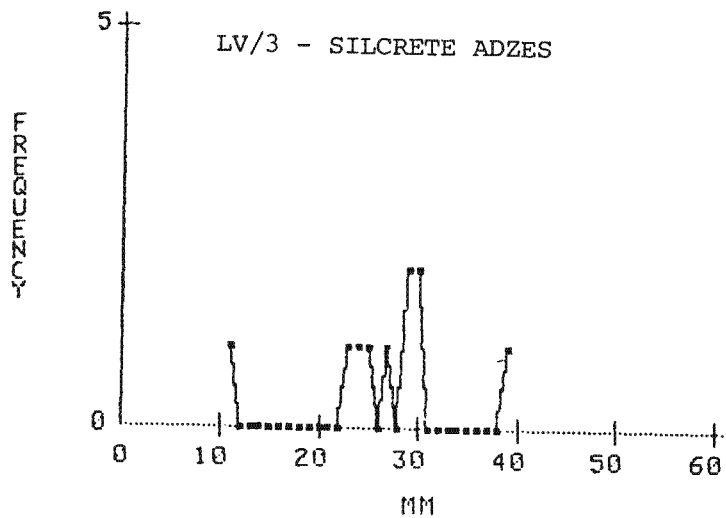
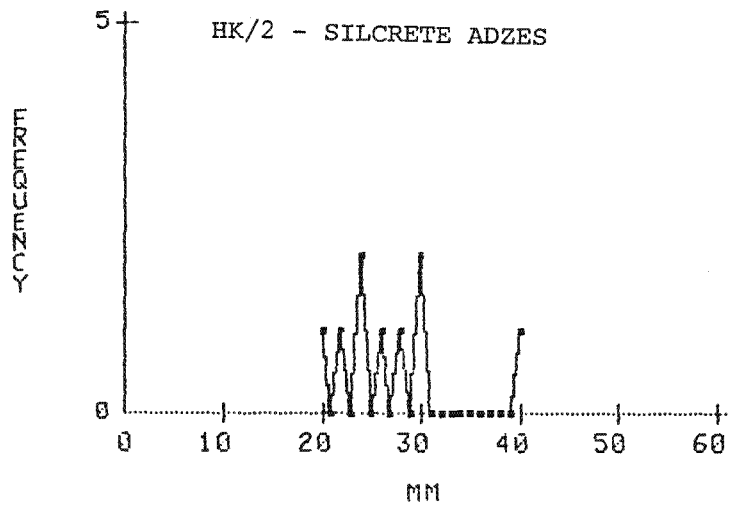
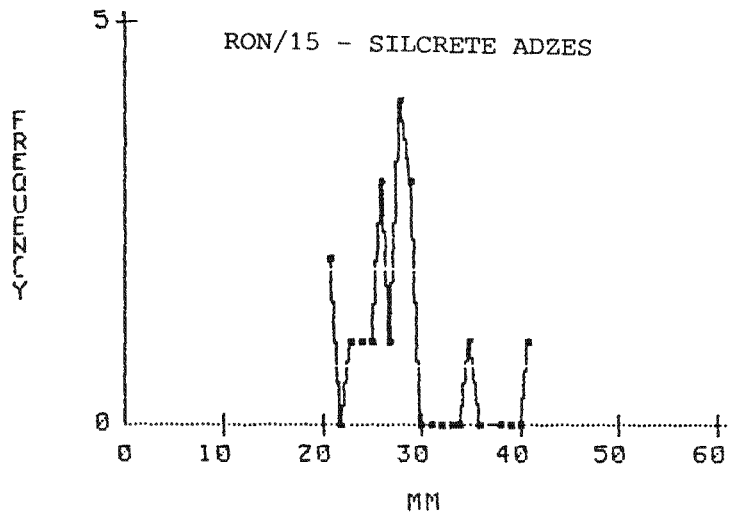


FIG. 5:9 FREQUENCY DIAGRAMS OF BACKED BLADE LENGTHS (SILCRETE)

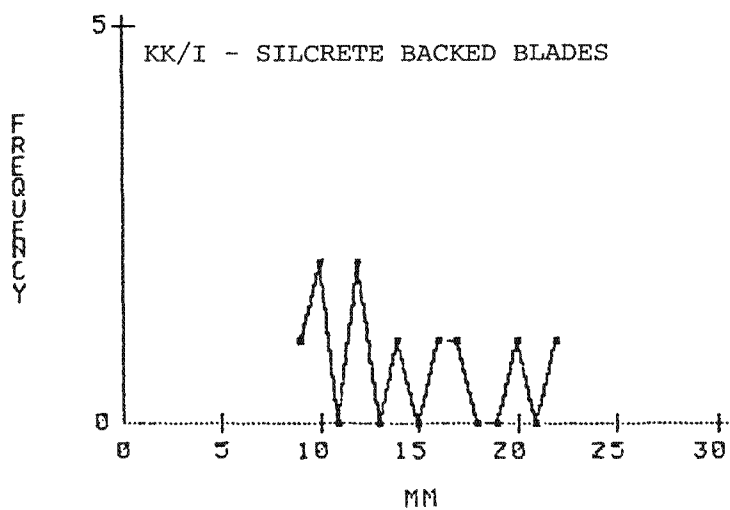
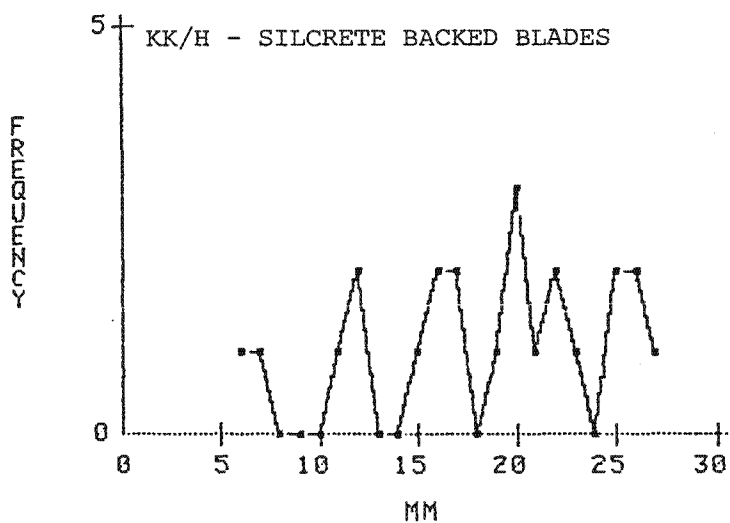
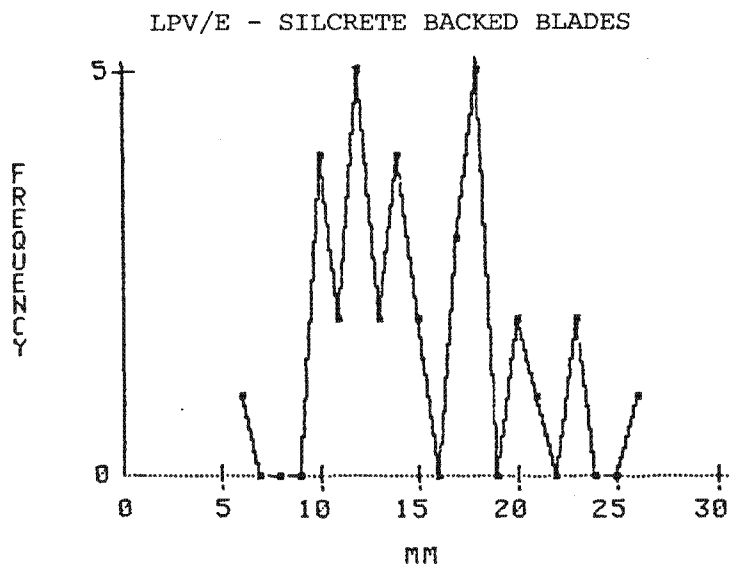


FIG. 5:9 contd.

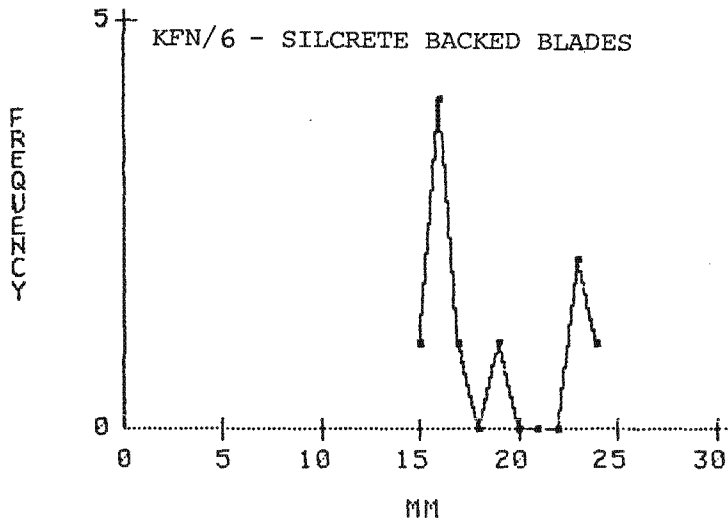
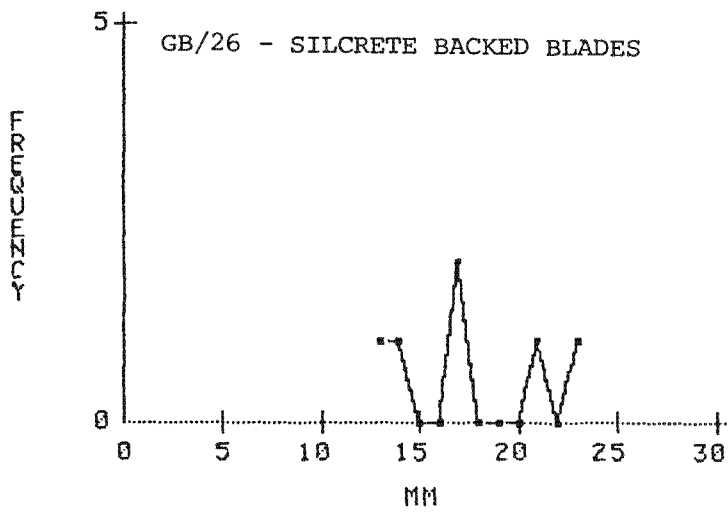
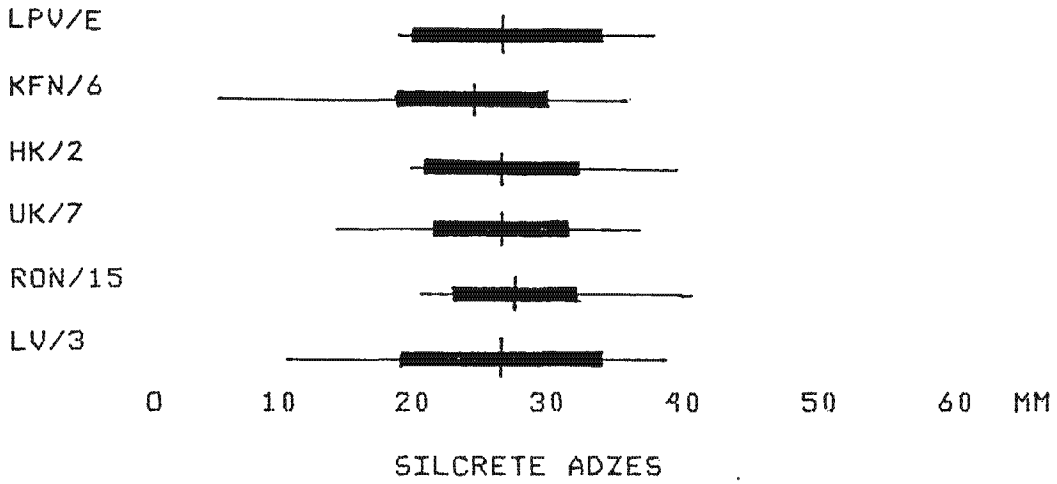
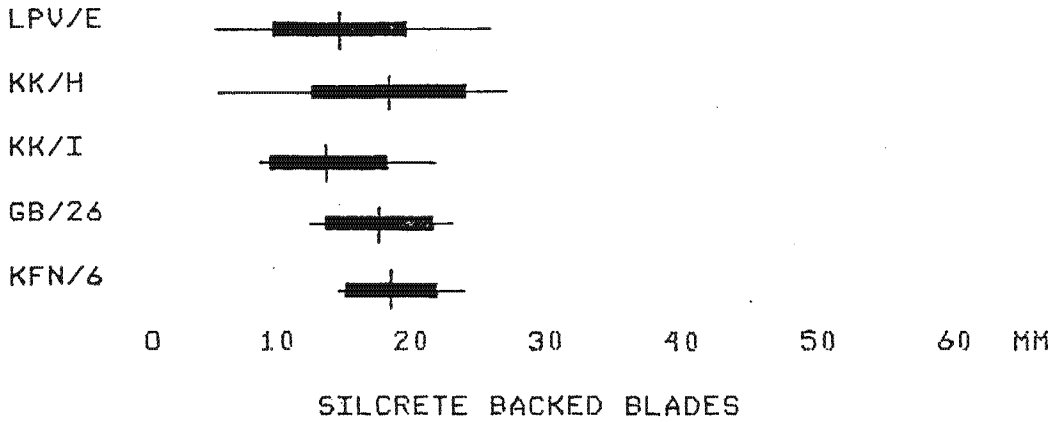


FIG. 5:10 LENGTH MEASUREMENTS OF ADZES AND BACKED BLADES

SITE: RANGE, MEAN, STANDARD DEVIATION.



SITE: RANGE, MEAN, STANDARD DEVIATION.



THE ASSEMBLAGES: STONE TOOL PATTERNS IN THE SANDVELD

The theme pursued in this chapter is the analysis of the various classes of stone artefacts which characterise the assemblages recorded during the sampling programme. Particular attention is paid to the relationship between assemblage composition and the spatial distribution of sites across the landscape. The variation between sites in similar localities is considered as well as the more obvious differences between sites in contrasting environmental contexts. Assemblages are compared mainly on the basis of differences in artefact and raw material frequencies. Detailed lithic inventories of the 21 sites which form the core of this analysis are included in Appendices 6 to 10. The distribution of the sites is shown in Fig. 5:1. In the following discussion the various sites are considered under the categories listed in Table 5:1, namely deflation hollows, talus slopes and open koppie scatters.

1. DEFLATION HOLLOWES

Deflation hollows are by no means consistent in terms of where they occur or what kind of assemblages they contain. During the sampling programme it became apparent that although hollows in close proximity to one another usually contained a very similar range of artefacts, there were significant differences between assemblages on the coastal flats and those near to the mountains. To facilitate the description and analysis of hollows in different environmental contexts the deflation sites were separated into three groups (see Table 6:1).

The majority of deflation sites fall within the riparian group which describes hollows located near to one of the three major river systems in

TABLE 6:1

DEFLATION HOLLOW SITES SAMPLED IN THE RESEARCH AREA

GROUP 1. RIPARIAN SITES

Koopmansdrif	KMD/F
Point 209	209/A
Leipoldtville	LPV/E
Klein Klipheuwel	KK/H
Klein Klipheuwel	KK/K
Klein Klipheuwel	KK/I
Wadrifoutpan	WDSP/C

GROUP 2. SITES CLOSE TO ROCK OUTCROPS

Pepper Tree Hill	PTH/6
Grootberg	GB/26

GROUP 3. INTERIOR SANDVELD SITES

Kruisfontein	KFN/6
Het Kruis	HK/2

the research area. Most of these sites are in coastal or near-coastal lowland settings. These assemblages have come to be regarded as the classic sandveld deflation pattern as they are large, visually very impressive artefact scatters, characterised by high numbers of finely crafted backed tools. The second group is more heterogeneous and includes those deflation areas located in sand bodies close to koppies and rocky outcrops. They are found at higher elevations than riparian sites and are located mainly in the central sandveld. A typical setting is one where a broad sweep of sand encompasses a small koppie or where deep sand deposits have accumulated at the base of a mountainous ridge (see Plate 5). Deflation bays situated in these areas contain assemblages which are less dense and often differ subtly from the so-called classic pattern. The third group are inland sandveld sites situated near the mountains. Assemblages from this region sometimes share contextual characteristics with the riparian group but, because they show compositional affinities with non-deflation sites in the Cape Fold Belt mountains, it is useful to think of them as a separate group.

1.1 Riparian Sites (Group 1)

1.1.1 The Waste Category

Within the riparian group the classic pattern is well illustrated by the the three Death Valley sites (KK/H, KK/K & KK/I) and the nearby LPV/E hollow, close to the Langvleirivier (see Plate 6). At all these sites quartz dominates the waste category. It comprises 50-60% of the total waste, followed by silcrete which constitutes 30-45% of the waste. Cryptocrystalline silicates (CCS) are consistently present but always in small quantities, usually less than 3%, with quartzite a variable presence ususally accounting for 4-6% of the waste. Indurated shale is either absent or present in very low quantities at these sites. This is shown graphically in Fig. 6:1.



Plate 5 : view of "Pepper Tree Hill" with sandy deflation area visible around the base of the kopple.



Plate 6 : Site LPV/E. An example of a large riparian deflation bay.

In the waste category chips are numerically the most common artefact. They outnumber flakes by a ratio of about 2:1, whilst flakes outnumber chunks by a similar ratio. In the classic pattern silcrete flakes outnumber those of quartz although, conversely, quartz cores are more common than silcrete cores. Due to the way quartz fractures it is often difficult to identify quartz flakes with any degree of certainty and it is possible that they are under represented. Quartz cores feature prominently at the majority of sandveld sites and reflect the prevalence of bipolar working; most of the quartz cores being classified as bipolar or 'rice grain'. Although bipolar cores are also found in silcrete, they are fairly rare and most silcrete cores are either of irregular or bladelet type.

1.1.2 The Utilised Category

In terms of artefact analysis the utilised category is probably the most unsatisfactory of the three generally recognised artefact categories as, it brackets together several disparate artefact types. At deflation sites the most commonly encountered artefacts in this category, are utilised flakes (which make up the vast majority of the utilised class), pièces esquillées and grindstones.

As with unused flakes, most utilised flakes at riparian hollows are of silcrete. Pièces esquillées show the reverse trend and are far more common in quartz. With the doubts expressed earlier about the correct placement of pièces esquillées it is interesting to compare their frequencies with those of quartz cores. At many sites there is a close correspondence between the two classes; sites with a high ratio of quartz to silcrete cores also show a high ratio of quartz to silcrete pièces esquillées. Similarly, at De Hangen (Yates 1983), a distinct correlation appears to exist between the high incidences of quartz bipolar cores and quartz pièces esquillées which further suggests a functional equivalence.

Both upper and lower grindstones are a persistent feature of deflation hollow assemblages. Although no precise correlation could be established between numbers of grindstones and the numbers of other artefacts, sites with a high formal tool component invariably contained several grindstones. At the other end of the scale it was unusual to find a site, even one with few other artefacts, that did not contain at least one lower grindstone. The presence of these large quartzitic grindstones in areas often far away from any possible raw material source, suggests two things:- firstly, that they were cached at sites for use on repeated visits; secondly, that grindstones were a key factor in the occupation of deflation hollows.

The large lower grindstones frequently show a marked dishing of the grinding surface indicative of heavy usage. Similarly, upper grindstones are often heavily worn and sometimes display pecking. The use of grindstones to prepare plant foods has been suggested on many occasions (for example Burchell 1822; Raven-Hart 1967). The absence of organic material in deflation situations, however, renders their use for this purpose conjectural. Ochre is abundant in almost all hollows in both the red haematitic and the darker limonitic varieties. The frequent traces of red ochre staining on grindstones demonstrates at least one of their functions (see Plate 7).

1.1.3 The Formal Tool Category

The raw material frequencies of the total formal tools for each deflation site are listed in Appendix 10 and shown graphically in Figs. 6:3 and 6:4.

The most obvious feature of the classic pattern is the dominance of silcrete formal tools. They average 60-80% of the total formal tools as compared to 20-30% in quartz. CCS tools form a small but persistent element which is usually less than 10% of the total, whilst the remaining raw materials are rare or uncommon.



Plate 7 : Corrie stained lower grindstone.



Plate 8 : Site AND/a. A typical example of a small deposit - containing cave with a prominent talus slope

It has become customary, especially in open site studies in the southwestern Cape, to type assemblages according to the relative frequencies of scrapers, backed tools and adzes. The latter two classes are particularly diagnostic and have been used to argue for activity differences between adjacent habitat zones (Mazel & Parkington 1981; Parkington 1980a). Scrapers, on the other hand, are ubiquitously present as the sine qua non of surface scatters. In the classic deflation pattern, scrapers average 40-50% of the total formal component, backed tools 20-30% (sometimes higher) and adzes 0-5%.

Not all the riparian sites, however, follow the classic pattern in toto. Some sites, interestingly, preserve the typological characteristics whilst differing in raw material usage, the most notable examples being the group of deflation sites situated close to the north bank of the Verlorevlei some 12km from the sea. This sub-group is represented by KMD/F and 209/A and the feature which sets them apart from the other riparian sites is the high incidence of quartz in all the artefact categories coupled with a corresponding decrease in the amount of silcrete. In the waste category, for example, the frequency of quartz approaches 80% of the total and, unusually for the classic pattern, quartz flakes outnumber those in silcrete.

A similar trend was recorded by Mazel (1978) at the nearby Uithoek site where quartz exceeded 90% of the total waste. The consistently high incidence of quartz at these Verlorevlei sites is difficult to account for, but may relate to the relative proximity of conglomerate quartz. Mazel (1978), suggested that a possible explanation for the high quartz content of certain sites, Het Kruis for example, is that silcrete artefacts were preferentially collected by earlier archaeologists working in the area. This seems unlikely in the case of the Verlorevlei sites, however, as the pattern of quartz domination is consistently present at all the sites

sampled in this area and formal tool frequencies are what one would expect for un-ravaged assemblages.

In the formal tool category at the Verlorevelei sites, quartz tools outnumber those made in silcrete. What is more interesting, however, is that despite this quartz dominance, the frequencies of scrapers, backed tools and adzes conform fairly closely to the classic pattern. The question of the raw material specificity of certain tools is considered later in this chapter but it is evident from these sites that certain classes of formal tools are not restricted to any one raw material.

1.2 Deflation Sites Close to Rock Outcrops (Group 2)

The sites in this group (represented in Table 6:1 by PTH/6 & GB/26) follow the classic pattern fairly closely in terms of the raw material frequencies in the waste, utilised and formal tool categories. The main differences lie in the size of the assemblages and in the frequencies of different formal tools. None of the deflation hollows recorded near outcrops during the survey approached the classic lowland riparian sites in terms of artefact numbers. As regards the formal classes in the sites sampled, scrapers maintained their normal level of 40-50% and the numbers of backed pieces remained high, particularly at PTH/6 where they comprised 30% of the total formal class. The major variation from the classic pattern was the increases in adzes: 12% of the formal at PTH/6 and 8.2% at GB/26.

1.3 Interior Sandveld Deflation Sites (Group 3)

The interior sandveld sites (represented in Table 6:1 by KFN/6 & HK/2) resemble the quartz dominated Verlorevelei sites but have more adzes than the classic pattern. High quartz frequencies were recorded in the waste category whilst in the formal classes the incidence of quartz tools is considerably above the norm for the classic sites. The numbers of scrapers are again consistently high whilst the other classes vary. At KFN/6 the

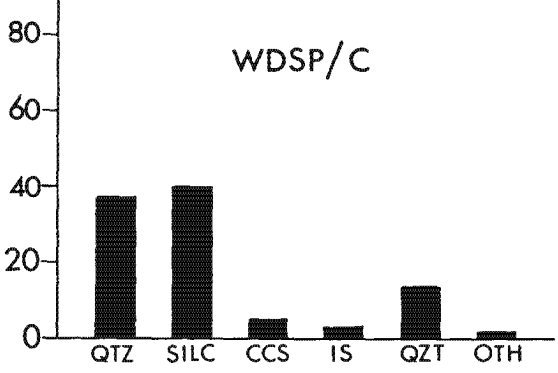
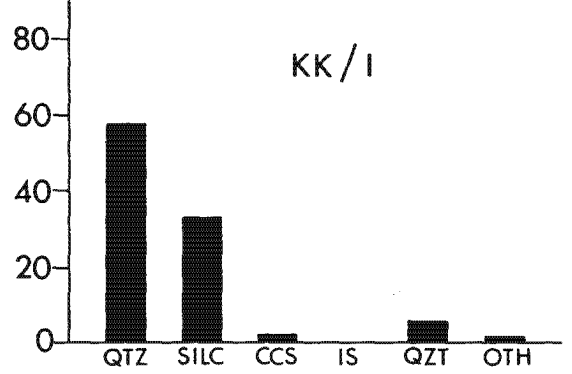
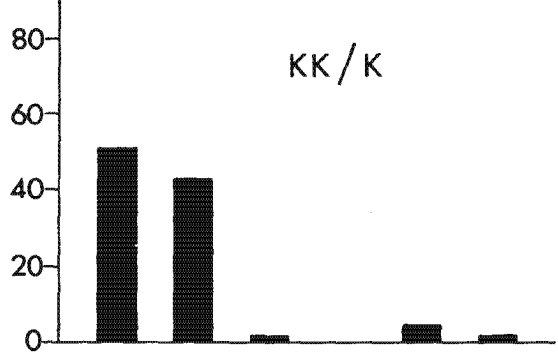
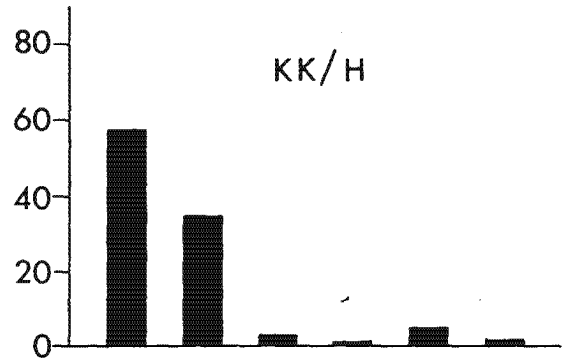
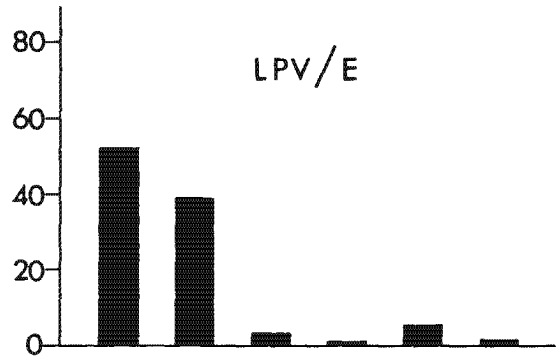
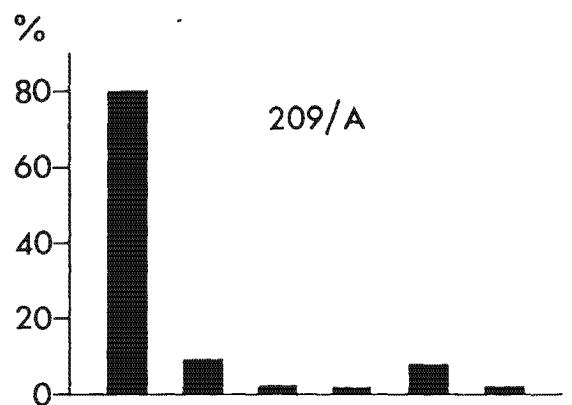
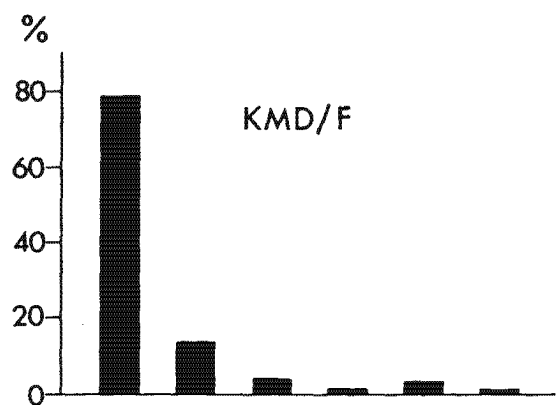


FIG. 6:1 Raw material frequencies of waste category.
Deflation hollow sites (Group 1)

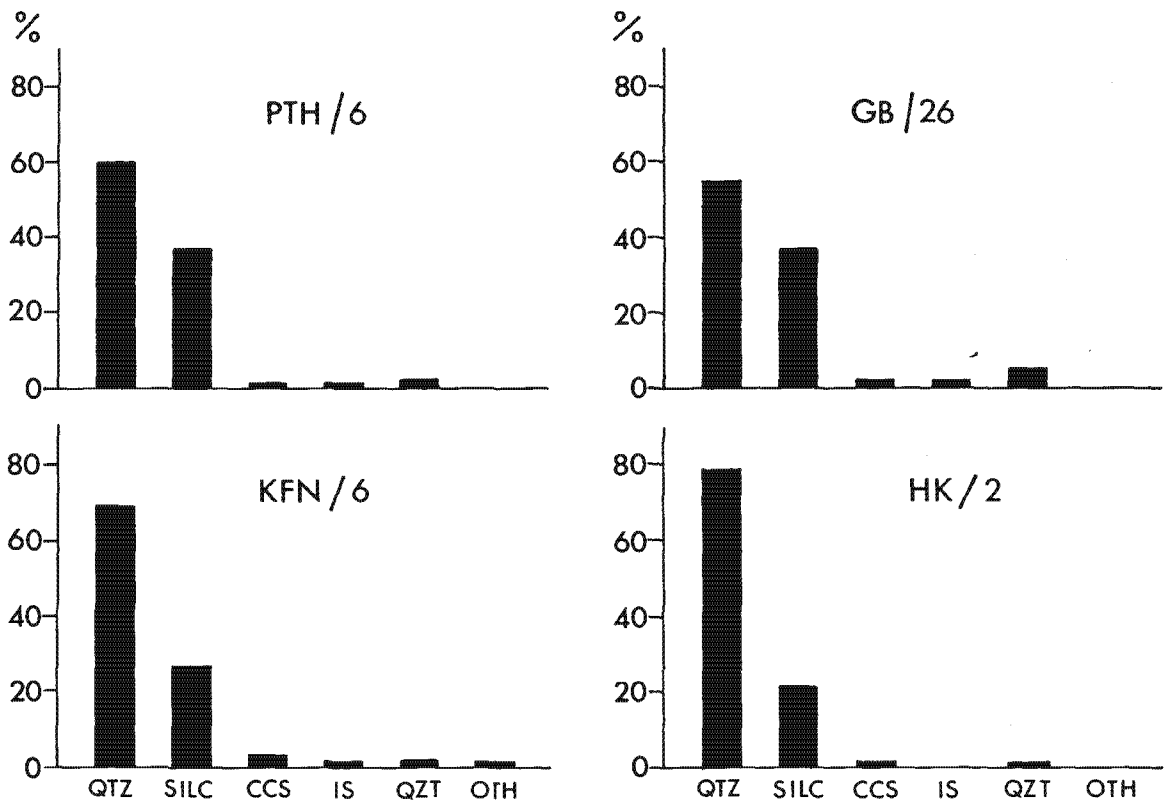


FIG. 6 : 2 Raw material frequencies of waste category.
 Deflation hollow sites (Groups 2 and 3)

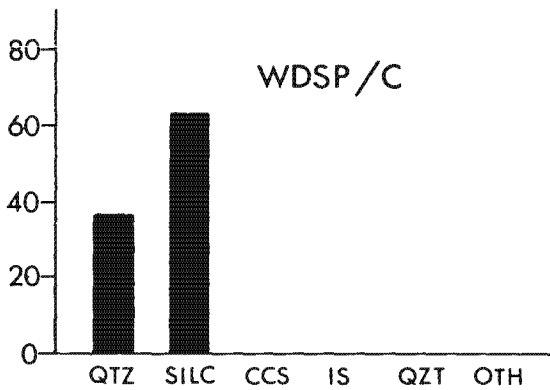
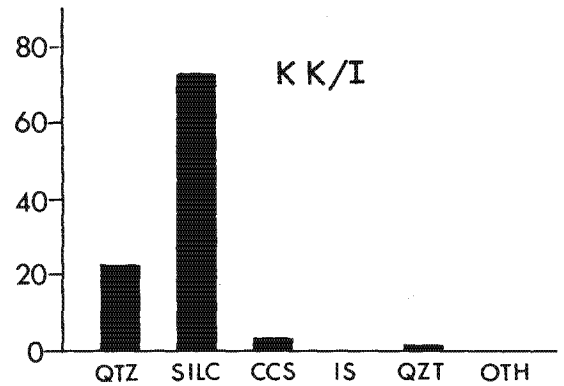
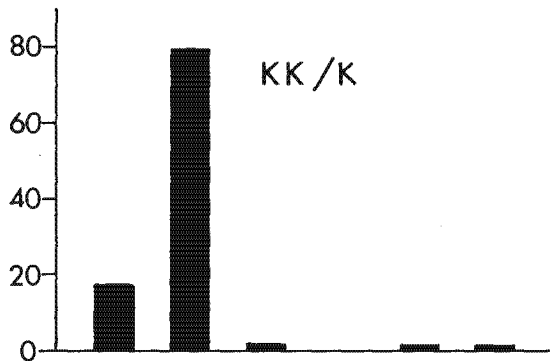
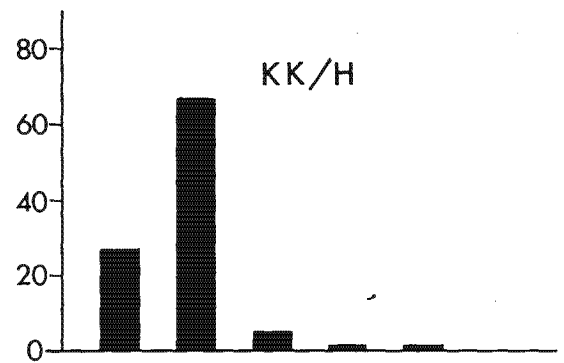
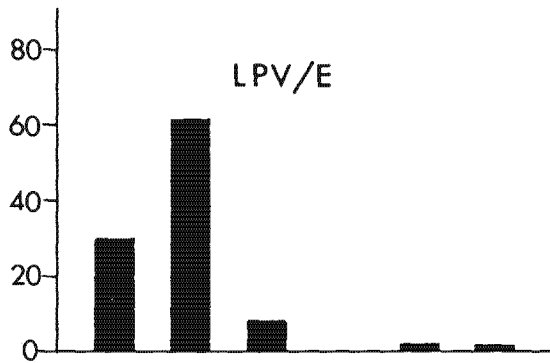
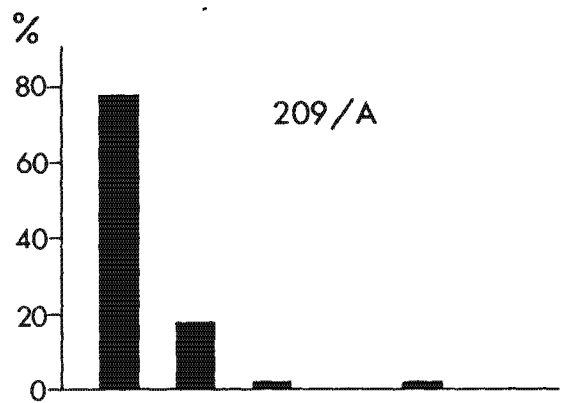
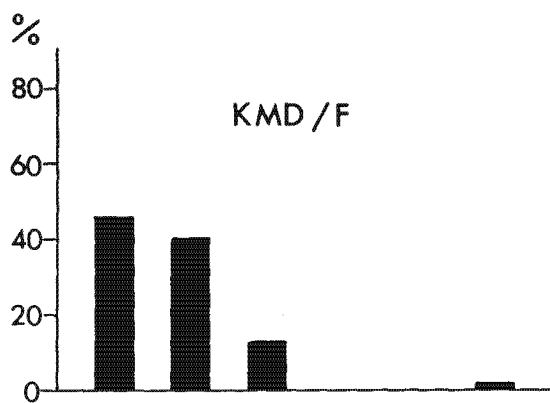


FIG. 6:3 Raw material frequencies of formal tools category.
Deflation hollows (Group 1)

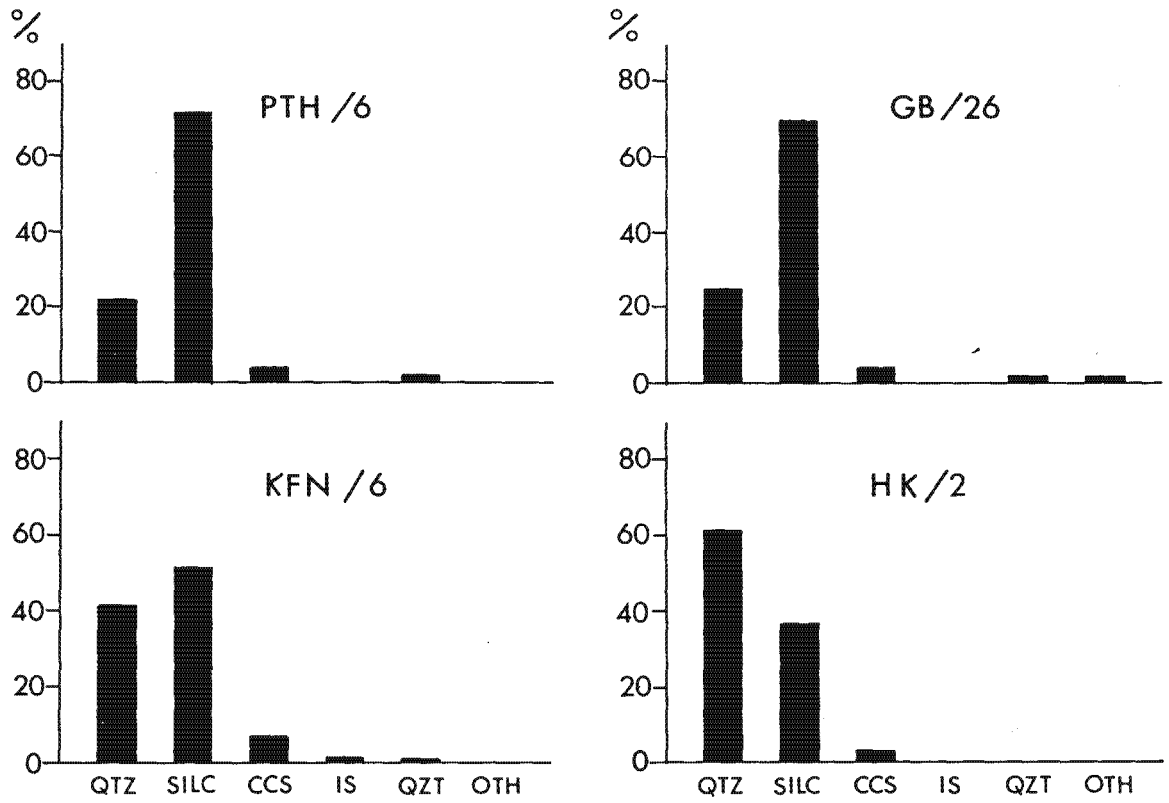


FIG. 6 : 4 Raw material frequencies of the formal tools category.
Deflation hollows (Groups 2 and 3)

backed elements remain high (20.5%) with adzes intermediary (11.2%). The Het Kruis site HK/2, which is closer to the mountains, includes a high adze count (18.9%) with a coincident decrease in the numbers of backed pieces (6.8%).

1.4 Comparative Sample

In order to extend the sandveld deflation sample, the formal tool frequencies of the deflation sites sampled by Mazel (1978) have been included in Table 6:2. For the purposes of this study they have been allocated to Group 1 (riparian sites) and Group 3 (interior sandveld). The distribution of these sites is included in Fig. 5:1. Some comment is necessary on the provenance of these sites. To begin with, no study of deflation hollows would be complete without mention of the so-called 'Verlore' site (VER).

This is probably the richest deflation site area in the sandveld in terms of formal tools and is situated on the north bank of the vlei approximately 1.5km from the sea. Although closer to the sea and within the shell midden zone, its position is somewhat analogous to the Death Valley sites adjacent to the Langvleirivier. This is particularly evident in the assemblage patterning which closely follows the classic mode although this is hardly surprising as 'Verlore' is in fact the archetype of the classic sandveld deflation bay. The Verlore (VER) sample of Mazel (1978) is an amalgamation of two adjacent bays plus a collection of artefacts formerly housed at the South African Museum which are thought, on fairly reliable evidence, to have come from the same area. The Verlore (VER D/DX) sample represents a re-examination by Kaplan and Kaufmann (1983), of the material from one of these bays.

The Uithoek (UH) site is located close to the Koopmansdrif (KMD/F) site of the current sample. It likewise demonstrates a high incidence of quartz with 59.7% of the formal tools being of quartz as compared to 20.2%

	GROUP 1										GROUP 3					
	VER		VER D/DX		UH		KOOK		RF		BH		KMK /2		HK 2b	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
CONVEX SCRAPER	622	45.0	396	47.3	64	50.4	100	50.8	31	46.3	58	26.7	89	32.1	5	38.5
BACKED SCRAPER	105	7.6	20	2.4	5	3.9	28	14.2	5	7.5	9	4.1	58	20.9	-	-
TOTAL SCRAPER	727	52.6	416	49.7	69	54.3	128	65.0	36	53.7	67	30.9	147	53.1	5	38.5
BACKED BLADES	135	9.8	97	11.6	2	1.6	12	6.1	3	4.5	1	0.5	17	6.1	-	-
BACKED POINTS	155	11.2	74	8.8	4	3.1	12	6.1	10	14.9	4	1.8	14	5.1	-	-
SEGMENTS	30	2.2	28	3.3	13	10.2	6	3.1	6	9.0	1	0.5	8	2.9	1	7.7
MISC. BACKED	78	5.6	66	7.9	4	3.1	5	2.5	4	6.0	3	1.4	19	6.9	1	7.7
TOTAL BACKED	398	28.8	265	31.7	23	18.1	35	17.8	23	34.3	9	4.1	58	20.9	2	15.4
DRILLS	54	3.9	40	4.8	6	4.7	1	0.5	-	-	-	-	18	6.5	-	-
ADZES	30	2.2	7	0.8	12	9.4	7	3.6	-	-	129	59.4	34	12.3	4	30.8
M.R.P	171	12.4	106	12.7	17	13.4	26	13.2	8	11.9	11	5.1	20	7.2	2	15.4
AWL	-	-	1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
ARROW-HEAD	1	0.1	2	0.2	-	-	-	-	-	-	-	-	-	-	-	-
BORED STONE	-	-	-	-	-	-	-	-	-	-	1	0.5	-	-	-	-
TOTAL FORMAL	1381	100.0	837	99.9	127	99.8	197	100.1	67	100.1	217	100.0	277	100.0	13	100.1

TABLE 6:2 - COMPARATIVE SAMPLE OF SANDVELD DEFLATION SITES.

FORMAL TOOL FREQUENCIES. (AFTER MAZEL 1978; KAPLAN & KAUFMANN 1983)

of silcrete. As such it clearly belongs with the sub-group of quartz dominated Verlorevelei sites. The remaining two sites in the riparian group, Kookfontein (KOOK) and Rietfontein (RF), are situated in the northern part of the reseach area close to the Jakkalsrivier. Both sites approximate to the classic pattern.

Three of the Mazel (1978) sites are interior sandveld hollows. Bontheuwel (BH) is close to the mountains and is an extreme example of an adze dominated hollow. Koopmanskraal (KMK/2) lies outside the boundaries of the research area in the middle reaches of the Verlorevelei. It shows a standard sandveld pattern augmented by a high adze component. The Het Kruis 2b sample is really too small to be reliable but complements the nearby Het Kruis sample of this project (HK/2).

1.5 Formal Tool Patterns

As shown previously, at the level of formal tool classes, scraper frequencies tend to remain fairly constant, whilst the frequency of backed pieces and adzes vary considerably from site to site. Furthermore, this variation has a spatial dimension. Across the research area, from the coast to the foot of the Cape Fold Belt mountains, there is a progressive increase in adze frequencies and a corresponding decrease in the frequency of backed pieces. This can be seen by comparing the frequencies of adzes and backed pieces from assemblages in deflated sandy bays in different parts of the sandveld.

	%adzes	%backed pieces
Leipoldtville LPV/E	1.3	33.6
Pepper Tree Hill PTH/6	12.0	30.0
Koopmanskraal KMK/2	12.3	20.9
Bontheuwel BH	59.4	4.1

Apart from the grosser patterning visible at the assemblage level, other trends are also discernible in the individual tool types, especially in terms of raw material frequencies. Within the scraper class, convex scrapers are common in both silcrete and quartz and their frequency in either raw material tends to follow, as well as contribute to, the trend visible in the assemblage of which they are a part. In the quartz dominated Verlorevlei sites, for example, quartz scrapers form the majority whilst in the classic deflation pattern silcrete scrapers predominate. The most likely explanation for this evident adaptability (assuming they are functionally equivalent) is that scrapers reflect raw material availability and probably, to a lesser extent, the preferences of the toolmakers.

Backed scrapers, on the other hand, appear to be more raw material specific as they are almost always made of silcrete. Even in assemblages dominated by quartz, backed scrapers are rarely made of quartz. They are never present in high numbers and frequencies fluctuate markedly, even at sites in close proximity to one another. In ratio to convex scrapers they range from 1:20 at Verlore D/Dx to 1:1.5 at Koopmanskraal.

Within the class of backed tools, backed blades outnumber backed points at every site in the current sample, with the exception of WDSP/C where the formal tool count was very low. At the sites sampled by Mazel (1978) the situation was reversed. This paradox may well represent a difference in classification criteria rather than a real phenomenon. Most of the backed blades and points are made of silcrete although examples are also found in CCS and in quartz.

Segments form a small but persistent element at most sites. The presence of segments in the sandveld hollows is of particular interest as they are a time related feature in the southern Cape Wilton, and reach their highest frequencies between about 7000 and 5000 B.P. (Deacon, J. 1974). They are the only tool type in the sandveld which is consistently

more common in quartz than in silcrete. Segments reach their highest frequencies at the quartz dominated Verlorevlei sites. At Point 209/A they make up 10.0% of the formal total and 10.2% at Uithoek. All the segments recorded at 209/A were made of quartz and all were small in size with a maximum chord length of 10mm.

Drills (borers) are seldom present in large numbers in the sandveld but are a distinctive ingredient in the classic deflation pattern. They are present at almost all of the coastal and near coastal sites although their frequency rarely exceeds 5% of the total formal class. No drills were recorded in the Group 2 sites near to rock outcrops whilst only two of interior sandveld deflation assemblages, namely KFN/6 and Koopmanskraal, included drills. In this respect the inland sandveld group of sites resemble talus slope sites from the nearby mountains where drills are rare inclusion. In the sandveld drills are manufactured almost exclusively from silcrete and CCS.

2. TALUS SLOPES AND OPEN KOPPIE SCATTERS

These two categories are grouped together for analysis as a degree of overlap exists at several sites and the distinction between the two types of assemblage is not always clear. The sites sampled in these categories are listed in Table 5:1. The talus samples refer to scatters found in the dripline and talus zones of small caves and rock shelters containing a deposit. These sites presented few problems in terms of definition and location, although the actual sampling was not easy as the scatters tended to spill over rock steps and boulders in the talus zone. The so-called open koppie scatters, however, are far more difficult to define, both conceptually and spatially. They take the form of large, low density stone scatters, often covering an area of several thousand square metres. There is no apparent focus apart from the koppie itself, for this type of

scatter, hence the appellation. In addition, these diffuse scatters are not of uniform type but appear to reflect a number of different, and sometimes superimposed, patterns. In general they are characterised by a very low density of formal tools; a prominent but variable number of utilised or minimally retouched flakes; and a preponderance of waste material. Another feature of these large scatters is the occasional presence of artefacts with MSA-like characteristics.

2.1 Talus Slopes

Four talus scatters (LV/3, AND/6, LB/5 and UK/7) are examined as typical examples of assemblages associated with small cave deposits (see Plate 8). The samples were recorded at various locations across the sandveld where open koppie scatters do not occur, thus avoiding the problem of separating the different assemblage types.

The waste category at these sites does not differ radically from the deflation pattern (see Fig. 6:5). Waste material was not recorded at LV/3 but, at the other sites, quartz is the most common raw material. The frequencies are higher than in the classic deflation pattern but do not reach the extremes of the quartz dominated Verlorevelei sites.

The utilised category also resembles the deflation pattern. Utilised silcrete flakes outnumber those in quartz and virtually all the pièces esquillées are in quartz. Only at UK/7 is the situation reversed, with pieces esquillees being more common in silcrete than in quartz. As shown by the metrical analyses (Chapter 5), the assemblage at UK/7 is, in many ways, subtly different from the typical sandveld talus slope pattern. It is situated in the foothills of the Uitkomsberge and is, technically, a mountain site but is included within this sample set due to its location on the sandveld/mountain interface. UK/7 is perhaps best considered as a western example of the mountain assemblages discussed by Mazel (1978) and

Mazel & Parkington (1981).

As is to be expected, it is in the formal tools category that significant differences between talus zone and deflation hollow assemblages become apparent. In terms of raw materials the ratio between silcrete and quartz is even more pronounced in favour of silcrete than in the classic deflation pattern. In the talus samples, 70-80% of the tools are made of silcrete as compared to 15-20% of quartz (see Fig. 6:6).

Scraper frequencies are slightly lower than the sandveld norm and average 35-50% of the formal tools. The frequencies of backed pieces and adzes, however, are markedly different from the classic deflation pattern. Backed tools comprise less than 10% of the formal at most talus sites, whilst adzes register 20-40%.

Segments are extremely rare in samples from talus zone scatters. The small cave site Langvleiberge (LV/3) is atypical in this respect, as the assemblage contains segments as well as other backed pieces. This, along with other factors considered in the next chapter, has possible implications for the chronology of the site. As with backed tools, drills are a very rare inclusion in talus assemblages. Overall it is clear that, although the sandveld talus assemblages are more ephemeral, they are remarkably similar to those found further east in the mountains.

2.2 Open Koppie Scatters

We must now turn to the problem of the open koppie scatters and their relationship to talus slope occurrences. As an example of the sampling problems encountered with these assemblages, two of the locations are described. Rondeberg is an isolated, semi-mountainous koppie, south of Verlorevlei. Archaeologically it is a rich area with a plethora of rock art sites and small shelters. Although none of the rock shelters contain very much deposit, several have copious talus scatters. There are no permanent water sources in the immediate vicinity but several large, natural

catchment basins exist near the summit which contained traces of water well into the dry season. Many of the sandveld koppies have similar rock basins which could have served as a source of water during the winter (see Plate 9).

There is a general scatter of quartz waste over the whole of Rondeberg, as well as the ephemeral presence of large silcrete and quartzite flakes with MSA-like characteristics. These include faceted platform flakes and occasional unifacial points. Material from the talus zones of the small shelters spills down the rocky slopes ending up on a fairly level terrace area where it merges with the general quartz background scatter (see Plate 10).

Klipheuwel is a medium sized koppie rising from the flat, sandy plain which stretches between the Langveirivier and the Jakkalsrivier (see Plate 11). Along the north-east side of Klipheuwel there are several small caves. The talus scatters from these sites trail down the slope onto a fairly level terrace where they join a broad sweep of predominantly silcrete waste which runs around the base of the koppie. The sampling problem here, as at Rondeberg, is to distinguish the talus occurrences from the general background scatter.

It is apparent from an analysis of the samples from these two locations, Rondeberg and Klipheuwel, that little difference exists between the samples recorded in the area of the general scatter and those recorded on the talus slopes. Most of the problems of differentiation arise from the fact that the general background scatters are far less dense. The important point is that, whilst the open koppie samples from Rondeberg and Klipheuwel are quite different from each other, especially in terms of raw materials, they closely resemble, in each case, the scatters on the talus slopes. The implication clearly is that, in these cases, the talus assemblages are parts of the general scatter, albeit located close to small rock shelters



Plate 9 : A water filled rock basin at POINT 582.



Plate 10 : Site RDN/15. A small shelter at the base of Rondeberg, fronted by a level terrace.

or overhangs.

Two samples were recorded at Rondeberg; one came from the talus slope fronting a small shelter (RON/15) and the other from the terrace area (RON/10). Quartz dominates the waste category of these samples, to the virtual exclusion of other materials. In terms of frequencies, quartz accounts for over 90% of the total waste at RON/15 and almost 90% at RON/10 (see Fig. 6:5). These are the highest frequencies of quartz waste, including that in the deflation samples, recorded in the sandveld. High incidences of quartz bipolar cores and pièces esquillées were also noted. Although the formal tool count is significantly low, the two samples are essentially similar with adzs outnumbering backed pieces.

At the Klipheuwel sites quartz assumes more normal proportions with frequencies within the range typical for sandveld sites. In the formal tool category silcrete is the most common raw material and only a few of the scrapers are made of quartz. As at Rondeberg, and characteristically in open koppie situations, the incidence of formal tools was very low, particularly on the terrace area (KH/3). In the talus sample (KH/1) backed pieces were uncommon compared to adzes.

2.3 MSA-related Assemblages

Artefacts with MSA-like attributes have been recorded at many locations throughout the sandveld. They are most commonly found on koppies but also occur in deflation areas. Due to their very low density they are difficult to categorise other than to say that they are uncharacteristic of the LSA and would not be out of place in an MSA assemblage. This appraisal would probably have remained marginal if it were not for two factors. The first being the presence of two caves in the sandveld with deep MSA deposits, namely Elands Bay Cave and Diepkloof, and the second, the discovery of a dense MSA open site scatter on the koppie known as

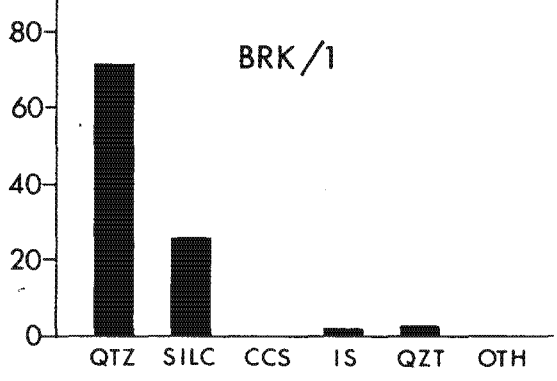
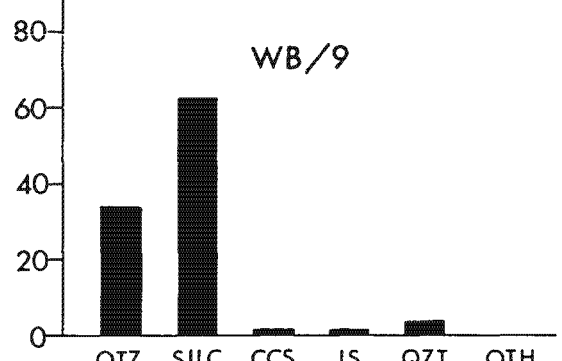
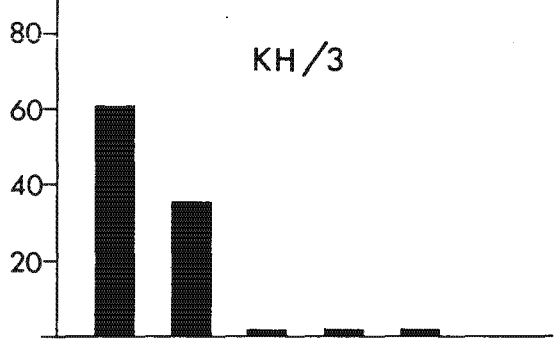
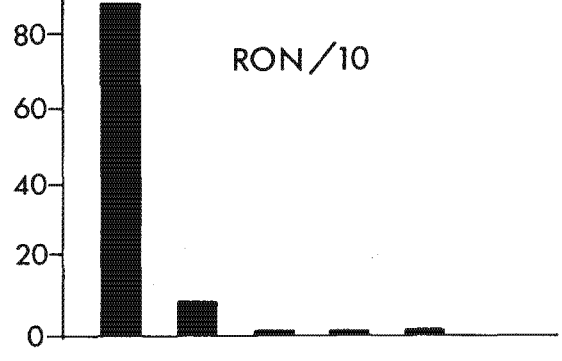
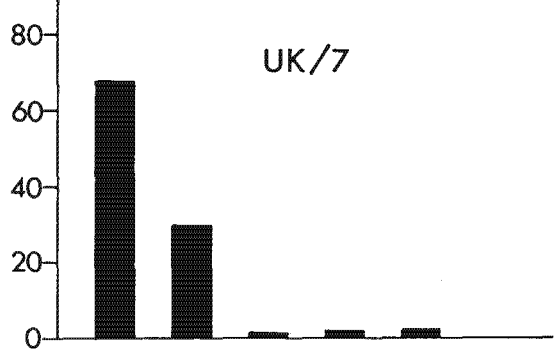
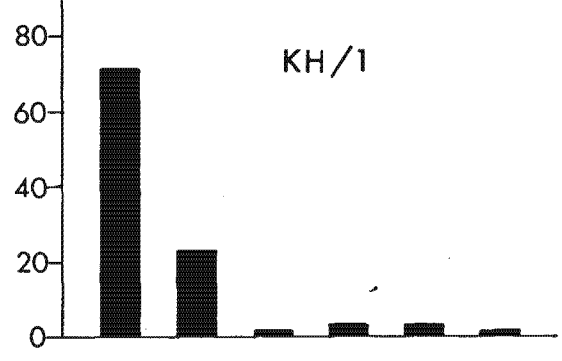
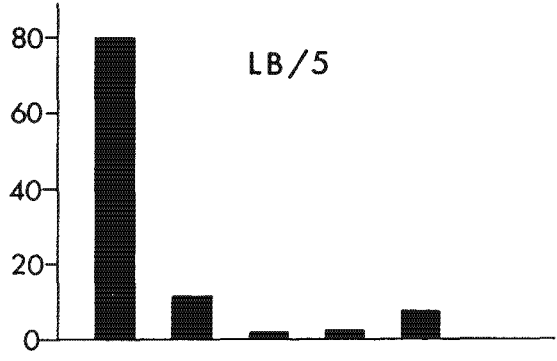
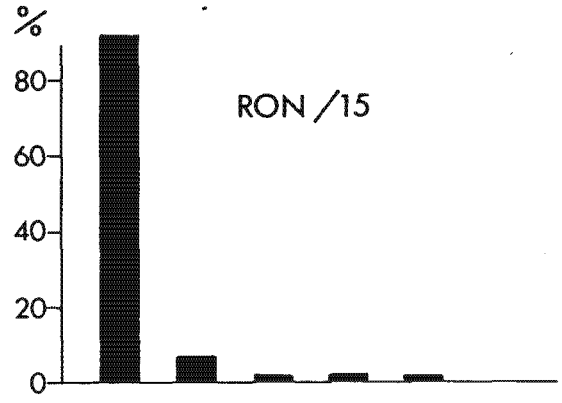
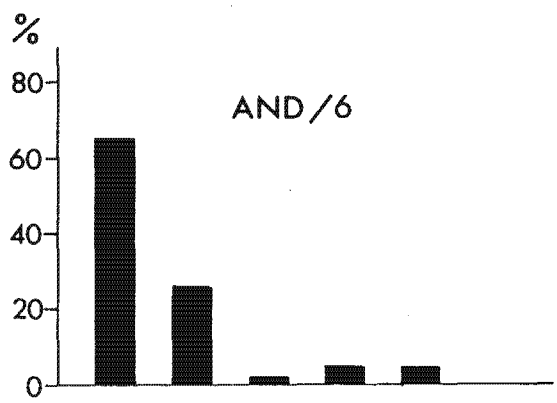


FIG. 6:5 Raw material frequencies of waste category. Talus and open koppie sites

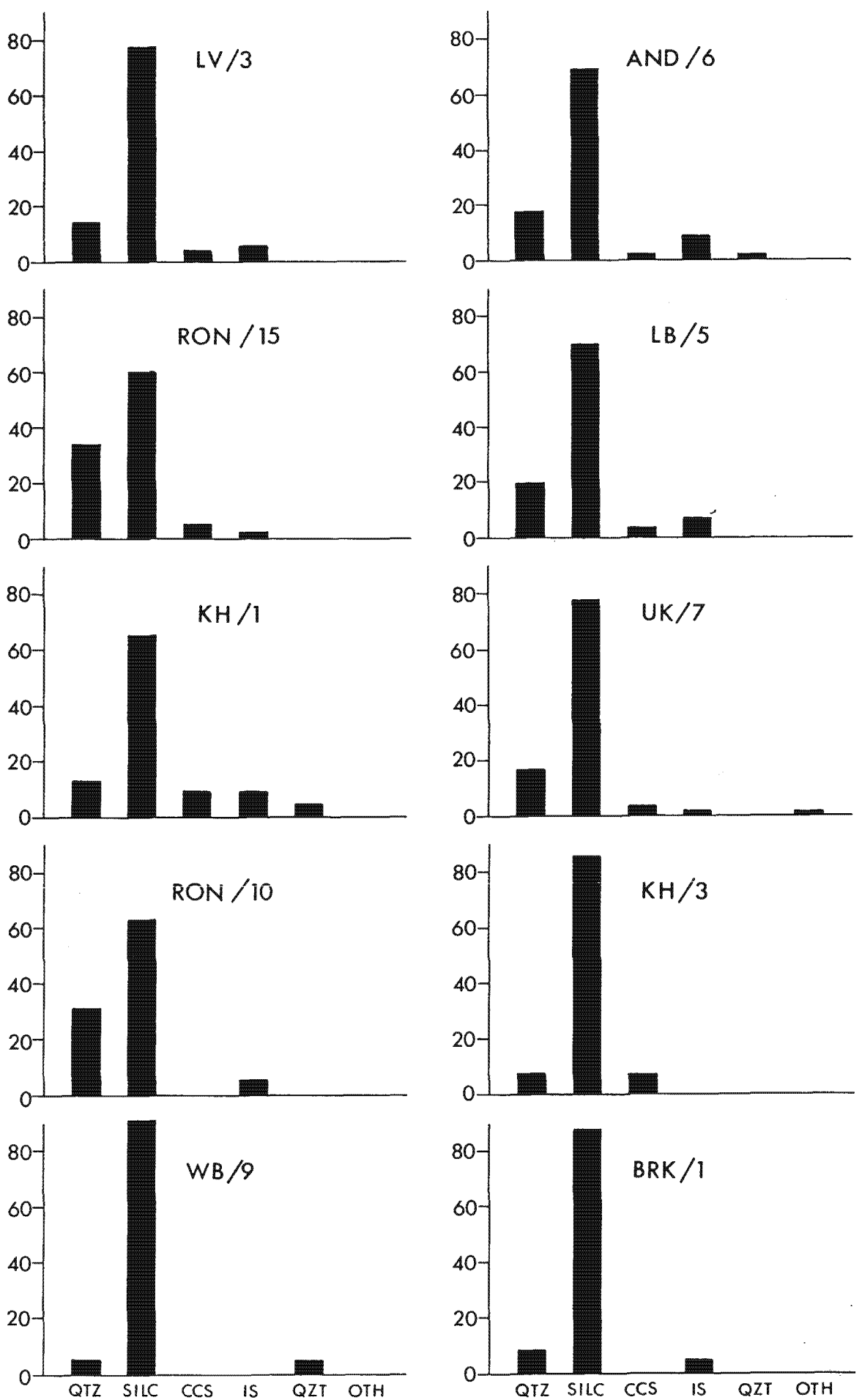


FIG. 6:6 Raw material frequencies of the formal tools category. Talus and open koppie sites.

Wolfberg.

Wolfberg is an isolated, semi-mountainous koppie situated on the extensive coastal plain, south of the Jakkalsrivier (see Plate 12). Its nearest neighbour is the previously mentioned Klipheuwel. Wolfberg is a fascinating case study in its own right, as it contains a selection of all the important types of sandveld site other than deflation hollows. These include rock art sites, small shelters with deposit and a general background scatter of silcrete. A detailed study of all the aspects of one of these koppie systems would do much to clarify some of the issues considered only briefly in this thesis.

Wolfberg has an extensive plateau below the summit region. There is a general scatter of silcrete over most of the plateau area which cascades down the steep slopes to the plain below. At the southern end of the plateau a shallow depression contains a very dense scatter probably concentrated by water over a long period of time. Samples recorded from this area revealed an assemblage very different in form to the previously encountered types. Known as WB/9, it is the only site sampled where silcrete dominated the waste, utilised and formal tool categories. As shown in Fig. 6:5 there is nearly twice as much silcrete waste as quartz.

In places, the artefact density exceeded 500 pieces per square metre. This is all the more remarkable as, for once, chips were not the largest class in the waste category. The assemblage consisted mainly of chunks and flakes with a relatively high incidence of utilised flakes and snapped blades. Formal tool frequencies were low, with occasional scrapers and backed pieces. Most of the backed element were large, minimally backed segments. Many of these were broken but whole specimens usually exceeded 20 mm in length. Large angular trapezoids were also noted. Most of the artefacts were in a highly weathered condition.

Much of the material conforms to the southern Cape Howieson's Poort



Plate 11 : View of Kliphouwel. Several small shelters are visible at the base of the koppie.



Plate 12 : Wolfberg.

pattern described by Volman (1981). The Wolfberg WB/9 assemblage is very dissimilar to the quartzite dominated MSA levels at Elands Bay Cave, but closely resembles the Howieson's Poort artefacts recovered from the test pit at Diepkloof (Parkington 1977). The upper 10-20cm of the Diepkloof deposit contains an LSA occupation with sheep bones and pottery postdating 1600 B.P.. An occupational hiatus separates the LSA layers from the lower Orange-Black complex in which a test pit was excavated to a depth of 1.8 m below the pre-excavation cave surface without reaching bedrock. Two dates were obtained from charcoal 10 cm below the surface of this complex:- 29 400 ± 675 B.P. (Pta-1051) and greater than 24 000 B.P. (GaK-4596). Charcoal from near the bottom of the test pit was dated at older than 45 270 years B.P. (Pta-1054) (Parkington 1977; Volman 1981). Despite some admixture of the industries on the surface, it was clear that the Howieson's Poort artefacts were separated from the LSA levels by an occupational hiatus of at least 30 000 years. As at the Wolfberg open site, almost all of the formally retouched pieces were silcrete and included segments as well as other backed and truncated forms.

The final site sampled in this series was at Bruinkop, to the north of the Jakkalsrivier near to Heerenlogementsberg. Again this is a large isolated koppie with several small shelters and a widespread background scatter. Although nowhere as concentrated, visual inspection showed the range of artefacts and raw materials to be similar to those at Wolfberg. The debris on the steep north facing escarpment resembles the material on the boulder strewn slope below Diepkloof Cave. In both cases there is a litter of silcrete chunks and flakes with smaller quantities of quartzite. This type of assemblage, a diffuse scatter of predominantly silcrete waste with large flakes and MSA elements, appears to be limited to the larger, more prominent, of the sandveld koppies.

Bruinkop lacks an extensive plateau on the scale of Wolfberg but just

below the summit beacon there is a level courtyard area enclosed by boulder massifs. This is best described as a site complex as it encloses several small shelters and overhangs adorned with rock paintings. As at Rondeberg there is no apparent source of fresh water but several large catchment basins occur in the surrounding rocks. Perhaps the most interesting discovery at Bruinkop was a cache of four whole ostrich eggs buried in a shallow sandy infill at one of the small shelters (see Plate 13). A similar cache of five ostrich eggs was recovered from the shell midden known as Connie's Limpet Bar (site DM/1) near the mouth of Verlorevlei (Horwitz 1979).

Another interesting feature at Bruinkop was a dense concentration of broken tortoise carapaces and bones in a small nook between large boulders. The area had been contained by roughly laid low stone walling presumably intended to act as a windbreak. Although tortoise remains are a constant feature of koppie sites, this type of density is highly atypical and the only similar instance, within the bounds of the research area, occurred at Bredevlei on the margin of the Uitkomsberge. A possible explanation, bearing in mind the unusual stone walling, is that this represents a very late phenomenon, almost a squatter situation, when resources had become highly restricted and only items such as tortoises were freely available.

The sample BRK/1 was recorded in the courtyard area where a fairly dense scatter fanned out from a small overhang with rock paintings and merged with a more diffuse and widespread assemblage with some MSA artefacts. Although ostensibly an open scatter, the sample resembles a talus slope rather than an open koppie scatter. This is borne out by the formal tool and raw material frequencies which are clearly those of the talus zone pattern.

The location of this scatter highlights one of the principles observed many times during the survey and sampling programmes. In the case of BRK/1

the choice of site was governed not by the desire for shelter, as there were several secluded caves nearby which could have been used, but by the need for an open level activity area. There was, however, a focus for the scatter, 'in this case a minimal overhang with paintings. The requirements seem to be:- firstly, a spacious level area for stone knapping and other activities and, secondly, a small shelter, an overhang or even a boulder, as a focus for these activities.

3. SUMMARY

In order to unravel the rather convoluted pattern of stone tool assemblages described in this chapter, the following is a brief summary of the more important points. The three main types of assemblage were described in terms of their location:- deflation hollows, talus slopes and open koppie scatters.

3.1 Deflation Hollow Assemblages

The majority of large deflation assemblages fall within the range of the classic deflation pattern as described by Mazel & Parkinton (1981). These assemblages, typically situated in near-coastal riverine environments, display an overall quartz domination, although most of the formal tools are made of silcrete. Scrapers are present in consistently high numbers at all these sites and are the most abundant of the formal tools, although the assemblages are characterised by the presence of various types of backed tools and by the complete or virtual absence of adzes. Other diagnostic features are drills, both upper and lower grindstones, quartz pièces esquillées and bipolar cores.

A variation on the classic mode is shown by the Verlorevlei group of sites, characterised by very high quartz frequencies in all the artefact categories. Despite this raw material shift the frequencies of the common formal tools still correspond to the classic pattern. Point 209/A is an

extreme example of this sub-group of sites with waste, utilised and formal tool categories all being quartz dominated.

Deflation hollows close to rock outcrops (Group 2), always contained smaller assemblages in terms of artefact numbers but followed the classic pattern fairly closely except for an increase in the frequency of adzes. Deflation sites situated in the interior sandveld (Group 3) resembled the Verlorevlei sites in artefact and raw material composition with the addition of a large, and in some cases substantial, adze component.

3.2 Talus Slope Assemblages

The assemblages associated with small deposit-containing shelters, form a remarkable homogenous set which differ markedly from the deflation pattern. These assemblages are distributed throughout the koppies and massifs of the sandveld and are characterised by large quantities of quartz waste and a relatively small formal tool complement, composed almost entirely of silcrete. Scrapers are always present, although in frequencies lower than those in deflation sites. The diagnostic features are the consistently high adze numbers and the almost negligible incidence of backed tools. Segments and drills are virtually absent from these assemblages.

3.3 Open Koppie Scatters

This is the generic term applied to the very large, diffuse scatters of artefactual debris, covering the slopes and plateaux of several of the sandveld koppies. They are characterised by low frequencies of formal tools and relatively high numbers of utilised pieces. At the locations sampled no significant differences, apart from artefact density, were discernible between talus occurrences and the general background scatter. It was, therefore, concluded that at these sites the talus scatters were a more concentrated extension of the widespread koppie scatter.

3.4 MSA-related Assemblages

Another type of assemblage, also widely spread across koppies, was made up of, or at least included, MSA related material. These scatters were very dispersed and often intermingled with open koppie assemblages. Only at the Wolfberg WB/9 site was the material sufficiently concentrated to infer an affinity with the Howieson's Poort Industry.

CHAPTER 7.

DISCUSSION : SETTLEMENT PATTERNS IN THE SANDVELD

In the preceding chapters attention was focussed on environments and habitats in the sandveld; the different types of site which make up the archaeological record and the variability encountered in stone tool assemblages. The function of this chapter is to explain this variability in terms of spatial and temporal patterning and to investigate to what extent settlement systems in the sandveld have changed over the last four millenia.

Before examining the significance of the patterns described in the last chapter, some of the problems and issues relating to stone tool assemblages, and open sites in particular, are considered. Surface artefacts have long been used by archaeologists to locate sites, to provide supplementary information on culture histories and to assess the potential of subsurface deposits. As noted by Lewarch & O'Brien (1981), a fairly recent development has been the tendency to expand on these traditional roles and to use the surficial distribution of artefacts as a source of archaeological data independent of subsurface remains.

Obviously to use this type of data effectively it is necessary to understand something of the site formation process as well as the post-depositional history of a site. A theoretical model proposed by Ammerman and Feldman (1974), and refined by Isaac (1977), reduces the complex processes involved in the generation of an assemblage into a number of steps:

- (1) the manufacture of artefacts or sets of tool types by a group.
- (2) the use of these artefacts for one or more specific purposes.

This may involve maintenance such as modification or sharpening

of the artefacts.

(3) the discard of the artefacts.

In an ideal situation these three stages would coincide spatially and temporally, but in practice no simple relationship can be expected between activity and assemblage character. The three processes of manufacture, use and discard may have different spatial contexts and may not even take place at the same site. This has serious implications for non-probabilistic sampling strategies in which sites are often selected for reasons of sample size and emphasizes the need to distinguish between residential and special activity sites.

Despite these problems, if a sufficient number of sites are sampled then any patterned differences that exist between sites should become apparent. How these patterns are interpreted will depend on the particular research design adopted and to what extent competing hypotheses are tested in order to arrive at the most likely explanation for inter-assemblage differences. The interpretation will be affected by various factors, such as the range of tools present, the set of raw materials used, and the type of activities suggested by the artefacts, as well as by more intangible elements such as stylistic considerations. As Isaac (1977:6) observes:

"No two stone artifact assemblages are identical and it is common experience that any set of assemblages varies in a complex fashion with some distinctions being subtle and others being striking and conspicuous."

In the case of the sandveld all the surface assemblages, excepting the minority with MSA affiliations, are attributable to the Wilton Industry, in terms of typology. The range of artefact classes and types all fall within the described Wilton spectrum and assemblage differences are largely a matter of artefact frequencies, raw materials and site context. As noted by Mazel and Parkington (1981), this presupposes that differences in assemblage composition cannot be explained in terms of membership of

separate technological traditions. Furthermore, although the frequencies of occurrence vary considerably, most of the common tool types are represented at all the sites sampled, irrespective of context.

Leaving the question of time depth aside for the moment, the overall picture is one of a range of sites, with technologically similar tools, that express different aspects of an economic network. It has been shown (Binford & Binford 1966), that the variation in the distribution of stone tools can be used to infer functional differences between sites. The crucial assumption, however, in a functional explanation of variability, is that certain stone tools were used for specific purposes. The function of common microlithic tools such as scrapers, adzes and backed pieces can probably be determined by micro-wear studies, although the potential of this line of research has not yet been fully realised in the south-western Cape. There is also a body of evidence from historic, ethnographic and archaeological sources which supports the notion of distinct functional types. Many of these distinctions have been conventionalised in the common names given to tool types.

Whilst some facts can be brought to bear on the issue of functional specificity, very little is known about the efficiency of prehistoric tools. In view of the emphasis placed on assemblage composition, a major problem is how to relate the frequency with which a tool occurs, to the amount of time spent performing a specific activity. Replication studies by Keller (1966), indicate that no simple relationship exists between factors such as the material of the tool, the shape of its working edge, the manner of its use and the material on which it was employed.

A related problem is the place of tool discard. The probability of a tool being abandoned after it has been used will depend on the type of tool involved and on the activity being performed as well as the rarity of the raw material used. Different tools will not have an equal chance of ending

up in the same place and the distribution of stone tools will be skewed according to their discard characteristics.

THE SANDVELD ASSEMBLAGES

Previous reconstructions of settlement patterns in the sandveld (Mazel 1978; Mazel & Parkington 1981; Parkington 1980a), were based on evidence recovered from open and excavated sites as well as from information gathered from a variety of coastal situations. Significant differences in assemblage composition were shown to exist between the coast, the sandveld and the Cape Fold Belt mountains. The patterning discernible in these stone tool assemblages, it was argued, reflected the use and discard habits of prehistoric toolmakers. The observed variability was explained in terms of different activities being scheduled for different segments of the landscape. This functional explanation depended on the adoption of synchronic viewpoint in which it was assumed that the sites were roughly contemporary. With the greatly increased data base now available, however, some modification on two fundamental points is necessary. Firstly, the pattern of stone tool assemblages is far more complex than previously envisaged and, secondly, not all the assemblages are contemporary.

In the last chapter three different types of assemblage pattern were described. These were deflation hollow assemblages, scatters on the surface and talus zones of small deposit-containing shelters and the more dispersed type of occurrence referred to as an open koppie pattern. The work of Mazel and Parkington (1978, 1981), clearly demonstrated the existence of dense stone tool assemblages in the sandveld characterised by high numbers of backed pieces and very few adzes. In the present work these are described collectively as the classic deflation pattern and are shown to occur mainly in low lying, near-coastal riverine environments. Although these are the most visually striking assemblages in the sandveld, other, less obvious and

less dense, types of deflation assemblage were also recorded. These sites demonstrate that a considerable variation in raw material and artefact composition occurs in sandveld deflation hollows and that these variations are, to a certain extent, related to the geographic location of the hollows. A significant feature of these assemblages was the increase in the number of adzes in deflation sites close to rock outcrops and at inland situations close to the western fringes of the Cape Fold Belt mountains.

Investigation of the strings of small koppies and semi-mountainous massifs in the sandveld revealed the existence of assemblages very different from those encountered in deflation hollows. These assemblages were rich in adzes but showed a paucity of backed pieces and were usually focussed on small rock shelters.

Obviously no single or simple explanation can account for these contrasting patterns or the subtle variations that occur within the different assemblage types. What is clear is that it can no longer be assumed that sandveld and mountain assemblages of different typological character are contemporary. At present the only way of establishing a chronology which can be used as a model for surface sites is to refer to those stratified shelters in the sandveld which have been excavated. The two sandveld sites, Diepkloof and Tortoise Cave, offer some potential in this respect.

Tortoise Cave is situated 5 km from the sea on a small koppie on the southern bank of Verlorevlei. It has recently been re-excavated by Tim Robey (1984), as part of an ongoing regional research programme conducted by the Spatial Archaeology Research Unit at the University of Cape Town. Although the actual shelter is small it has a substantial deposit extending over a series of rock steps in front of the cave with a maximum excavated depth of nearly 1.5 m. It is predominantly a shell midden deposit and careful excavation has revealed a stratified occupation with good

resolution of prehistoric events. More importantly for this project, stone tools were present throughout the excavated layers which were separable into discrete, dateable horizons. The frequencies of the formal tools recovered from the excavated layers and the talus collection of Mazel (1978), referred to as Tortoise Cave Open, are shown in Table 7:1.

Although the formal tool counts from the talus sample and the upper post-pottery layers (layers 1 to 3) are not large they are essentially similar. Furthermore, they are quite unlike any deflation pattern and closely resemble the talus slope samples described in the last chapter. The radiocarbon dates from the post-pottery levels at Tortoise Cave range from 760 ± 50 B.P. (Pta-3600), obtained from bedding 10cm below the surface, to 1680 ± 50 B.P. (Pta-3312) from charcoal at a depth of 28cm near the base of layer 3 (Robey 1984). A similar time span was recorded for the short Holocene occupation at Diepkloof Cave. Post-pottery levels with bedding, dating from about 1700 B.P. to about 300 B.P., were superimposed on Pleistocene MSA levels (Parkington 1977).

The most interesting and unique aspect of the Tortoise Cave excavation are the layers which pre-date the appearance of pottery. These have now been securely dated (Robey 1984). Layers 4 to 9 fall within the time period of about 2000 to 4000 B.P. A date of 4020 ± 60 B.P. (Pta-3595) from charcoal, at a depth of 120cm, close to bedrock in the area excavated in front of the cave, marks the base of this series of layers. Layers 10 to 13 fall within the time bracket 4000 to 4400 B.P. Charcoal from layer 13 was dated to 4330 ± 50 B.P. (Pta-3605). As Table 7:1 shows, the deposits which accumulated during the periods represented by layers 4-9 and layers 10-13 contain substantial numbers of formal tools.

The significant point is that the layers at Tortoise Cave which pre-date 2000 B.P. contain large numbers of backed pieces and the assemblages from these levels strongly resemble those recorded at the classic deflation

	T.C. OPEN		LAYER 1-3		LAYER 4-9		LAYER 10-13		LAYER 14	
	F	%	F	%	F	%	F	%	F	%
CONVEX SCRAPER	14	50.0	5	31.3	72	46.8	97	50.5	3	25.0
BACKED SCRAPER	-	-	1	6.3	11	7.1	8	4.2	3	25.0
TOTAL SCRAPER	14	50.0	6	37.5	83	53.9	105	54.7	6	50.0
BACKED BLADES	-	-	-	-	11	7.1	16	8.3	-	-
BACKED POINTS	-	-	-	-	1	0.6	6	3.1	-	-
SEGMENTS	-	-	-	-	6	3.9	4	2.1	2	16.7
MISC. BACKED	-	-	-	-	8	5.2	16	8.3	2	16.7
TOTAL BACKED	-	-	-	-	26	16.9	42	21.9	4	33.3
DRILLS	1	3.6	-	-	3	1.9	1	0.5	-	-
ADZES	4	14.3	6	37.5	4	2.6	4	2.1	-	-
M.R.P	9	32.1	4	25.0	37	24.0	39	20.3	2	16.7
AWL	-	-	-	-	-	-	1	0.5	-	-
UNIFACIAL PT.	-	-	-	-	1	0.6	-	-	-	-
TOTAL FORMAL	28	100.0	16	100.1	154	99.8	192	99.9	12	100.1

TABLE 7:1 - TORTOISE CAVE. FORMAL TOOL FREQUENCIES.

(AFTER MAZEL 1978; ROBEY 1984)

sites. Tortoise Cave also provides a sequence in which the two kinds of assemblage, one characterised by adzes and the other by backed pieces, are located temporally with respect to one another. It was previously thought (Mazel & Parkington 1981) that adze-rich assemblages were primarily a mountain phenomenon and were contemporary with the backed piece sandveld deflation assemblages.

LATE POST-POTTERY ASSEMBLAGES

At Tortoise Cave it is quite clear that the stone tool assemblages from the talus slope and the post-pottery excavated levels are quite unlike those recovered from the earlier stratified deposits. There is, however, a close resemblance between the former and many of the sites in the Cape Fold Belt mountains. The frequencies of some of the stone artefacts recovered from these mountain sites (Parkington 1980a) are listed in Table 7:2 along with samples from the current project. These data are used in a correspondence analysis (Underhill et al. in prep.), the results of which are shown graphically in Figs. 7:1 & 2. The correspondence analysis plots demonstrate the similarity between the late post-pottery mountain assemblages and the adze-rich talus samples from the sandveld.

Furthermore, the available radiocarbon dates suggest that, as at Tortoise Cave and Diepkloof in the sandveld, this pattern postdates 1700 B.P. in the Cape Fold Belt mountains. At Andriesgrond a date of 1640 ± 50 B.P. (Pta-2480), was obtained from the base of the main ash units (Parkington, pers. comm.) and at De Hangen, charcoal on bedrock yielded a date of 1850 ± 50 B.P. (Pta-127), (Parkington 1977). Both these dates come from horizons immediately below the pottery bearing levels.

In terms of assemblage patterning the consistent feature at these sites, both in the sandveld and the mountains, is the high frequency of

DEFLATION HOLLOWESSYMBOL: ●

NO.	SITE		SCRAP	BKD	ADZE	DRILL	MRP	P.ESQ
1.	VERLORE	VER	727	398	30	54	171	116
2.	UITHOEK	UH	69	23	12	6	17	40
3.	VENSTERKLIP		638	272	8	64	49	211
4.	KOOKFONTEIN	KOOK	128	35	7	1	26	22
5.	RIETFONTEIN	RF	36	23	0	0	8	18
6.	KOOPMANSKRAAL	KMK/1	121	33	25	11	10	17
7.	KOOPMANSKRAAL	KMK/2	147	58	34	18	20	23
8.	BONTHEUVEL	BH	67	9	129	0	11	22
9.	DE NEUS 1		66	6	0	4	4	5
10.	DE NEUS 2		179	22	28	2	20	43
11.	DE NEUS 3		194	5	141	1	26	34
12.	DE NEUS 4		10	0	28	0	5	3
13.	DE NEUS 5		224	7	46	0	62	39
14.	RIETVLEI		28	13	31	1	10	14
15.	HET KRUIS	HK/2b	5	2	4	0	2	9
16.	KOOPMANSDRIF	KMD/F	57	27	2	4	42	8
17.	POINT 209	209/A	48	19	5	2	23	23
18.	LEIPOLDVILLE	LPV/E	216	178	7	6	122	30
19.	KLEIN KLIPHEUVEL	KK/H	252	113	6	12	89	54
20.	KLEIN KLIPHEUVEL	KK/I	187	91	1	4	72	22
21.	KLEIN KLIPHEUVEL	KK/K	110	72	0	10	37	25
22.	KRUISFONTEIN	KFN/6	234	88	48	7	52	92
23.	PEPPER TREE HILL	PTH6/9	36	25	7	0	7	10
24.	GROOTBERG	GB/26	52	19	8	0	19	18
25.	WADRIFSOUTPAN	WDSP/2	6	4	0	0	1	4

TABLE 7:2 FREQUENCIES OF SELECTED STONE ARTEFACTS FROM ASSEMBLAGES IN THE SOUTH WEST CAPE.

(NUMBERS ON THE LEFT AND SYMBOLS RELATE TO THE CORRESPONDENCE

ANALYSIS PLOTS AND SITE DISTRIBUTION MAP FIGS. 7:1, 2 & 3)

TALUS SLOPESSYMBOL: ▲

NO. SITE		SCRAP	BKD	ADZE	DRILL	MRP	P.ESQ	
26.	BREDEVLEI CAVE	7	1	38	0	8	14	
27.	BRAKVLEI	10	2	7	0	3	19	
28.	NARDOUWSKLOOF	19	0	44	0	7	13	
29.	DE HANGEN OPEN	13	4	35	0	12	6	
30.	KLIPFONTEINRAND 2 OPEN	5	0	52	0	6	6	
31.	SEVILLA	13	3	19	1	5	13	
32.	MALGASHOEK	19	1	40	0	6	14	
33.	ANDRIESGROND OPEN	38	5	42	0	15	19	
34.	RENBAAN OPEN	25	2	36	0	7	7	
35.	DRIEHOEK	9	0	71	0	3	1	
36.	CLANWILLIAM DAM EAST	30	2	100	2	24	16	
37.	WARMHOEK	34	2	49	0	13	10	
38.	KEURBOS	19	0	41	0	18	9	
39.	ANDKOP	AND/6	26	1	9	0	8	16
40.	LANGVLEIBERGE	LV/3	21	9	20	0	7	11
41.	KLIPHEUVEL	KH/3	9	1	0	0	4	7
42.	LANGBERG	LB/5	3	1	4	0	0	2
43.	RONDEBERG	RON/10	9	1	5	0	3	5
44.	RONDEBERG	RON/15	17	5	21	0	4	18

TABLE 7:2 CONTD.

EXCAVATED ASSEMBLAGESSYMBOL: ■

NO. SITE	SCRAP	BKD	ADZE	DRILL	MRP	P.ESQ
45. EBC<3500 BP	91	7	7	1	40	168
46. TORTOISE CAVE 1	10	1	11	0	4	5
47. TORTOISE CAVE 2	115	17	5	3	31	56
48. TORTOISE CAVE 3	90	29	3	1	17	38
49. TORTOISE CAVE 4	16	4	0	1	9	10
50. DE HANGEN CAVE	105	15	49	2	51	86
51. KLIPFONTEINRAND 0	92	5	7	1	4	39
52. KLIPFONTEINRAND 1	164	15	6	1	10	16
53. KLIPFONTEINRAND 2	90	5	8	4	9	3
54. KLIPFONTEINRAND 3	76	12	8	0	8	6
55. ANDRIESGROND 2	140	19	161	6	44	72
56. ANDRIESGROND 4	45	13	10	4	18	25
57. RENBAAN CAVE	91	6	97	1	11	62
58. PATERNOSTER	30	3	0	0	6	45

TABLE 7:2 CONTD.

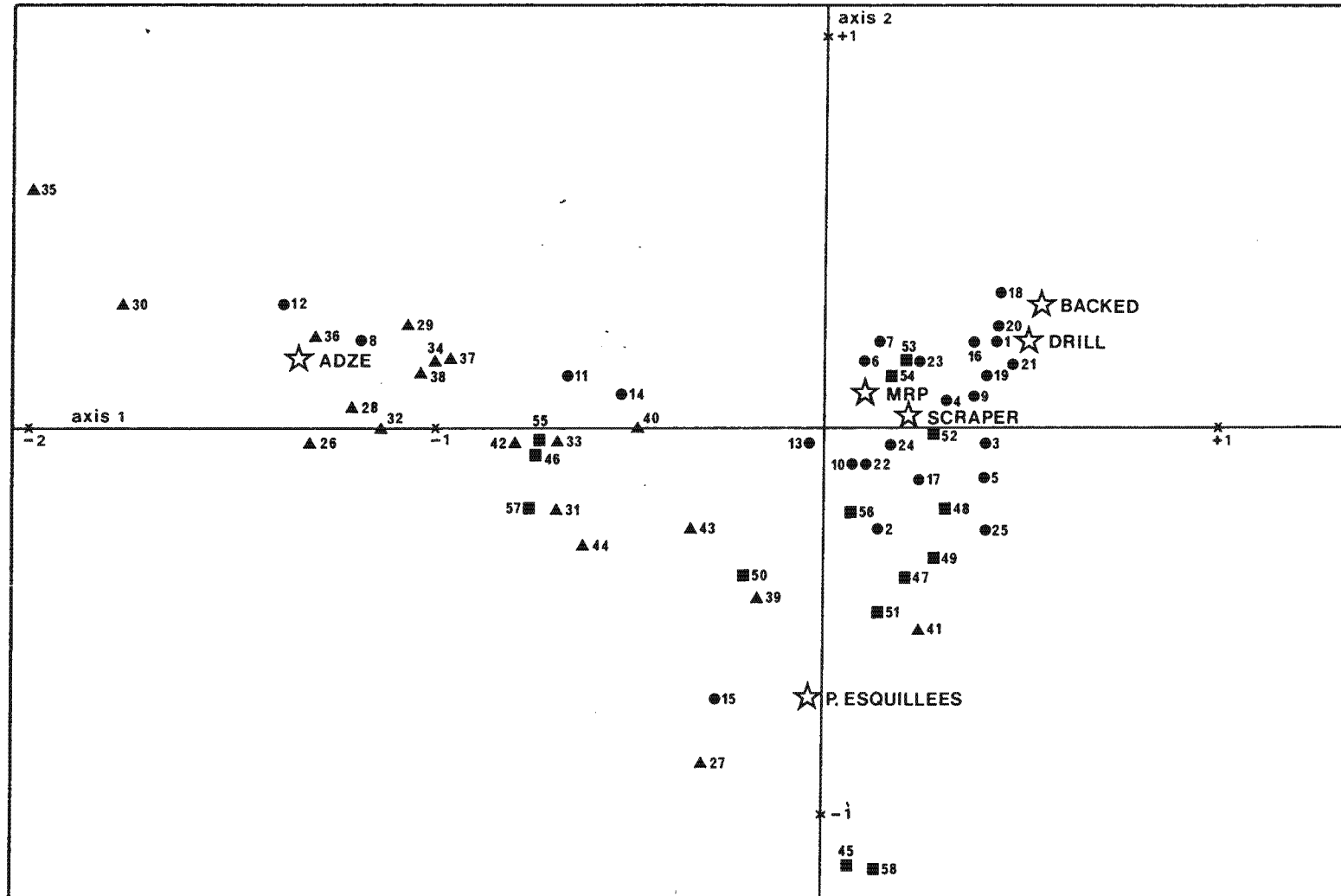


FIG. 7:1 CORRESPONDENCE ANALYSIS PLOT. SANDVELD AND MOUNTAIN SITES

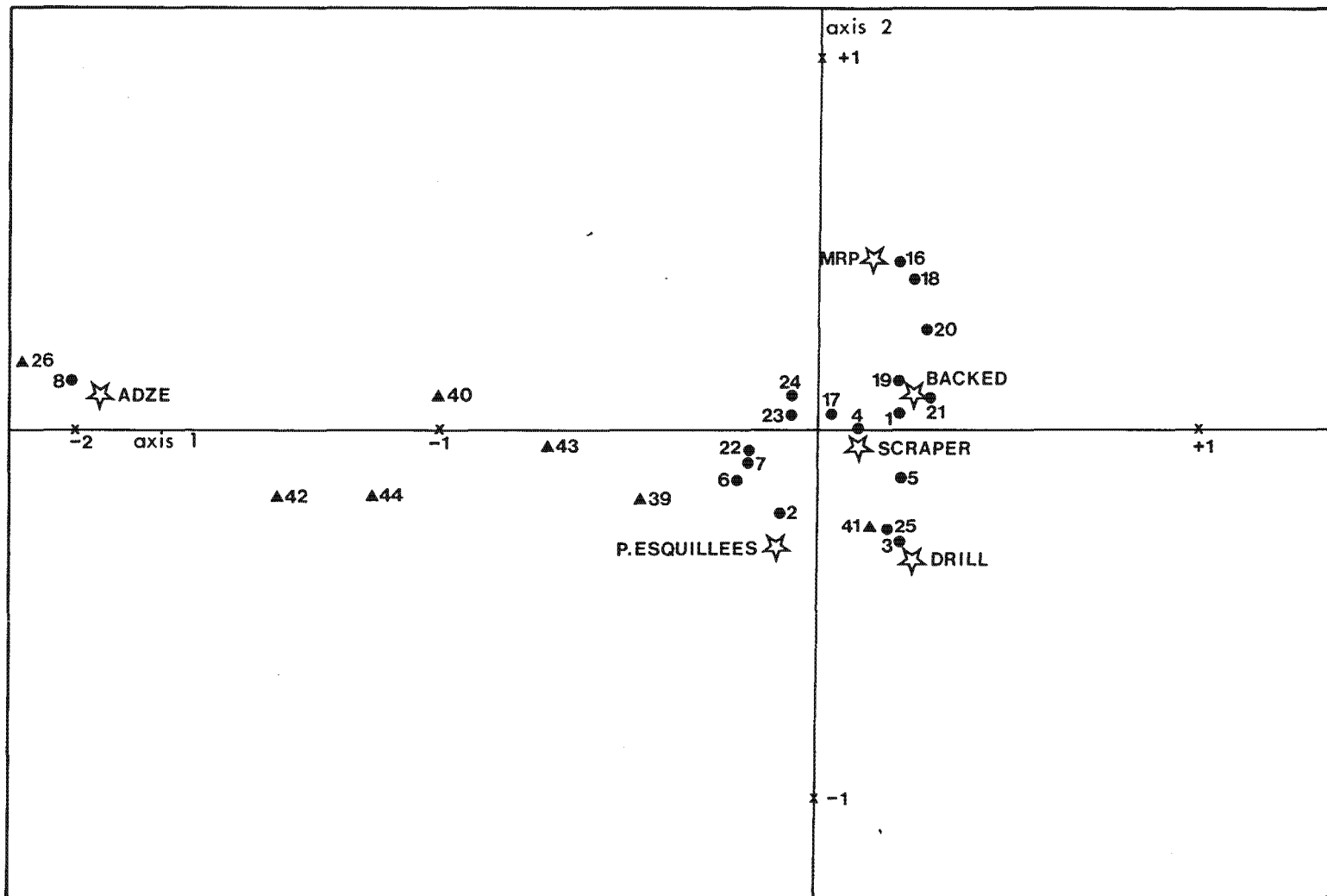


FIG. 7:2 CORRESPONDENCE ANALYSIS PLOT. SANDVELD OPEN SITES

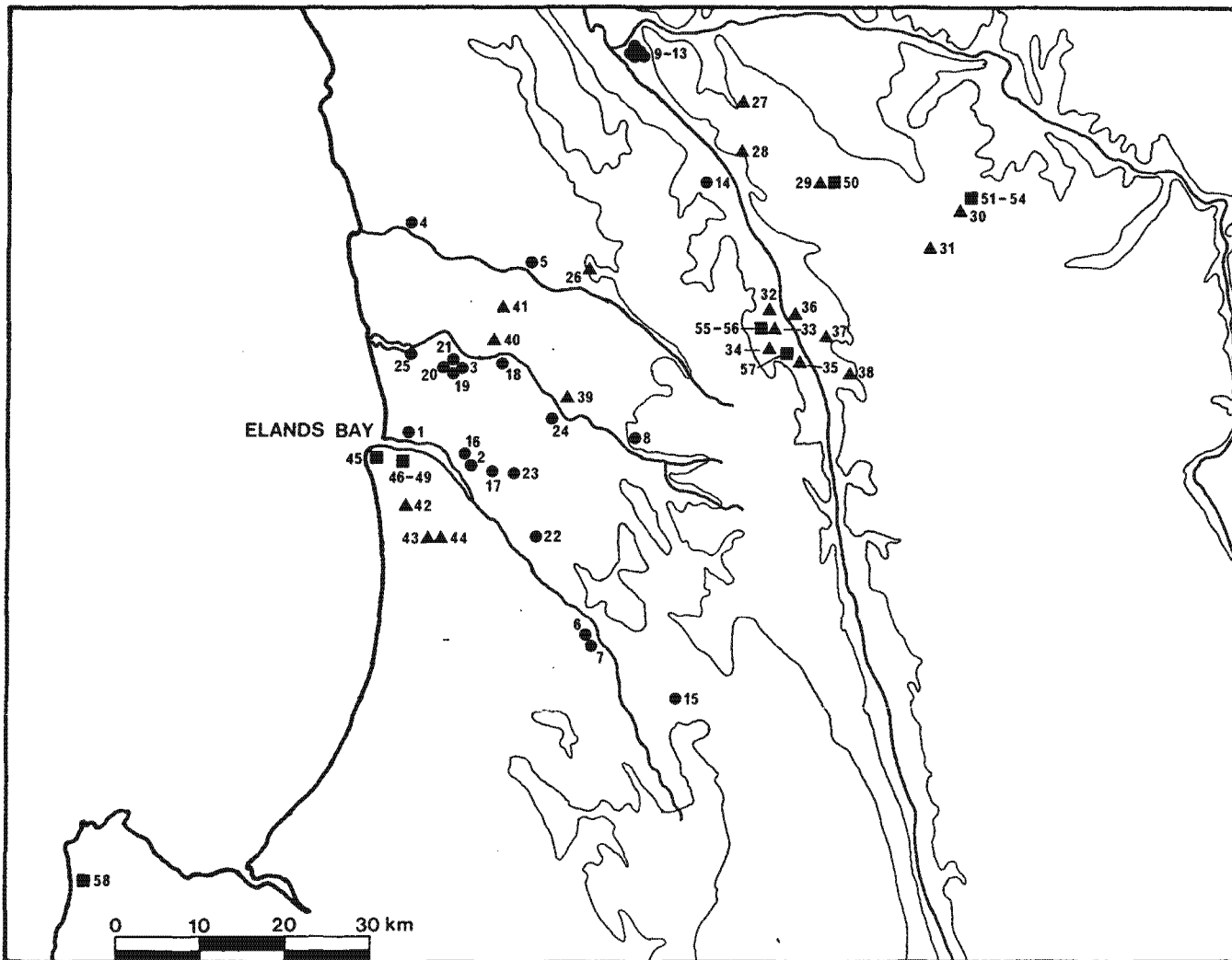


FIG. 7:3 DISTRIBUTION OF SITES

adzes. It has been argued (Mazel & Parkington 1981), that adze-rich assemblages in the mountains relate to woodworking activities and were complemented, on a scheduling basis, by the sandveld deflation sites with high numbers of backed tools.

It is now necessary to modify these earlier comments with respect to the the sandveld. Two points are important. Firstly, sites with high adze frequencies are not restricted to the mountains but extend all the way across the sandveld to near the coast. Although the sandveld assemblages are less dense they are by no means uncommon and mirror, on a smaller scale, the pattern found in the mountains. Secondly, these sites are a relatively late phenomenon which postdates the appearance of pottery and are not contemporary with deflation hollow sites rich in backed tools.

DEFLATION HOLLOW ASSEMBLAGES

Tortoise Cave provides a vital clue to the understanding of the chronology of deflation sites, as it is the only excavated site in the sandveld which contains comparable assemblages. The stone tool assemblages bracketed by the periods 2000 to 4000 B.P. and 4000 to 4400 B.P., display a composition typical of the classic deflation pattern. This type of assemblage does not occur on the surface of a shelter deposit or on a talus slope (with the possible exception of the small cave Langvleiberge LV/3 where a few backed pieces occur in the drip line).

The sequence of events at Tortoise Cave suggests that the two assemblage types, one characterised by adzes and the other by backed blades, were not deposited at the same time. It seems most likely that the deflation hollows were occupied, and the assemblages that characterise these sites were discarded between about 4000 and 1700 B.P. The lower levels at Tortoise Cave are a coastal expression of this pattern which may also be present at Langvleiberge Cave.

Prior to about 4000 B.P. the higher sea levels, which rendered the shoreline less productive, and the generally more arid conditions, are considered to have made the coastal areas an unattractive proposition for prehistoric groups (see Chapter 3). Elands Bay Cave was not visited after about 7800 B.P. until reoccupation commenced at about 3800 B.P. An occupational hiatus of a similar dimension is recorded at Tortoise Cave with a slightly earlier reoccupation date. This period of aridity must have similarly affected the interior sandveld which makes it unlikely that the deflation hollows were regularly occupied whilst the coast was neglected.

Pottery does occur in some deflation hollows and although the quantity is insubstantial it does indicate that the hollows were visited after 1700 B.P. The distribution of adzes is also informative. They reach their highest frequencies in hollows close to rock outcrops and in sites close to the mountains. It would seem likely that, like pottery, they are an 'overprint' and not part of the early pattern. The virtual absence of adzes in lowland coastal settings suggests that they are a spill-over from the later occupation of the koppies and massifs of the sandveld. The second correspondence analysis plot (Fig. 7:2) shows a basic separation of talus sites and deflation hollows coupled with a tendency for deflation sites with above average numbers of adzes to be located along the adze axis with the talus sites.

The metrical analyses detailed in Chapter 5 provide further support for the contention that adzes were not part of the original activity pattern which produced the classic deflation assemblages. The mean length of adzes in the sampled deflation hollows was found to be greater than the mean for flakes. Although small cores of bladelet dimension were fairly abundant, as were numerous small flakes, there was a lack of any waste material of suitable size for translation into adzes. This suggests that adzes were introduced either as completed tools or as adze blanks from

which the finished tool could be fashioned when required. One of the possible sources of material suitable for adzes could have been the open scatters such as Wolfberg WB/9, which contain quantities of artefactual debris of MSA origin. Large silcrete flakes are common at this type of location and the majority of the adzes found in the sandveld are made of silcrete. This would also explain the occasional presence of large faceted platform flakes, seemingly out of place, in deflation hollow settings.

SANDVELD SETTLEMENT

Having established the most likely time periods for the discard of the two main assemblage types, one characterised by backed pieces and the other by adzes, it remains to clarify the relationship between the two patterns and the reasons for the different contexts in which they are found. The evidence suggests that both types of location, deflation hollows and small shelters, were used as living sites. Most of the rock shelters which form a focus for the adze rich talus scatters contain occupational deposits and often include traces of bedding. Whilst the deflation hollows seldom preserve organic material certain aspects of the assemblage patterning, such as the abundance of scrapers and the presence of large lower grindstones, are more likely to reflect home bases than transitory activity camps. Also the actual quantity of lithic material indicates that the hollows were either used continuously over an extended period of time or re-scheduled for occupation on many occasions.

If, as the archaeological evidence suggests, these different types of site represent a change in hunter-gatherer settlement, then interest is naturally focussed on the point in time when this shift, from deflation hollows to rock shelters, took place. The scarcity of pottery at the former, as compared to its qualifying presence at the latter, suggests that the transition from open veld locations to rocky eminences may have been

quite abrupt. This being so, it is useful to examine to what extent the two patterns overlap.

Prior to about 1700 B.P. occupation was focussed on the open sandy plains with apparently little attention directed to the sandveld koppies and massifs unless any of the open koppie scatters can be shown to relate to contemporary raw material acquisition. It is only near the coast that the two patterns are found in the same context. At Tortoise Cave both types of assemblage occur in stratified deposits. Also, some of the large coastal shell middens, which do not contain any artefacts of note and therefore are not easily related to either pattern, demonstrate a temporal overlap between the two periods in question.

Pottery has been found on many of the shell middens in the research area and most of the smaller accumulations do not in fact extend back beyond the pottery era (Buchanan et al 1983). A few sites do, however, have shell deposits which predate the appearance of pottery. These include Tortoise Cave, Elands Bay Cave and an as yet unspecified number of the prodigious shell mounds found opposite rocky reefs along the west coast. So far three of these have been dated: Mussel Point, to the south of Elands Bay; Kreefbaai, 10 km to the north of Verlorevlei; and Lambert's Bay further to the north. Radiocarbon dates on charcoal obtained from the bases of these middens all fall around 2700 B.P. (Buchanan et al 1983) which suggests that these mounds began to build up some time after 3000 years ago.

These data show that whatever changes were taking place in the interior sandveld, between about 3000 and 300 B.P., shellfish collecting continued unabated at the coast. The obvious question is: Can coastal exploitation be linked to either, or both, of the assemblage patterns. There seems little doubt that the adze-rich assemblages found at the sandveld koppies relate, at least in part, to what was happening at the

coast. Firstly there is the unequivocal association of adzes and shellfish in the stratified deposits of Tortoise Cave. Secondly, several near coastal sites were recorded during the survey programme which had shell deposits and rudimentary assemblages which included numerous adzes. The Langberg LB/5 sample of this project is an example. Thirdly, the ubiquitous presence of marine shell at rock shelter sites throughout the sandveld is suggestive of more than just a passing interest in the coast. Whilst not achieving midden proportions, the quantity of shell at many of these inland sites argues against the importation of marine fauna merely for purposes of decoration or for use as implements.

Links between the classic type of deflation pattern and exploitation of the coast are far more tenuous. At present the only positive association between a backed piece characterised assemblage with marine catchment are the pre-2000 B.P. layers at Tortoise Cave. Many of the deflation bays which lie within the shell midden zone contain shell scatters but seldom include enough stone tools to provide a diagnostic assemblage. This problem is exemplified by the Wadrifoutpan WDSF/C sample described in the last chapter. Only at the Verlore deflation site of Mazel (1978), was a classic deflation assemblage found associated with a sizable quantity of shell. At present there is no way to establish whether or not the shell and stone are contemporary and in view of the number of shell scatters in the vicinity the most likely explanation is that the shell is a later addition. In contrast to the koppie sites, shell is a rare inclusion in deflation sites away from the coast. Significantly though, shell does occur in hollows close to rock outcrops along with adzes and pottery. At Pepper Tree Hill, for instance, deflation areas close to the koppie contained not only locally collectable species but also a cowrie shell and glass trade beads.

These data suggest that the exploitation of the coast cannot be divorced from activities within the sandveld and that, at least for the

post pottery period, links can be established between shellfish collecting and occupation of the koppies. In contrast, the stable isotopic assessments of prehistoric diets (Sealy 1984), offer a somewhat different view of subsistence strategies employed at the coast as compared to the mountains. $\delta^{13}\text{C}$ measurements of human skeletons indicate that inland mountain dwellers consumed an almost negligible amount of marine based foods, whereas coastal dwellers ate little else. This tends to contradict the subsistence strategy models of Parkington (1977), which assumed a degree of seasonal movement between coast and mountains. Sealy (1984), considers coastal exploitation to be a separate and self-contained way of life. Significantly, however, no skeletons from the sandveld were subjected to isotopic analysis and the only skeletons which fall within the research area of this project, or anywhere nearby, are from the vicinity of Elands Bay Cave. Furthermore only one of these skeletons post-dates 4000 B.P.. Whilst the four Elands Bay skeletons indicate that some people may have existed on a marine based diet it does not rule out the possibility of complementary exploitation of the sandveld and the coast. It is in fact very difficult to envisage two totally separate economies operating in adjacent and to some extent overlapping biomes.

THE INFLUENCE OF PASTORALISM

An obvious, but none the less significant, observation is that in the sandveld the shift in settlement from open sandy plains to rocky koppies coincides with the appearance of pottery and the remains of domestic animals in stratified contexts such as Diepkloof Cave (Parkington 1977). Both of these events signify the arrival of pastoralists. Although the facts surrounding the arrival of domestic animals in southern Africa are currently obscure, it is generally recognised (Schweitzer 1974), that by about 1800 years ago sheep were spread through many parts of the sub-continent. In the Cape Province several sites dated within the first half

millenium A.D. have yielded sheep and pottery in LSA contexts (Deacon et al 1978).

Although it has been argued (Stow 1905; Cooke 1965) that domestic animals were introduced by an immigrant population physically and culturally different from the indigenous hunter-gatherers, the prevalent view (Marks 1972), is that the pastoralist economy was, at least in part, a process of adoption by indigenous people. Inherent in this model is the idea of gradual acculturation in which some of the population took to herding whilst others remained as hunter-gatherers. It is also probable that the latter capitalised on their neighbour's stock as another kind of game animal.

The early European settlers in the Cape recognised a basic distinction between those who owned herds of cattle and flocks of sheep and practised pastoralism (loosely referred to as 'Khoi' or 'Hottentots') and those who lived by what is now referred to as hunting and gathering (loosely referred to as 'San' or 'Bushmen'). The spread of a pastoralist economy throughout the low lying areas of the south-western Cape must have severely restricted the activities of the remaining hunter-gatherer bands. The proliferation of small cave and shelter sites in the Cape Fold Belt mountains is almost certainly a response to this incursion. Likewise, the small sites in the strings of sandveld koppies, although on a smaller scale than those in the mountains, may also be interpreted as hunter-gatherer refugia, occupied subsequent to the introduction of pastoralism.

If the shift away from the low lying plains was a reaction to a more dominant pastoralist presence, then a number of changes can be inferred. These would include an overall increase in human population concomitant with a reduction of wild biomass in favour of protected domestic stock. The need for greater security in the wake of conflict situations would have made the previously neglected koppies a more attractive proposition for

remaining hunter-gatherer bands. This in turn would necessitate some modification of subsistence strategies such as a move away from open plain hunting to a greater dependence on plant foods and small animals.

Support for this view is supplied by the very consistent pattern of small sites spread throughout the koppies and massifs of the sandveld. Most of the occupation centred on small caves, recessed shelters and even rock overhangs. An important determinant governing occupation appeared to have been the need for a level area fronting the site. Sites lacking this frontage tended to be avoided. This even applied to some of the large caves in the research area. Most of the stone tools are found on these activity areas which thus provided convenient spots to run samples. Deposits at these sites are invariably shallow with ash and bedding concentrations often visible on the surface. Marine shell, ochre, pottery and grindstones are all characteristic along with a high adze component amongst the formal tools.

Demographic changes must also have taken place after the introduction of a pastoralist economy. Although an overall population increase is posited, a mean reduction in the group size of the remaining hunter-gatherer units would seem to be a necessary corollary. The relationship between pastoralists and hunter-gatherers was in all probability a dynamic interplay with members of the latter party being incorporated into pastoralist groups, loosely attached on a client basis or eliminated in conflict.

The distribution of certain motifs in the rock art of the southwestern Cape (Manhire et al 1983), can be used to amplify this theme. Scenes of conflict are occasionally depicted although it is not clear whether these show inter-band aggression or confrontations between hunter-gatherers and pastoralists. Their distribution is mainly limited to the east of the Olifants River and may relate to conflict situations engendered

by seasonal concentrations of hunting bands. Certainly paintings of large groups of humans are far more common in the mountains than in the sandveld. This tends to confirm the view that the main thrust of hunter-gatherer occupation after about 2000 B.P. was concentrated in the mountains. Rock art data indicates that only small bands ventured into the sandveld. The mean group size for humans in the sandveld is 6.7 (Manhire 1981), as compared to 13.4 for the Pakhuis region of the Cedarberg mountains (Maggs 1971).

The scheduling of activities by small bands of hunter-gatherers in the sandveld has implications both for the type of subsistence strategies pursued and the social organisation of groups. The numbers suggested by the rock art are considerably smaller than the optimum group size for hunter-gatherer bands (Binford 1980), or the modal group size of Dobe !Kung units (Lee 1968). Following Binford's (1980) distinction between collectors and foragers, it would seem that these were not logistically organised groups but ones that pursued a foraging strategy of gathering food on an encounter basis. In this system the small koppie sites would provide ideal residential bases from which foraging parties could operate. Furthermore, minimal number foraging groups dispense with division of labour and both male and female members follow similar resource procurement routines (ibid.). It may be that the mixed lines of males and females depicted in the sandveld rock art relate to these episodes.

SETTLEMENT SYSTEMS

An important observation, previously emphasised (Manhire et al 1983), is the enormous increase in the number of sites in the sandveld after the introduction of a pastoralist economy. Prior to this development, sites were fewer in number and restricted to certain areas. During the period 2 - 4000 B.P. occupation was focussed on what are today deflation areas. Apart

from these occurrences, as of yet the only locations with components attributable to this period are the pre-ceramic levels of Elands Bay Cave and Tortoise Cave and some of the larger shell middens. Beginning some time after 2000 B.P. there is a proliferation of deposits in small shelters, talus scatters and small shell middens. As discussed later in this chapter, it is probable that the majority of rock art sites also belong to this period.

To return to Binford's (1980) model of collectors and foragers, one way of looking at the sites bracketed by the time period of 2 - 4000 B.P., which are epitomised by the large deflation hollow scatters, is in terms of the logistical strategies employed by collectors. Unlike foragers, who search out resources on an encounter basis, collectors home in on specific resources in specific contexts. Translated into the milieu of the pre-pastoralist sandveld, the deflation hollow sites would represent residential bases from which task groups set out to locate particular resources. If the target is mobile game then a base camp need only be situated in the approximate locality of the quarry. It would be more logical, in this instance, to locate the residential base near a dependable resource such as water, which may explain the presence of the large deflation assemblages in riverine environments.

Although the precise function of the various types of backed pieces which characterise these assemblages is problematic, the authoritative view (for eg. Clark 1959; Deacon 1976; Phillipson 1977), is that some backed elements were incorporated into compound arrow heads. This being so, the deflation hollows can be understood as residential bases for large, logistically organised bands of hunter-gatherers for whom game hunting, with bows and arrows, was an integral part of the economy. The policy of long term use and re-scheduling of the same base camp, as is shown by the dense artefact concentrations within defined site boundaries, is consistent

with collector systems.

By about 1700 B.F. the pattern of site distribution in the southwestern Cape had entirely altered and subsequent occupation was directed towards the Cape Fold Belt mountains and, to a lesser extent, the koppies of the sandveld. With no evidence to suggest an environmental change, this shift is best viewed as a spatial relocation of the remaining hunter-gatherer bands in the face of competition from a more dominant pastoralist presence. An impression of the change in the use of space in the sandveld can be gained by comparing the distribution of deflation hollows (Fig. 4:4) with that of talus scatters and deposits (Fig. 4:3).

The shift in settlement patterns after the appearance of domestic stock is accompanied by a change in subsistence strategies or at least a change in the scale of operations. This is seen as a move away from large game hunting to an economy more reliant on plant foods and small animals such as tortoises and dassies. In this mode of procurement sites are not re-occupied to anything like the extent they were during the previous millennia. Residential moves are frequent and are adjusted to coincide with the location of widespread but dependable resources.

The same trends are evident in the pattern of shellfish predation. Beginning around 3000 B.P. there is a rapid build up of a few exceptionally large, mussel dominated, shell middens opposite prominent rocky reefs. Coinciding with the introduction of pottery there is an enormous proliferation of small midden sites and, although mussels are still overwhelmingly preferred, limpet dominated sites appear at specific localities close to sheltered shorelines.

Some support for these patterns is supplied by the reports and journals of European travellers in the early contact period. Of note are the accounts of Olof Bergh (Mossop 1931) and Johannes Starrenburg (Raidt 1973); both of whom travelled through the sandveld, in 1682 and 1705

respectively. The diaries of Jan van Riebeeck (Thom 1952), establish that well before these journeys took place a basic distinction was recognised between pastoralists, who owned sheep and cattle, and a less well defined, but lower status, group of indigenous people who lacked domestic stock.

On his journey through the sandveld, Bergh (Mossop 1931:95) bartered sheep at a Gregriqua kraal in the vicinity of modern day Graafwater but there is no mention of any non-pastoralist groups. Starrenburg (Raidt 1973:23-9), travelled along the north bank of the Verlorenvlei, called Quaecomma in the language of the Hottentots, before crossing the sandveld to arrive at Hannibal's kraal near the Langvleirivier. The solitary koppie Wolfberg, or Wolvenberg, is mentioned by both Bergh and Starrenburg as a prominent landmark (see Plate 12).

Although only 23 years had elapsed since Bergh's pioneering trek, when Starrenburg crossed the sandveld in 1705 the structure of the pastoralist society had already undergone a rapid change. Freeman such as the notorious Dronke Gerrit (Raidt 1973:21 & 25) had ceased to barter livestock from the Hottentots and instead resorted to armed robbery. Starrenburg notes:

"how the whole country has been spoilt by the recent freedom of bartering, and the atrocities committed by the vagabonds, since when the cattle of one kraal is carried off by the Dutch, they in turn go to rob others, and these again rob their neighbours, running off with the spoil into the mountains and feasting there until it is finished and then again seeking for more; and so from men who sustained themselves quietly by cattle-breeding, living in peace and contentment, divided under their chiefs and kraals, they have nearly all become Bushmen, hunters and brigands, dispersed everywhere between and in the mountains."

(Raidt 1973:41)

It is clear from accounts such as this that not only were the pastoralist's kraals being disrupted but the dividing line between stock owners and those without stock were becoming blurred.

The majority of parties exploring northwards from Cape Town during the latter half of the 17th century followed Jan Danckaert's lead in crossing

over the Cape Fold Belt mountains into the Olifants River valley. It is from these expeditions that some idea of the life-style of what are obviously hunter-gatherers can be gleaned. Danckaert's party of 1660, as reported in van Riebeeck's diary (Thom 1958:300), encountered a people, small in stature, who hunted with bows and arrows and ate honey as part of their diet. A similar account is given by Simon van der Stel, en route to Namaqualand in 1685, who describes several meetings with people who have no cattle and are referred to as Sonqua. Again hunting with bows and arrows is mentioned and also elements of a varied diet which includes honey, bulbs, tortoises, caterpillars and locusts (Serton et al 1971:241 & 277).

There are, however, hints that not all of the Sonqua lived in this manner. Van der Stel (Waterhouse 1932:122) states that each tribe of Hottentots has some Sonquas who are employed to bring news of the approach of strange tribes. Starrenburg, in describing the plight of Hottentots who have fallen into extreme poverty, writes of 'their Sonquas (or soldiers) who daily roam over the plains to catch dassies, jackals and other animals' (Raidt 1973:31).

The impression one gains from these accounts is that during the latter half of the 17th century hunter-gatherers, often referred to as Sonquas, were to be found in the river valleys of the Cape Fold Belt mountains, whereas the various Hottentot tribes moved around the low lying plains of the sandveld and the coastal foreland. Both Bergh and Starrenburg expected to find pastoralists in the sandveld and were in fact reliant on them for supplies of fresh meat. It is also clear that they moved frequently and their kraals were not easy to find. This is attested to by Starrenburg who evinces some doubt as to his ability to locate the kraal of Captain Hannibal (Raidt 1973:21-23). Furthermore, it was by no means unusual to find small numbers of Sonquas loosely attached to Hottentot tribes in a type of client relationship.

An important point made by Parkington (1984b) is that the term Sonqua, or Soaqua, is not synonymous with the term Bushman. In the period of early contact with European settlers the term Sonqua is used fairly consistently to describe a small people, usually associated with the more mountainous areas, who subsisted by hunting and gathering but who also preyed upon their neighbour's domestic stock. The word Bushman, or Bosjesman, only appears later in the literature and to some extent replaces the earlier term but with some dilution of meaning. Subsequently any indigenous person who did not own cattle and lived opprobriously by hunting, gathering or stealing was labelled a Bushman.

Two pertinent facts are discernible from the informal ethnographic data left by the early Dutch settlers. Firstly, following the arrival of van Riebeeck in 1652, there was a fairly rapid break up of the pastoralist society so that by the end of the 17th century many Hottentots living in the south-western Cape had been dispossessed of their cattle. Secondly, it is clear that the people referred to as the Sonqua can be identified with the pattern of archaeological material recovered from the uppermost excavated levels of caves and rock shelters in the sandveld and the Cape Fold Belt mountains.

The evidence from sites such as Diepkloof in the sandveld and De Hangen and Renbaan in the Cedarberg, suggests that although occupation of many caves and shelters dates back to the beginning of the pastoralist era, much of the material, notably the bedding layers, is fairly late and overlaps with the period of European contact. The brief segment of time described by the early travellers is the end point of a much longer period, possibly as much as 1500 years, when pastoralists and hunter-gatherers co-existed in the south-western Cape. It would be unrealistic to assume that this brief finale is representative of the whole. The initial period of penetration of domestic stock was probably followed by a period of rapid

change marked by cultural borrowing in which the hunter-gatherers were the recipients of new ideas as well as technological innovations such as pottery. During the intervening centuries before the European incursion there may have been several periods of adjustment necessitated by new events such as the introduction of cattle. What the journals of the early travellers do suggest, however, is that, up until the advent of European colonisation, at least some of the hunter-gatherer bands pursued a life style recognizably different from that of the pastoralists.

ROCK ART OF THE SANDVELD

Although not central to this project, the rock paintings of the sandveld are so numerous that some attempt to incorporate them into the framework described in this chapter would seem justified. To date, over 12 000 individual paintings have been recorded within the confines of the research area. They are widely distributed throughout the koppies and massifs of the sandveld and almost every outcrop contains some examples of the art.

Within the painted sample certain broad categories are evident, the most informative being the human figures and animals. As elsewhere in southern Africa paintings of human figures outnumber those of animals. In the sandveld the ratio of humans to animals is about 3.5:1 (Manhire 1981). There are also a small number of paintings of inanimate objects which include isolated items of technology such as bags and, less frequently, bows.

A distinctive feature of sandveld rock art, which differentiates it from other areas in the south-western Cape, is the abundance of handprints. Two distinct types are present: the plain handprint and the decorated or stylised version. Although plain handprints occur in small pockets in the

Cape Fold Belt mountains the stylised form, with a characteristic 'U' shaped motif inscribed on the palm, is virtually limited to the sandveld. Handprints are part of a complex of paintings, linked by a similarity in technique and concept, which includes finger dots, lines and a variety of geometric forms such as cruciform shapes, grids and circles.

Within the scope of this project there are two important questions concerning the rock art. Firstly, to which economic group did the painters belong, were they hunter-gatherers or pastoralists or did both groups contribute to the art? Secondly, How old are the paintings?

There is very little in the content of the paintings to suggest that one need look beyond hunter-gatherers for the origin of the art. Painting certainly began in South Africa well before the pastoralist era, this is demonstrable by the early dates obtained from a number of painted specimens (Thackeray 1983). Accepting that regional differences do occur in rock art, the 'essence' of the south-western Cape painted sample is basically similar to that in areas such as Lesotho or the Drakensberg where the Khoi pastoralists did not penetrate. Although paintings of domestic stock in the form of fat-tailed sheep do occur in the south-western Cape they are extremely rare and seem to be a curiosity rather than a central motif such as the eland.

Furthermore, the manner and technique in which sheep are painted is not appreciably different from the way most wild animals are painted and there is no development in the art towards a stylised representation of domestic animals. Admittedly very little is known of pastoralist cosmology but if the art was of Khoi origin one might expect something along the lines of the stylised 'cattle forms' found in the rock art of Tanzania (Chaplin 1974). A further point of interest is that despite the widespread presence of cattle at the time of European settlement no verifiable paintings of cattle exist in the south-western Cape.

If the art is a reflection of a widespread San cognitive system, as Lewis-Williams (1981,1983), maintains, then, allowing for regional differences in execution, the motivation behind the art should be the same in all areas. Although conflated images and overtly trance associated paintings are singularly rare in the south-western Cape, the juxtaposition of certain motifs is suggestive of more than just a casual relationship. Eland are the most commonly painted animals in the sandveld and are usually shown in lines of up to 12 animals. Occasionally, however, eland are included as adjuncts to groups of human figures. An example of the purposeful juxtaposition of an eland within a group of human figures is shown in Plate 14. The repetition of this type of theme at a number of sandveld sites suggests that the eland is being used symbolically, in a form less obvious perhaps than in the eastern Cape or the Drakensberg, but nevertheless maintaining its position as a central symbol in San mythology.

An intriguing variation on this theme concerns the very high incidence of elephant paintings in certain areas. In the sandveld the ratio of eland to elephant is 2.9:1 (Manhire 1981); in the Pakhuis region of the Cedarberg the ratio is 2:1 (Maggs 1967); in the Olifants River 1.6:1 (van Rijssen 1980); whilst at Boontjieskloof paintings of eland and elephant are approximately equal in number (Golson 1984). Not only are elephants high in number in these areas but, as with eland, are found in association with human figures and, in a few rare instances, in conjunction with elephantine therianthropes (Maggs & Sealy 1983). The elephant was certainly common in the south-western Cape of the pre-colonial era (Skead 1980), and appears to have been an important symbol, possibly with a role complementary to that of the eland in the San cognitive system.

Turning to the question of the time depth of the art, it seems unlikely, for a number of reasons, that the bulk of the paintings of the south-western Cape are older than 2000 years. In the sandveld the



Plate 13 : Bruinkop. A cache of four ostrich eggs.



Plate 14 : Site RCN/1. An example of juxtapositioning, with human figures and an eland forming a balanced group.

occupational hiatus recorded at Elands Bay Cave and Tortoise Cave coupled with the evidence of a long period of extreme aridity virtually rules out the possibility of any of the paintings pre-dating 4000 B.P.. In addition there is the factor of preservation. Although the generally dry climate of the sandveld together with the hard quartzitic sandstone canvasses promote conditions favourable for preservation, the long term effects of erosion must inevitably take their toll.

The strongest evidence for the majority of the art post dating 2000 B.P. is the repeated association of rock paintings with the numerous small koppie sites. As noted previously, there was a great increase in the number of sites of all types during this time and by far the greater majority of deposits, stone scatters and shell middens relate to this period. Almost without exception, sites with deposit are complemented by paintings and, at the other end of the scale, almost no rock painting locations lack stone artefacts. Furthermore, whenever these scatters contain sufficient numbers of formal tools to be diagnostic they conform to the adze rich koppie pattern and show little affinity with the earlier deflation mode.

Although most of the evidence for assigning these paintings to the later period is circumstantial, a few scenes, by virtue of their content, are directly attributable either to the time when pastoralism was known to exist in the Cape or to the colonial epoch. These include the domestic fat-tailed sheep and various renditions from the historical era such as wagons and the well known galleon at Heidedal in the Porterville district.

Whilst these images are not common they do establish a precedent whereby new events are documented in the rock art. Irrespective of whether they are literal depictions or additions to an existing cosmological system, their inclusion indicates that rock art is not a static mode of expression but operates, at least in part, as a dynamic response to changing conditions. Similarly, adjustments in the socio-economic

environment, such as those caused by the introduction of pastoralism and the arrival of European colonists, should also be detectable in the art. It is suggested that the appearance of hand prints and allied motifs in the painted record are a reflection of this type of change.

By virtue of their superior preservation and from the evidence of superimposing it can be inferred that handprints are a late addition in the sandveld. This group of paintings marks a complete break from earlier forms. The technique of delicate painting using some form of stylus is replaced by the cruder application of ochre by hand and finger.

It is plausible that this change in technique is a reaction to an increasingly pastoralist dominated landscape or to the disruptive effects of European colonisation. The shift away from complex human and animal imagery to a more abstract form of expression can be seen as reflecting disruption of the socio-economic system and the breakdown of the San belief system. On van Riebeeck's arrival in 1652 the hunter-gatherer and pastoralist life-styles appeared to be intact but by 1700 these once stable systems had begun to disintegrate. This would seem the most likely period for a parallel breakdown of the art.

CONCLUSIONS

The analysis of a number of surface assemblages from the sandveld indicate that no discernible changes in stone tool technology occurred during the last 4000 years. There was, however, a major shift in the pattern of hunter-gatherer settlement.

No assemblages from the sandveld have yet been dated between 7800 and 4400 B.P. and it seems unlikely that people exploited the area to any great extent during this period. It is suggested that an increase in local aridity in the mid-Holocene rendered the sandveld unsuitable for occupation

by hunter-gatherer bands.

Between about 4000 and 1700 B.P. occupation was focussed on open veld locations with little attention directed towards the sandveld koppies. The majority of sites are concentrated in what are today deflation areas situated in lowland near coastal riverine environments. The assemblages at these sites are characterised by the presence of various backed tools and a virtual absence of adzes.

After about 1700 B.P., coincidental with the appearance of pottery, there is a proliferation of small cave and shelter deposits in the sandveld koppies. Apart from pottery, common features at these sites are ash complexes, bedding material and marine shell. The assemblages associated with these sites contain a high adze complement whilst backed tools are noticeably rare.

It is suggested that the move away from open veld locations was a direct result of the introduction of a pastoralist economy and the domination of low lying areas by domestic stock. After 1700 B.P. hunter-gatherer settlement shifted mainly towards the Cape Fold Belt mountains and to a lesser extent, towards the koppies of the sandveld.

This move was probably accompanied by a shift in subsistence strategy away from large game hunting to the exploitation of widespread, but dependable resources such as plants and small animals. Possible correlations with this include changes in group size and social organisation. Subsistence strategies in the sandveld are considered to be related to changes in coastal occupation and patterns of shell fish predation.

The sandveld witnessed a number of changes in settlement pattern during the Holocene. Early Holocene occupation of Elands Bay Cave and Tortoise Cave was followed by a long period of virtual neglect, spanning

Tortoise Cave was followed by a long period of virtual neglect, spanning the mid-Holocene, after which attention was re-directed towards the sandveld such that by about 4000 B.P. occupation was well established in near coastal riverine locations. Subsequent to the introduction of pastoralism, around 1700 B.P., hunter-gatherer settlement shifted from open veld situations to the koppie systems of the sandveld. Following this adjustment, pastoralists and hunter-gatherers co-existed in the sandveld and the Cape Fold Belt mountains for at least 1500 years until the advent of European colonialism when both these economies suffered disruption.

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APPENDICES

KEY TO APPENDIX 1

The following observations are used:

SITE CATEGORY

RA	Rock Art
DEP	Deposit
STS	Stone Scatter
SHM	Shell Midden
SHS	Shell Scatters

ANCILLARY CATEGORY

P	Pottery
DEP	Deposit
ST	Stone
SH	Shell

APPENDIX 1

ARCHAEOLOGICAL SITES IN THE RESEARCH AREA

ZONE 1

LOCALITY ELANDS BAY

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
EB	1	RA/DEP/STS/SHM	P	ROCK
	2	RA/DEP/STS/SHM	SH	"
	3	RA/DEP/SHS		"
	4	SHS		"
	5	SHS	ST	"
	6	SHS		"
	7	SHS		"
	8	SHM		"
	9	STS		"
	10	STS		"
	11	STS		"
	12	SHM	ST/P	"
	13	SHM	P	OPEN

LOCALITY BOBBEJAANSBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BB	1	RA/DEP/SHM	ST/P	ROCK
	2	RA/DEP/SHM	ST/P	"
	3	RA/SHS	DEP/ST	"
	4	RA		"
	5	RA		"
	6	RA/SHM	DEP/ST/P	"
	7	RA		"
	8	RA	SH	"
	9	RA		"
	10	SHM	DEP/ST/P	"
	11	SHS	DEP/ST/P	"
	12	DEP/STS/SHM	P	"
	13	SHM	ST/P	"
	14	SHS	ST/P	OPEN
	15	SHM	DEP/ST/P	ROCK
	16	DEP/STS/SHM	P	"
	17	SHM	ST/P	"
	18	SHM	ST/P	"
	19	SHM	ST/P	"
	20	SHM		OPEN
	21	SHM	ST/P	"
	22	STS	DEP	ROCK
	23	SHS	ST	"
	24	SHM	ST	OPEN
	25	SHS	ST	ROCK
	26	SHS	ST/P	"

27	SHS			OPEN
28	SHS			ROCK
29	SHS		ST	"

LOCALITY DIE MOND

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
DM	1	SHM	ST/P	OPEN
	2	SHM		"
	3	SHM	P	"
	4	SHM		"
	5	SHM		"

LOCALITY SKIETKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SKT	1	SHM	DEP/ST/P	ROCK

LOCALITY BLOUKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BL	1	RA		ROCK
	2	RA		"
	3	RA	SH	"
	4	RA		"
	5	SHS	P	"

LOCALITY ROOIBERG/VERLORE

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
RBV	1	RA	ST	ROCK
	2	RA		"
	3	STS	SH	"

LOCALITY KOPPIE "740"

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
740	1	RA	ST	ROCK
	2	RA		"

LOCALITY UITKYKBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
UIT	1	RA	SH/ST	ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA		"

LOCALITY MUISHOEKBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
MB	1	RA/STS	SH	ROCK
	2	STS		"
	3	RA		"
	4	RA	ST/SH	"
	5	RA		"
	6	RA		"
	7	RA		"
	8	RA		"
	9	RA/STS	SH/P	"
	10	RA		"
	11	STS		OPEN

LOCALITY KLEINMUISHOEKBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KM	1	RA		ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA/STS		"
	6	RA		"

LOCALITY POINT "582"

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
582	1	STS		OPEN
	2	STS		"
	3	STS		"
	4	RA		ROCK
	5	RA		"
	6	RA		"
	7	RA/STS	P	"
	8	RA		"
	9	RA		"
	10	RA	ST/SH	"
	11	RA/STS	P	"
	12	RA		"
	13	RA/STS	DEP/SH	"
	14	RA		"
	15	RA		"
	16	RA		"
	17	RA	ST	"
	18	RA		"

LOCALITY DIEPKLOOF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
*DK	1	RA/DEP/STS	SH/P	ROCK
	2	RA/STS	DEP/SH	"
	3	RA		"

4	RA	ST	"
5	RA		"
6	RA		"
7	RA		"

LOCALITY WITKLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
WK	1	RA		ROCK
	9	RA		"
	10	RA/STS	DEP/SH	"
	11	RA		"
	12	RA/STS	F	"
	13	RA	DEP/ST/SH/P	"
	14	RA	DEP/ST/SH	"
	15	RA		"
	16	RA		"
	17	RA		"
	22	RA/DEP	ST/SH/P	"
	23	RA		"
	24	RA	ST	"
	25	RA	ST	"
	26	RA		"

LOCALITY GROOTDRIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
GD	1	RA		ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA		"
	6	RA	ST	"
	7	RA		"
	8	RA/STS		"
	9	RA		"
	10	RA		"
	11	RA		"
	12	RA	ST	"
	13	RA	ST	"
	14	RA		"
	15	RA		"
	16	RA	DEP/ST/SH	"
	17	RA	ST/SH	"
	18	RA		"
	19	RA		"
	20	RA		"
	21	RA		"
	22	RA		"
	23	RA		"
	24	RA/STS		"
	25	RA	SH	"
	26	RA		"
	27	RA	ST	"
	28	RA	ST	"
	29	RA	ST	"
	30	RA		"

31	RA			"
32	RA	DEP		"
34	RA			"
35	RA			"
36	RA/STS			"
37	RA			"
38	RA			"
39	RA	DEP		"
40	RA			"
41	RA			"
42	RA	ST		"
43	RA			"
44	RA			"
45	RA			"
46	RA	DEP/SH		"
47	RA			"
48	RA			"
49	RA			"
50	RA			"
51	RA			"
52	RA			"
53	RA			"
54	RA			"
55	RA			"
56	RA			"
57	RA			"
58	RA/STS	SH		"
59	STS	P		"
60	STS			OPEN

LOCALITY SANDHOOG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SHG	1	RA	ST	ROCK
	2	RA		"
	3	RA		"

LOCALITY ROOIBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
RB	1	RA		ROCK
	2	RA	ST/P	"
	3	RA	ST/P	"
	4	RA		"
	5	RA	ST	"
	6	RA		"
	7	RA		"
	8	RA	ST	"
	9	RA/DEP/STS	P	"
	10	RA	ST	"
	11	RA	ST	"
	12	RA		"
	13	RA		"
	14	RA		"
	15	RA		"

LOCALITY UPPER ROOIBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
URB	1	RA/DEP/STS		ROCK

LOCALITY SKUINSKRAAL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SK	1	RA	ST	ROCK
	2	RA	DEP/ST	"
	3	RA		"

LOCALITY ENIGMA

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
EN	1	RA	ST	ROCK

LOCALITY KOPPIE "1120"

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
ET	1	RA		ROCK
	2	RA	DEP/ST	"
	3	RA	ST	"
	4	RA		"

LOCALITY KOPPIE "914"

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
914	1	RA		ROCK
	2	RA		"
	3	RA		"

LOCALITY WOLFBERG KOPPIES

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
WBK	1	RA	DEP/ST	ROCK
	2	RA	DEP	"
	3	RA		"
	4	RA		"
	5	RA	DEP/ST	"
	6	RA	DEP/ST	"
	7	RA/STS		"
	8	RA/DEP/ST	SH/P	"
	9	STS	SH/P	"
	10	RA		"
	11	RA/STS		"

LOCALITY BONANZA

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BZ	1	RA/DEF/ST		ROCK
	2	RA	ST/SH	"

LOCALITY MODDERFONTEIN SE KOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
MOD	1	RA	ST	ROCK

LOCALITY KOOPMANSKRAAL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KMK	1	STS		OPEN
	2	STS		"

LOCALITY NUWEDAM

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
ND	1	RA	DEF/SH	ROCK
	2	RA/DEF/STS/SHM		"
	3	RA		"

LOCALITY LANGBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
LB	1	RA		ROCK
	2	RA		"
	3	STS	SH	"
	4	RA	ST	"
	5	STS/SHM	DEF/P	"
	6	STS/SHS		"
	7	STS		"

LOCALITY KAMERBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KB	1	RA		ROCK
	2	RA	ST	"
	3	RA	ST	"
	4	RA		"
	5	RA		"
	6	RA	ST	"
	7	STS	SH	"
	8	RA	ST	"
	9	RA		"

LOCALITY RONDEBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
RON	1	RA	ST	ROCK
	2	RA		"
	3	RA	ST	"
	4	RA	DEF/ST	"
	5	RA	ST	"
	6	STS		"
	7	RA	P	"
	8	RA	ST	"
	9	RA	ST	"
	10	RA/STS	SH	"
	11	RA		"
	12	RA		"
	13	RA/DEF	ST/SH/P	"
	14	RA		"
	15	RA/STS	SH/P	"

LOCALITY DROEBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
DROB	1	RA	ST	ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA		"
	6	RA		"
	7	RA		"
	8	RA		"
	9	RA		"
	10	RA		"

ZONE 2

LOCALITY FORESTRY

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
FOR	1	STS/SHS		OPEN
	2	STS/SHS		"
	3	STS/SHS		"

LOCALITY VERLORE

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
VER	A	STS/SHS		OPEN
	B	STS/SHS		"
	C	STS/SHS		"
	D	STS		"

LOCALITY BONTHEUWEL/VERLORE

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BHV	1	STS		OPEN

LOCALITY SLANGKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SL	1	STS		OPEN
	2	STS		"
	3	STS	SH	"
	4	STS		"
	5	STS		"
	6	STS		"
	7	STS	SH /P	"
	8	STS		"
	9	STS	SH	"
	10	STS		"
	11	STS		"
	12	STS	SH	"
	13	STS		"
	14	STS		"
	15	STS	SH	"
	16	STS	SH/P	"

LOCALITY VENSTERKLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
VK	1	RA	P	ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA	ST/P	"
	6	STS		"

LOCALITY KOPPIE "840"

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
840	1	RA	ST	ROCK
	2	RA	ST	"
	3	RA		"
	4	RA		"
	5	RA		"
	6	STS		OPEN
	7	DEP	SH/ST	ROCK

LOCALITY NUWERUS

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
NUW				

AREA A	3	STS		OPEN
	5	STS		"
	6	STS	SH	"
	7	STS		"
	8	STS		"
	10	STS		"
	11	STS		"
AREA B	2	STS	P	"
	3	STS		"
	4	STS		"
	5	STS	P	"
AREA C	1	STS		"
	2	STS		"
	3	STS		"
	4	STS		"
	5	STS	P	"
AREA D	1	STS		"
AREA E	1	STS		"
	2	STS		"
	3	STS		"
	4	STS		"
	5	STS		"
	6	STS		"
	7	STS		"
	8	STS		"
	9	STS		"
	10	STS		"
	11	STS	P	"
AREA F	1	STS		"

LOCALITY UITHOEK

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
UH	A	STS		OPEN
	B	STS		"
	C	STS		"
	D	STS		"
	E	STS		"
	F	STS	SH/P	"
	G	STS		"
	H	STS		"
	I	STS	P	"
	J	STS		"
	K	STS		"
	L	STS		"

LOCALITY KOOPMANSDRIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KMD	A	STS		OPEN

B	STS	P	"
C	STS	P	"
D	STS		"
E	STS		"
F	STS	SH/P	"
G	STS		"
H	STS		"
I	STS		"
J	STS		"
K	STS		"
L	STS		"

LOCALITY TRAVERSE FROM POINT 209 TO UITHOEK

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
209/UH				
AREA A	1	STS		OPEN
	2	STS		"
	3	STS		"
AREA B	1	STS		"
	2	STS		"
AREA C	1	STS		"
	2	STS		"

LOCALITY TRAVERSE FROM POINT 747 TO POINT 209

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
747/209				
	C	STS		OPEN
	J	STS		"
	K	STS		"
	L	STS		"

LOCALITY POINT 209

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
209				
	A	STS		OPEN
	B	STS		"
	C	STS		"
	D	STS		"
	E	STS		"

LOCALITY PEPPER TREE HILL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
PTH				
	1	RA	ST	ROCK
	2	RA		"
	3	STS		OPEN
	4	STS		"

5	STS		"
6	STS		"
7	STS	SH/P	"
8	STS		"
9	STS		"

LOCALITY ROOIKRANS

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
RK	1	RA	ST/P	ROCK
	2	RA	ST	"
	3	RA	ST	"
	4	RA	ST	"
	5	RA	DEP	"
	6	RA	ST/SH	"
	7	STS		OPEN
	8	STS		"

LOCALITY MATJIESGOEDRIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
MAT	1	STS	SH	OPEN
	2	STS	SH	"

LOCALITY KLAARFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KLA	1	STS		OPEN

LOCALITY KOPPIE "920"

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
920	1	RA/DEP	ST/SH	ROCK
	2	RA	ST	"
	3	RA/STS	P	"
	4	RA	ST	"

LOCALITY KRUISFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KFN	1	STS		OPEN
	2	STS	P	"
	3	STS	P	"
	4	STS		"
	5	STS		"
	6	STS	P	"
	7	STS		"
	8	STS		"

LOCALITY BOKRUISFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BOK	1	STS	SH	OPEN
	2	STS		"
	3	STS	P	"
	4	STS		"
	5	STS		"

LOCALITY ONDERBERGVLEI

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
OBV	1	RA	ST	ROCK
	2	RA	ST	"

LOCALITY HET KRUIS

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
HK	1	STS		OPEN
	2	STS		"
	2b	STS		"

ZONE 3

LOCALITY KREEFBAAI

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KFB	A	SHS		OPEN
	B	SHS		"
	C	SHM		"
	D	SHS		"
	E	SHM		"

LOCALITY WADRIFSOUTPAN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
WDSF	1	RA		ROCK
	2	RA/DEF/SHM/STS	P	"
	3	RA/SHS	ST/P	"
	4	RA	ST	"
	B	SHS/STS	P	OPEN
	C	SHS/STS	P	"
	D	SHS/STS	P	"
	E	SHM/STS	P	"
	F	SHS	P	"
	G	SHS	ST/P	"
	H	STS	SH	"
	I	SHS		"

J	SHS/STS	P	"
K	SHS/STS		"
L	STS	SH	"
M	SHS/STS	P	"
N	SHS/STS	P	"
O	SHS/STS	P	"
P	SHS	P	"
Q	STS	SH	"
R	SHS		"
S	STS		"
T	SHS/STS	P	"

LOCALITY ONDER WADRIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
OW	1	RA	SH	ROCK
	2	RA		"
	3	SHM/STS	P	"
	4	SHS/STS	P	OPEN

LOCALITY WADRIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
WAD	1	RA	ST/SH	ROCK
	2	STS		OPEN
	3	RA	ST/SH	ROCK

LOCALITY LOUWSRUS

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
LRS	1	STS		OPEN
	2	STS		"
	3	STS		"
	4	STS		"
	5	STS		"
	6	STS	P	"
	7	STS	P	"
	8	STS		"
	9	STS		"
	10	STS		"
	11	STS		"
	12	STS		"
	13	STS		"
	14	STS		"
	15	STS		"
	16	STS		"

LOCALITY MIDDELPOS

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
MD	1	STS		OPEN
	2	STS	P	"

3	STS	"
4	STS	"
5	STS	"
6	STS	"
7	STS	"
8	STS	"
9	STS	"
10	STS	"
11	STS	"
12	STS	"
13	STS	"
14	STS	"
15	STS	"
16	STS	"
17	STS	"
18	STS	"
19	STS	"
20	STS	P "

LOCALITY KLEIN KLIPHEUWEL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KK	1	RA		ROCK
	A	STS	P	OPEN
	B	STS	P	"
	C	STS		"
	D	STS		"
	E	STS	P	"
	F	STS		"
	G	STS		"
	H	STS		"
	I	STS		"
	J	STS		"
	K	STS	P	"
	L	STS		"
	M	STS		"
	N	STS		"

LOCALITY LOUWSKLIPHEUWEL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
LKH	1	STS		OPEN
	2	STS	P	"

LOCALITY BOBBEJAANSKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BK	1	RA		ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA		"

6	RA		"
7	RA		"
8	RA		"
9	RA		"
10	RA		"
11	RA	ST	"
12	RA/STS	P	"
13	RA		"
14	RA	ST/P	"
15	RA		"
16	RA		"
17	RA	ST	"
18	RA/STS	DEP/SH/P	"
19	RA	ST	"
20	RA		"
21	RA		"
22	RA		"
23	STS	P	OPEN

LOCALITY LEIPOLDTVILLE

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
LPV	A	STS		OPEN
	B	STS		"
	C	STS		"
	D	STS		"
	E	STS	P	"
	F	STS		"

LOCALITY BOBBEJAANFONTEINBERGE

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BFB	1	RA		ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA		DEP/ST/SH
	6	RA		"
	7	RA		"
	8	RA/DEP/STS		SH
	9	RA		"
	10	RA		"
	11	RA		DEP/ST/SH
	12	RA		"
	13	RA		"
	14	RA		SH
	15	RA		DEP/ST
	16	RA		"
	17	RA		DEP/ST
	18	RA		"
	19	RA		"
	20	RA		"
	21	RA		"
	A	STS		OPEN
	B	STS		"

C	STS	"
D	STS	"
E	STS	"
F	STS	"
G	STS	"
H	STS	"
I	STS	"

LOCALITY OLIFANTSBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
OB	1	RA		ROCK
	2	RA	ST	"
	3	RA	ST	"
	4	RA		"
	5	RA		"
	6	RA		"
	7	RA		"
	8	RA	DEP/ST	"
	9	RA		"
	10	RA	ST	"
	11	RA	ST	"
	12	RA		"
	13	RA		"
	14	RA		"
	15	RA	ST	"
	16	RA		"
	17	RA		"
	18	RA		"
	19	RA	ST	"
	20	RA	ST	"
	21	RA/STS		"
	22	RA		"

LOCALITY GROOTBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
GB	1	RA		ROCK
	2	RA		"
	3	RA		"
	4	RA	ST	"
	5	RA		"
	6	RA	SH	"
	7	RA		"
	8	RA/STS	DEP	"
	9	RA/STS		"
	10	RA		"
	11	RA/STS	DEP/SH	"
	12	RA		"
	13	RA		"
	14	RA	ST	"
	15	RA/STS		"
	16	RA	DEP/ST	"
	17	RA	ST	"
	18	RA	DEP/ST/SH	"
	19	RA		"

20	RA		"
21	RA		"
22	RA		"
23	RA		"
24	RA	DEF/ST	"
25	RA		"
26	STS		OPEN

LOCALITY STAANDERKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
ST	1	RA	ST	ROCK

LOCALITY TIERKLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
TK	1	RA/DEF/STS	SH/P	ROCK

LOCALITY PRINS WILLEMSKLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
FWK	1	RA		ROCK
	2	RA	ST	"
	3	RA/DEF/STS	SH	"
	4	RA	ST	"
	5	RA		"
	6	RA		"
	7	RA		"
	8	RA		"
	9	RA	ST	"
	10	RA	ST	"
	11	RA		"
	12	RA		"
	13	RA		"

LOCALITY PRINS WILLEMSKLIP NORTH

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
FWKN	1	RA	ST	ROCK

ZONE 4

LOCALITY GROOTRIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
GF	A	SHS	P	OPEN
	B	SHM		"
	C	SHM		"
	D	SHM		"
	E	SHM		"
	F	SHM		"
	G	SHM	ST/P	"

LOCALITY STEENBOKSFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SBF	1	RA/SHS		ROCK
	2	RA/DEF/SHM/STS	P	"
	3	RA		"
	4	RA		"
	5	RA/DEF/SHM/STS	P	"
	6	RA		"
	7	RA	ST/SH/F	"
	8	RA	ST	"
	9	RA	DEF/ST/SH	"
	10	RA		"
	11	RA		"
	12	RA	SH	"
	13	RA	SH	"
	14	STS		OPEN

LOCALITY STEENBOKSFONTEIN SOUTH

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SBFS	1	RA	ST/SH	ROCK
	2	RA/STS	SH/P	"

LOCALITY LANGVLEIBERGE

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
LV	1	RA/DEF/STS	SH/P	ROCK
	2	RA	ST/P	"
	3	RA/DEF/STS	SH/P	"
	4	RA/DEF	ST/SH/P	"
	5	RA		"
	6	RA		"
	7	RA		"
	8	RA		"
	9	RA	ST	"

10	RA/STS	SH/F	"
11	RA		"
12	RA	ST/SH	"
13	RA		"
14	RA		"
15	RA		"
16	RA		"
17	RA	ST/P	"
18	STS	P	"

LOCALITY ANDKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
AND	1	RA	DEP/SH	ROCK
	2	RA		"
	3	RA		"
	4	RA	DEP/ST	"
	5	RA		"
	6	RA/DEP/STS	SH/F	"
	7	RA		"

LOCALITY TUIN SE KOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
TS	1	RA/STS	DEP/P	ROCK
	2	RA		"
	3	RA	P	"
	4	RA	ST/P	"
	5	RA	ST	"
	6	RA	ST	"

LOCALITY KOPPIE 590

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
FN	1	RA	DEP/ST/P	ROCK
	2	RA/STS		"
	3	RA	ST	"
	4	RA	ST	"
	5	RA		"
	6	RA	ST	"
	7	RA	ST	"
	8	RA	ST	"
	9	RA		"
	10	RA		"
	11	RA		"
	12	RA		"
	13	RA		"

LOCALITY HANGLIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
HF	1	RA/DEP	ST	ROCK

2	RA		"
3	RA		"
4	RA	DEF	"
5	RA	ST	"
6	RA/STS		"
7	RA		"
8	RA		"
9	RA		"
10	RA	ST	"
11	RA	ST	"
12	RA		"
13	RA		"
14	RA		"
15	RA/STS		"
16	RA	ST	"
17	RA		"
18	RA	ST	"
19	RA		"
20	RA/STS		"

LOCALITY MUISKLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
MK	1	RA	ST	ROCK
	2	RA	ST/P	"
	3	STS		"
	4	STS		OPEN

LOCALITY DROERIVIER

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
DRO	1	RA	ST	ROCK
	2	RA		"
	3	RA		"
	4	RA/STS	P	"
	5	RA	ST	"
	6	RA		"
	7	RA		"
	8	RA/DEF/STS	P	"

LOCALITY BONTHEUWEL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BH	1	STS		OPEN

ZONE 5

LOCALITY DUIN SE RIF

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
DSF	1	SHM		OPEN

LOCALITY HARDEVLAK SE KLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
HSK	1	DEP/STS/SHS	P	ROCK
	2	RA		"

LOCALITY KLEIN HARDEVLAK SE KLIP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KHSK	1	RA	ST	ROCK
	2	STS	P	OPEN

LOCALITY WOLFBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
WB	1	RA		ROCK
	2	RA	DEP/ST	"
	3	RA	ST	"
	4	RA		"
	5	RA		"
	6	RA/DEP/STS	SH/P	"
	7	RA	ST	"
	8	RA	ST	"
	9	STS		"
	10	STS		"

LOCALITY KLIPHEUWEL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KH	1	RA/DEP/STS	SH/P	ROCK
	2	RA/STS	DEP/SH/P	"
	3	RA/DEP/STS	SH/P	"
	4	RA		"
	5	RA		"
	6	STS	P	OPEN

ZONE 6

LOCALITY LAMBERT'S BAY

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
LBB	1	SHM		OPEN

LOCALITY ALBINA

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
ALB	1	RA	ST	ROCK
	2	RA		"

3	RA	SH	"
4	RA		"
5	RA/DEF/SHM	ST	"

LOCALITY DEUSFRING

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
DSP	1	SHM		OPEN

LOCALITY SOUTPANSKLIPHEUWEL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
SPK	1	RA		ROCK
	2	RA		"
	3	RA		"
	4	RA		"
	5	RA		"
	6	RA		"
	7	STS/SHS		"

LOCALITY HARDE VLAKTE KLIPHEUWEL EXTENSION

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
HVKE	1	STS/SHS	P	OPEN

LOCALITY KOOKFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KOOK	1	STS		OPEN

LOCALITY RIETFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
RF	1	STS		OPEN
	ZONE 7			

LOCALITY BRUINKOP

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BRK	1	RA/STS	SH/P	ROCK
	2	RA	ST	"
	3	RA	DEF/ST/P	"
	4	DEF/ST	SH	"
	5	STS		"
	6	RA		"

LOCALITY BREDEVLEI

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BDV	1	RA/STS		ROCK
	2	RA	DEP/ST	"
	3	RA	DEP/ST	"
	4	STS		"
	5	STS		OPEN
	6	STS	DEP/F	ROCK
	7	RA/DEP/STS	F	"

LOCALITY CARSTENBERG

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
CB	1	RA	ST	ROCK
	2	RA	ST/F	"
	3	RA/STS	SH/P	"
	4	RA	ST	"
	5	RA/STS	SH	"
	6	RA		"

LOCALITY BURDESKRAAL

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
BUR	1	STS		ROCK
	2	RA		"
	3	RA	ST/P	"
	4	RA/STS	F	"
	5	STS		"
	6	STS		"
	7	CAIRN		"
	8	RA/STS		"
	9	RA/STS		"
	10	RA	ST	"
	11	RA	ST	"
	12	STS		"
	13	STS		"
	14	STS		"
	15	RA		"
	16	RA/DEP/STS	SH/P	"
	17	RA	ST	"
	18	RA		"
	19	RA		"
	20	STS		OPEN
	21	STS	F	ROCK
	22	STS		"

LOCALITY UITKOMS

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
UK	1	RA	ST	ROCK
	2	RA		"
	3	RA		"
	4	RA	DEP/ST	"
	5	RA		"

6	CAIRNS		"
7	RA/DEP/STS	SH/P	"
8	CAIRNS		"
9	STS		"
10	RA/DEP/STS	SH/P	"
11	RA	DEP/ST	"
12	RA		"
13	RA	ST	"
14	RA/STS		"
15	RA		"
16	RA	ST	"

LOCALITY KLEINFONTEIN

CODE	SITE NO	SITE CATEGORY	ANCILLARY	FOCUS
KLFN	1	RA/STS		ROCK
	2	STS		"
	3	RA	ST	"
	4	RA	"	"
	5	RA	"	"
	6	RA		"
	7	CAIRNS		"
	8	RA	ST	"
	9	RA		"
	10	RA		"
	11	RA		"
	12	RA		"
	13	RA/STS		"
	14	RA	ST	"
	15	RA	ST	"
	16	RA		"
	17	RA		"
	18	RA		"

APPENDIX 2

ROCK ART SITES

ZONE 1

LOCALITY	CODE	TOTAL NO. OF SITES
Elands Bay	EB	3
Bobbejaansberg	BB	9
Bloukop	BL	4
Rooiberg/Verlore	RBV	2
Koppie "740"	740	2
Uitkykberg	UIT	5
Muishoekberg	MB	9
Kleinmuishoekberg	KM	6
Point "582"	582	15
Diepkloof	DK	7
Witklip	WK	15
Grootdrif	GD	57
Sandhoog	SHG	3
Rooiberg	RB	15
Upper Rooiberg	URB	1
Skuinskraal	SK	3
Enigma	EN	1
Koppie "1120"	ET	4
Koppie "914"	914	3
Wolfberg Koppies	WBK	10
Bonanza	BZ	2
Modderfontein Se Kop	MOD	1
Nuwedam	ND	3

Langberg	LB	3
Kamerberg	KB	8
Rondeberg	RON	13
Droeberg	DROB	10

ZONE 2

LOCALITY	CODE	TOTAL NO. OF SITES
Vensterklip	VK	5
Koppie "840"	840	5
Pepper Tree Hill	PTH	2
Rooikrans	RK	6
Koppie "920"	920	4
Onderbergvlei	OBV	2

ZONE 3

LOCALITY	CODE	TOTAL NO. OF SITES
Wadrifsoutpan	WDSP	4
Onder Wadrif	DW	2
Wadrif	WAD	2
Klein Klipheuwel	KK	1
Bobbejaanskop	BK	22
Bobbejaanfonteinberge	BFB	21
Olifantsberg	OB	22
Grootberg	GB	25
Standerkop	ST	1
Tierklip	TK	1
Prins Willemsklip	PWK	13

Prins Willemsklip North	PWKN	1
-------------------------	------	---

ZONE 4

LOCALITY	CODE	TOTAL NO. OF SITES
Steenboksfontein	SBF	13
Steenboksfontein South	SBFS	2
Langvleiberge	LV	17
Andkop	AND	7
Tuin Se Kop	TS	6
Koppie "590"	590	13
Hanglip	HP	20
Muisklip	MK	2
Droerivier	DRO	8

ZONE 5

LOCALITY	CODE	TOTAL NO. OF SITES
Hardevlak Se Klip	HSK	1
Klein Hardevlak Se Klip	KHSK	1
Wolfberg	WB	8
Klipheuwel	KH	5

ZONE 6

LOCALITY	CODE	TOTAL NO. OF SITES
Albina	ALB	5

Soutpansklipheuwel

SPK

6

ZONE 7

LOCALITY	CODE	TOTAL NO. OF SITES
Bruinkop	BRK	3
Bredevlei	BDV	4
Carstenberg	CB	6
Buroeskraal	BUR	12
Uitkoms	UK	13
Kleinfontein	KLFN	16

APPENDIX 3

STONE SCATTERS AND SITES WITH DEPOSIT

ZONE 1

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Elands Bay	EB	1	Deposit/Stone scatter
		3	Deposit
		9	Stone scatter
Bobbejaansberg	BB	1	Deposit
		2	Deposit
		3	Deposit/Stone scatter
		12	Deposit/Stone scatter
		15	Deposit/Stone scatter
		16	Deposit/Stone scatter
		22	Stone scatter
Rooiberg/Verlore	RBV	3	Stone scatter
Muishoekberg	MB	1	Stone scatter
		2	Stone scatter
		9	Stone scatter
Klein Muishoekberg	KM	5	Stone scatter
Point "582"	582	7	Stone scatter
		11	Stone scatter
		13	Stone scatter
Diepkloof	DK	1	Deposit/Stone scatter
		2	Stone scatter
Witklip	WK	10	Stone scatter
		12	Stone scatter
		22	Deposit/Stone scatter
Grootdrif	GD	8	Stone scatter
		24	Stone scatter
		36	Stone scatter
		58	Stone scatter
		59	Stone scatter
Rooiberg	RB	9	Deposit/Stone scatter
Upper Rooiberg	URB	1	Deposit/Stone scatter
Wolfberg Koppies	WBK	1	Deposit/Stone scatter
		7	Stone scatter
		8	Deposit/Stone scatter
		9	Stone scatter

		11	Stone scatter
Bonanza	BZ	1	Deposit/Stone scatter
Nuwedam	ND	2	Deposit/Stone scatter
Langberg	LB	3	Stone scatter
		5	Deposit/Stone scatter
		6	Stone scatter
Kamerberg	KB	7	Stone scatter
Rondeberg	RON	6	Stone scatter
		7	Stone scatter
		10	Stone scatter
		13	Deposit/Stone scatter
		15	Stone scatter

ZONE 2

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Vensterklip	VK	6	Stone scatter
Koppie "920"	920	1	Deposit/Stone scatter
		3	Stone scatter

ZONE 3

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Wadrifsoutpan	WDSP	2	Deposit/Stone scatter
		B	Stone scatter
		E	Stone scatter
		S	Stone scatter
		T	Stone scatter
Onder Wadrif	OW	3	Stone scatter
Bobbejaanskop	BK	12	Stone scatter
		18	Stone scatter
Bobbejaanfonteinberge	BFB	8	Deposit/Stone scatter
Olifantsberg	OB	21	Stone scatter
Grootberg	GB	8	Stone scatter
		9	Stone scatter
		11	Stone scatter
		15	Stone scatter

Tierklip	TK	1	Deposit/Stone scatter
Prins Willemsklip	PWK	3	Deposit/Stone scatter

ZONE 4

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Steenboksfontein	SBF	2	Deposit/Stone scatter
		5	Deposit/Stone scatter
Steenboksfontein South	SBFS	2	Stone scatter
Langvleiberge	LV	1	Deposit/Stone scatter
		3	Deposit/Stone scatter
		4	Deposit/Stone scatter
		10	Stone scatter
		18	Stone scatter
Andkop	AND	6	Deposit/Stone scatter
Tuin Se Kop	TS	1	Stone scatter
Koppie "590"	FN	2	Stone scatter
Hanglip	HP	1	Deposit/Stone scatter
		6	Stone scatter
		15	Stone scatter
		20	Stone scatter
Muisklip	MK	3	Stone scatter
Droerivier	DRD	4	Stone scatter
		8	Deposit/Stone scatter

ZONE 5

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Hardevlak Se Klip	HSK	1	Deposit/Stone scatter
Wolfberg	WB	6	Deposit/Stone scatter
		9	Stone scatter
		10	Stone scatter
Klipheuwel	KH	1	Deposit/Stone scatter
		2	Deposit/Stone scatter
		3	Deposit/Stone scatter

ZONE 6

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Albina	ALB	5	Deposit/Stone scatter
Soutpansklipheuwel	SPK	7	Stone scatter

ZONE 7

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Bruinkop	BRK	1	Stone scatter
		4	Deposit/Stone scatter
		6	Stone scatter
Bredevlei	BDV	1	Stone scatter
		4	Stone scatter
		5	Stone scatter
		6	Stone scatter
		7	Deposit/Stone scatter
Carstenberg	CB	3	Stone scatter
		5	Stone scatter
Buroeskraal	BUR	1	Stone scatter
		4	Stone scatter
		5	Stone scatter
		6	Stone scatter
		8	Stone scatter
		9	Stone scatter
		12	Stone scatter
		13	Stone scatter
		14	Stone scatter
		16	Deposit/Stone scatter
		20	Stone scatter
		21	Stone scatter
22	Stone scatter		
Uitkoms	UK	7	Deposit/Stone scatter
		9	Stone scatter
		10	Deposit/Stone scatter
		14	Stone scatter
Kleinfontein	KLFN	1	Stone scatter
		2	Stone scatter
		13	Stone scatter

APPENDIX 4

DEFLATION HOLLOWES

ZONE 1

LOCALITY	CODE	SITE NO.	SCALE (0-10)
Point "582"	582	1	0.1
		2	0.1
		3	0.1
Grootdrif	GD	60	0.5
Koopmanskraal	KMK	1	-
		2	-

ZONE 2

LOCALITY	CODE	SITE NO.	SCALE (0-10)
Forestry	FOR	1	0.1
		2	0.1
		3	0.1
Verlore	VER	A	8
		B	8
		C	8
		D	6
Bontheuwel/Verlore	BHV	1	0.2
Slangkop	SL	1	0.3
		2	0.1
		3	0.1
		4	0.1
		5	0.1
		6	0.1
		7	0.1
		8	0.1
		9	0.2
		10	0.1
		11	0.1
		12	0.2
		13	0.1
		14	0.1
		15	1
		16	2
Koppie "840"	840	6	0.5

Nuwerus	NLW Area A	1	Empty
		2	Empty
		3	0.1
		4	Empty
		5	0.5
		6	0.5
		7	0.5
		8	0.2
		9	Empty
		10	0.75
		11	0.2
		12	Empty
	Area B	1	Empty
		2	0.3
		3	0.2
		4	0.2
		5	0.75
	Area C	1	0.1
		2	0.1
		3	0.1
		4	0.2
		5	0.5
	Area D	1	0.1
		2	Empty
	Area E	1	0.1
		2	0.1
		3	0.1
		4	0.3
		5	0.2
		6	1
		7	0.3
		8	2
		9	0.5
		10	0.3
		11	1
	Area F	1	0.2
Uithoek	UH	A	0.1
		B	2
		C	2
		D	1.5
		E	3
		F	3
		G	1.5
		H	0.5
		I	1
		J	1
		K	0.5
		L	0.5
Koopmansdrif	KMD	A	3.5
		B	2
		C	4
		D	2
		E	1

		F	4
		G	0.5
		H	0.1
		I	0.1
		J	0.1
		K	0.1
		L	0.3
		M	Empty
Point 209 to Uithoek	209/UH		
	Area A	1	1
		2	0.1
		3	0.5
	Area B	1	0.5
		2	0.5
	Area C	1	0.1
		2	0.1
Point 747 to Point 209	747/209	A	Empty
		B	Empty
		C	0.1
		D	Empty
		E	Empty
		F	Empty
		G	Empty
		H	Empty
		I	Empty
		J	0.3
		K	0.5
		K	0.5
Point 209	209	A	5
		B	6
		C	0.1
		D	0.1
		E	0.5
Pepper Tree Hill	PTH	3	0.2
		4	0.1
		5	2
		6	4
		7	2
		8	3
		9	2
Matjiesgoedrif	MAT	1	3
		2	2.5
Rooikraans	RK	7	0.5
		8	0.5
Klaarfontein	KLA	1	1
Kruisfontein	KFN	1	1
		2	0.5
		3	0.5
		4	0.2

		5	1.5
		6	6
		7	0.2
		8	0.1
Bokruisfontein	BOK	1	0.5
		2	2
		3	2
		4	2
		5	3
Het Kruis	HK	1	5
		2	4
		2b	-

ZONE 3

LOCALITY	CODE	SITE NO.	SCALE (0-10)
Wadrif soutpan	WDSF	C	2
		D	2
		F	0.2
		G	0.1
		H	2
		I	0.1
		J	2
		K	1
		L	0.5
		M	1.5
		N	0.5
		O	2
		Q	0.5
Onder Wadrif	OW	4	1
Wadrif	WAD	2	0.1
Louwsrus	LRS	1	0.1
		2	0.1
		3	2
		4	0.5
		5	0.5
		6	1
		7	3
		8	0.2
		9	0.5
		10	1
		11	1
		12	1
		13	0.1
		14	1
		15	0.1
		16	0.1
Middelpos	MD	1	0.1
		2	5
		3	4
		4	0.1

		5	0.1
		6	0.3
		7	0.3
		8	0.2
		9	0.5
		10	0.5
		11	3
		12	0.1
		13	0.2
		14	0.1
		15	0.1
		16	0.1
		17	0.3
		18	0.3
		19	0.2
		20	0.4
Klein Klipheuwel	KK	A	2
		B	3
		C	3
		D	2
		E	1.5
		F	2
		G	2
		H	6
		I	5
		J	2
		K	4
		L	0.3
		M	7
		N	0.5
Louwsklipheuwel	LKH	1	0.2
		2	2
Bobbejaanskop	BK	23	0.5
Leipoldtville	LPV	A	2
		B	2
		C	2
		D	4
		E	6
		F	0.5
Bobbejaanfonteinberge	BFB	A	0.5
		B	0.5
		C	0.5
		D	0.5
		E	0.5
		F	0.5
		G	0.5
		H	0.2
		I	0.5
Grootberg	GB	26	3

ZONE 4

LOCALITY	CODE	SITE NO.	SCALE (0-10)
Steenboksfontein	SBF	14	0.5
Muis klip	MK	4	0.5
Bontheuwel	BH	1	-

ZONE 5

LOCALITY	CODE	SITE NO.	SCALE (0-10)
Klein Hardevlak Se Klip	KHSK	2	1.5
Klipheuwel	KH	6	2

ZONE 6

LOCALITY	CODE	SITE NO.	SCALE (0-10)
Harde Vlakte Klip. Ext.	HVKE	1	2
Kookfontein	KOOK	1	-
Rietfontein	RF	1	-

APPENDIX 5

SHELL MIDDENS AND SHELL SCATTERS

ZONE 1

LOCALITY	CODE	SITE NO.	SITE CATEGORY		
Elands Bay	EB	1	Shell Midden		
		3	Shell Scatter		
		4	"		
		5	"		
		6	"		
		7	"		
		8	Shell Midden		
		10	Shell Scatter		
		11	"		
		12	Shell Midden		
		13	"		
		Bobbejaansberg	BB	1	Shell Midden
				2	"
3	Shell Scatter				
6	Shell Midden				
10	"				
11	Shell Scatter				
12	Shell Midden				
13	"				
14	Shell Scatter				
15	Shell Midden				
16	"				
17	"				
18	"				
19	"				
20	"				
21	"				
23	Shell Scatter				
24	Shell Midden				
25	Shell Scatter				
26	"				
27	"				
28	"				
29	"				
Die Mond	DM	1	Shell Midden		
		2	"		
		3	Shell Midden		
		4	"		
		5	"		
Skietkop	SKT	1	Shell midden		

Bloukop	BL	5	Shell Scatter
Nuwedam	ND	2	Shell Midden
Langberg	LB	5	Shell Midden

ZONE 2

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Forestry	FOR	1	Shell Scatter
		2	"
		3	"
Verlore	VER	A	Shell Scatter
		B	"
		C	"

ZONE 3

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Kreefbaai	KFB	A	Shell Scatter
		B	"
		C	Shell Midden
		D	Shell Scatter
		E	Shell Midden
Wadrifsoutpan	WDSF	2	Shell Midden
		3	Shell Scatter
		B	"
		C	"
		D	"
		E	Shell Midden
		F	Shell Scatter
		G	"
		I	"
		J	Shell Scatter
		K	"
		M	"
		N	"
O	"		
P	"		
R	"		
T	"		
Onder Wadrif	OW	3	Shell Midden
		4	Shell Scatter

ZONE 4

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Grootrif	GF	A	Shell Scatter
		B	Shell Midden
		C	"
		D	"
		E	"
		F	"
		G	"
Steenboksfontein	SBF	1	Shell Scatter
		2	Shell Midden
		5	"

ZONE 5

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Duin Se Rif	DSF	1	Shell Midden
Hardevlak Se Klip	HSK	1	Shell Scatter

ZONE 6

LOCALITY	CODE	SITE NO.	SITE CATEGORY
Lambert's Bay	LBB	1	Shell Midden
Albina	ALB	5	Shell Midden
Deurspring	DSP	1	Shell Midden
Soutpansklipheuwel	SPK	7	Shell Scatter
Harde Vlakte K. Ext.	HVKE	1	Shell Scatter

APPENDIX 6

STONE ARTEFACT INVENTORIES OF 21 SELECTED SITES

SITE: Leipoldtville LPV/E

TYPE OF SITE: Deflation

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	EST. 7709	98.9	
Cores	88	1.1	
TOTAL WASTE	7797	100.0	91.4
<u>UTILISED</u>			
Pièces esquillées	30	14.7	
Utilised flakes, chunks	159	77.9	
Grindstones	9	4.4	
Grindstone fragments	6	2.9	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	204	99.9	2.4
<u>FORMAL TOOLS</u>			
Scrapers	216	40.8	
Backed tools	178	33.6	
Drills	6	1.1	
Adzes	7	1.3	
Unifacial points	-	-	
Miscellaneous retouch	122	23.0	
Bored stones	1	0.2	
TOTAL FORMAL TOOLS	530	100.0	6.2
GRAND TOTAL	8531		100.0

SITE: Klein Klipheuwel KK/H

TYPE OF SITE: Deflation

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	Est. 13098	98.6	
Cores	187	1.4	
TOTAL WASTE	13285	100.0	95.2
<u>UTILISED</u>			
Pièces esquillées	54	26.3	
Utilised flakes, chunks	125	61.0	
Grindstones	11	5.4	
Grindstone fragments	14	6.8	
Hammerstones	1	0.5	
Anvil	-	-	
TOTAL UTILISED	205	100.0	1.5
<u>FORMAL TOOLS</u>			
Scrapers	252	53.4	
Backed tools	113	23.9	
Drills	12	2.5	
Adzes	6	1.3	
Unifacial points	-	-	
Miscellaneous retouch	89	18.9	
Bored stones	-	-	
TOTAL FORMAL TOOLS	472	100.0	3.4
<u>GRAND TOTAL</u>	13962		100.1

SITE: Klein Klipheuwel KK/K

TYPE OF SITE: Deflation

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	Est. 2947	98.4	
Cores	49	1.6	
TOTAL WASTE	2996	100.0	90.3
<u>UTILISED</u>			
Pièces esquillées	25	26.6	
Utilised flakes, chunks	55	58.5	
Grindstones	8	8.5	
Grindstone fragments	5	5.3	
Hammerstones	-	-	
Anvil	1	1.1	
TOTAL UTILISED	94	100.0	2.8
<u>FORMAL TOOLS</u>			
Scrapers	110	48.0	
Backed tools	72	31.4	
Drills	10	4.4	
Adzes	-	-	
Unifacial points	-	-	
Miscellaneous retouch	37	16.2	
Bored stones	-	-	
TOTAL FORMAL TOOLS	229	100.0	6.9
<u>GRAND TOTAL</u>	3319		100.0

SITE: Klein Klipheuwel KK/I

TYPE OF SITE: Deflation

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
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WASTE

Chips, chunks, flakes	Est. 8729	99.4	
Cores	50	0.6	
TOTAL WASTE	8779	100.0	94.7

UTILISED

Pièces esquillées	22	16.1	
Utilised flakes, chunks	90	65.7	
Grindstones	11	8.0	
Grinstone fragments	7	5.1	
Hammerstones	6	4.4	
Anvil	1	0.7	
TOTAL UTILISED	137	100.0	1.5

FORMAL TOOLS

Scrapers	187	52.7	
Backed tools	91	25.6	
Drills	4	1.1	
Adzes	1	0.3	
Unifacial points	-	-	
Miscellaneous retouch	72	20.3	
Bored stones	-	-	
TOTAL FORMAL TOOLS	355	100.0	3.8

<u>GRAND TOTAL</u>	9271		100.0
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SITE: Wadrifsoutpan WDSP/C

TYPE OF SITE: Deflation

CATEGORY FREQUENCY %CATEGORY %TOTAL ARTEFACTS

WASTE

Chips, chunks, flakes	208	98.6	
Cores	3	1.4	
TOTAL WASTE	211	100.0	89.8

UTILISED

Pièces esquillées	4	30.8	
Utilised flakes, chunks	7	53.8	
Grindstones	2	15.4	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	13	100.0	5.5

FORMAL TOOLS

Scrapers	6	54.6	
Backed tools	4	36.4	
Drills	-	-	
Adzes	-	-	
Unifacial points	-	-	
Miscellaneous retouch	1	9.1	
Bored stones	-	-	
TOTAL FORMAL TOOLS	11	100.1	4.7

GRAND TOTAL 235 100.0

SITE: Pepper Tree Hill PTH 6 TYPE OF SITE: Deflation

CATEGORY FREQUENCY %CATEGORY %TOTAL ARTEFACTS

WASTE

Chips, chunks, flakes	Est. 1436	99.3	
Cores	10	0.7	
TOTAL WASTE	1446	100.0	94.1

UTILISED

Pièces esquillées	7	17.5	
Utilised flakes, chunks	33	82.5	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	40	100.0	2.6

FORMAL TOOLS

Scrapers	24	48.0	
Backed tools	15	30.0	
Drills	-	-	
Adzes	6	12.0	
Unifacial points	-	-	
Miscellaneous retouch	4	8.0	
Bored stones	1	2.0	
TOTAL FORMAL TOOLS	50	100.0	3.3

GRAND TOTAL 1536 100.0

SITE: Grootberg GB 26

TYPE OF SITE: Deflation

<u>CATEGORY</u>	<u>FREQUENCY</u>	<u>%CATEGORY</u>	<u>%TOTAL ARTEFACTS</u>
<u>WASTE</u>			
Chips, chunks, flakes	Est. 7584	99.3	
Cores	57	0.8	
TOTAL WASTE	7641	100.1	97.3

UTILISED

Pièces esquillées	18	15.8	
Utilised flakes, chunks	92	80.7	
Grindstones	2	1.8	
Grindstone fragments	-	-	
Hammerstones	2	1.8	
Anvil	-	-	
TOTAL UTILISED	114	100.1	1.5

FORMAL TOOLS

Scrapers	52	53.1	
Backed tools	19	19.4	
Drills	-	-	
Adzes	8	8.2	
Unifacial points	-	-	
Miscellaneous retouch	19	19.4	
Bored stones	-	-	
TOTAL FORMAL TOOLS	98	100.1	1.3

<u>GRAND TOTAL</u>	7853		100.1
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SITE: Het Kruis HK 2

TYPE OF SITE: Deflation

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	Est. 1836	98.6	
Cores	27	1.4	
TOTAL WASTE	1863	100.0	94.9
<u>UTILISED</u>			
Pièces esquillées	5	19.2	
Utilised flakes, chunks	17	65.4	
Grindstones	3	11.5	
Grindstone fragments	1	3.8	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	26	99.9	1.3
<u>FORMAL TOOLS</u>			
Scrapers	42	56.8	
Backed tools	5	6.8	
Drills	-	-	
Adzes	14	18.9	
Unifacial points	-	-	
Miscellaneous retouch	13	17.6	
Bored stones	-	-	
TOTAL FORMAL TOOLS	74	100.1	3.8
<u>GRAND TOTAL</u>	1963		100.0

SITE: Andkop AND 6

TYPE OF SITE: Talus

<u>CATEGORY</u>	<u>FREQUENCY</u>	<u>%CATEGORY</u>	<u>%TOTAL ARTEFACTS</u>
<u>WASTE</u>			
Chips, chunks, flakes	Est. 3545	99.0	
Cores	36	1.0	
TOTAL WASTE	3581	100.0	96.5
<u>UTILISED</u>			
Pièces esquillées	16	18.8	
Utilised flakes, chunks	69	81.2	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	85	100.0	2.3
<u>FORMAL TOOLS</u>			
Scrapers	26	57.8	
Backed tools	1	2.2	
Drills	-	-	
Adzes	9	20.0	
Unifacial points	1	2.2	
Miscellaneous retouch	8	17.8	
Bored stones	-	-	
TOTAL FORMAL TOOLS	45	100.0	1.2
<u>GRAND TOTAL</u>	3711		100.0

SITE: Rondeberg RON 15

TYPE OF SITE: Talus

CATEGORY FREQUENCY %CATEGORY %TOTAL ARTEFACTS

WASTE

Chips, chunks, flakes	Est. 10634	99.6	
Cores	42	0.4	
TOTAL WASTE	10676	100.0	99.1

UTILISED

pièces esquillées	18	33.3	
Utilised flakes, chunks	36	66.7	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	54	100.0	0.5

FORMAL TOOLS

Scrapers	17	36.2	
Backed tools	5	10.6	
Drills	-	-	
Adzes	21	44.7	
Unifacial points	-	-	
Miscellaneous retouch	4	8.5	
Bored stones	-	-	
TOTAL FORMAL TOOLS	47	100.0	0.4

GRAND TOTAL

10777 100.0

SITE: Langberg LB 5

TYPE OF SITE: Talus

<u>CATEGORY</u>	<u>FREQUENCY</u>	<u>%CATEGORY</u>	<u>%TOTAL ARTEFACTS</u>
<u>WASTE</u>			
Chips, chunks, flakes	Est. 1951	98.9	
Cores	21	1.1	
TOTAL WASTE	1972	100.0	95.6
<u>UTILISED</u>			
Pièces esquillées	6	10.0	
Utilised flakes, chunks	52	86.7	
Grindstones	-	-	
Grindstone fragments	2	3.3	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	60	100.0	2.9
<u>FORMAL TOOLS</u>			
Scrapers	10	33.3	
Backed tools	2	6.7	
Drills	-	-	
Adzes	12	40.0	
Unifacial points	-	-	
Miscellaneous retouch	6	20.0	
Bored stones	-	-	
TOTAL FORMAL TOOLS	30	100.0	1.5
<u>GRAND TOTAL</u>	2062		100.0

SITE: Rondeberg RON 10

TYPE OF SITE: Open Koppie

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	Est. 2188	99.4	
Cores	14	0.6	
TOTAL WASTE	2202	100.0	97.9
<u>UTILISED</u>			
Pièces esquillées	5	17.9	
Utilised flakes, chunks	23	82.1	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	28	100.0	1.2
<u>FORMAL TOOLS</u>			
Scrapers	9	47.4	
Backed tools	1	5.3	
Drills	-	-	
Adzes	5	6.3	
Unifacial points	1	5.3	
Miscellaneous retouch	3	15.8	
Bored stones	-	-	
TOTAL FORMAL TOOLS	19	100.1	0.8
<u>GRAND TOTAL</u>	2249		99.9

SITE: Klipheuwel KH 3

TYPE OF SITE: Open Koppie

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	Est. 2283	99.7	
Cores	8	0.3	
TOTAL WASTE	2291	100.0	98.5
<u>UTILISED</u>			
Pièces esquillées	6	27.3	
Utilised flakes, chunks	16	72.7	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	22	100.0	0.9
<u>FORMAL TOOLS</u>			
Scrapers	9	64.3	
Backed tools	1	7.1	
Drills	-	-	
Adzes	-	-	
Unifacial points	-	-	
Miscellaneous retouch	4	28.6	
Bored stones	-	-	
TOTAL FORMAL TOOLS	14	100.0	0.6
<u>GRAND TOTAL</u>	2327		100.0

SITE: Wolfberg WB 9

TYPE OF SITE: Open Koppie

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
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WASTE

Chips, chunks, flakes	1123	98.6	
Cores	16	1.4	
TOTAL WASTE	1139	100.0	95.6

UTILISED

Pièces esquillées	3	9.7	
Utilised flakes, chunks	28	90.3	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	31	100.0	2.6

FORMAL TOOLS

Scrapers	5	22.7	
Backed tools	7	31.8	
Drills	-	-	
Adzes	-	-	
Unifacial points	1	4.6	
Miscellaneous retouch	9	40.9	
Bored stones	-	-	
TOTAL FORMAL TOOLS	22	100.0	1.8

<u>GRAND TOTAL</u>	1192		100.0
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SITE: Bruinkop BRK 1

TYPE OF SITE: Open Koppie

CATEGORY	FREQUENCY	%CATEGORY	%TOTAL ARTEFACTS
<u>WASTE</u>			
Chips, chunks, flakes	Est. 2768	99.3	
Cores	20	0.7	
TOTAL WASTE	2788	100.0	98.3
 <u>UTILISED</u>			
Pièces esquillées	-	-	
Utilised flakes, chunks	23	100.0	
Grindstones	-	-	
Grindstone fragments	-	-	
Hammerstones	-	-	
Anvil	-	-	
TOTAL UTILISED	23	100.0	0.8
 <u>FORMAL TOOLS</u>			
Scrapers	11	45.8	
Backed tools	1	4.2	
Drills	-	-	
Adzes	11	45.8	
Unifacial points	-	-	
Miscellaneous retouch	1	4.2	
Bored stones	-	-	
TOTAL FORMAL TOOLS	24	100.0	0.9
<u>GRAND TOTAL</u>	2835		100.0

APPENDIX 7

FREQUENCIES OF CHIPS, CHUNKS AND FLAKES
IN RAW MATERIAL CLASSES

SITE: KMD/F TYPE OF SITE: Deflation AREA SAMPLED: 153 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	1161	104	30	4	17	6	1322	58.1
	%	87.8	7.9	2.3	0.3	1.3	0.5	100.1	
Chunks	f	282	24	7	2	37	7	359	15.8
	%	78.6	6.7	1.9	0.6	10.3	1.9	100.0	
Flakes	f	345	171	52	3	21	1	593	26.1
	%	58.2	28.8	8.8	0.5	3.5	0.2	100.0	
TOTAL	f	1788	299	89	9	75	14	2274	100.0
	%	78.6	13.1	3.9	0.4	3.3	0.6	99.9	

SITE: 209/A TYPE OF SITE: Deflation AREA SAMPLED: 144 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	805	46	4	4	25	-	884	63.0
	%	91.1	5.2	0.5	0.5	2.8	-	100.1	
Chunks	f	98	11	2	-	76	23	210	15.0
	%	46.7	5.2	1.0	-	36.2	11.0	100.1	
Flakes	f	216	74	6	1	10	2	309	22.0
	%	69.9	23.9	1.9	0.3	3.2	0.6	99.8	
TOTAL	f	1119	131	12	5	111	25	1403	100.0
	%	79.8	9.3	0.9	0.4	7.9	1.8	100.1	

SITE:		KK/K		TYPE OF SITE:			Deflation	AREA SAMPLED: 54 m ²	
CLASS		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	269	169	2	-	8	8	456	51.1
	%	59.0	37.1	0.4	-	1.8	1.8	100.1	
Chunks	f	67	19	1	-	22	2	111	12.4
	%	60.4	17.1	0.9	-	19.8	1.8	100.0	
Flakes	f	118	190	2	-	8	8	326	36.5
	%	36.2	58.3	0.6	-	2.5	2.5	100.1	
TOTAL	f	454	378	5	-	38	18	893	100.0
	%	50.8	42.3	0.6	-	4.3	2.0	100.0	

SITE:		KK/I		TYPE OF SITE:			Deflation	AREA SAMPLED: 54 m ²	
CLASS		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	1099	408	15	-	56	6	1584	59.9
	%	69.4	25.8	0.9	-	3.5	0.4	100.0	
Chunks	f	163	36	4	-	38	9	250	9.5
	%	65.2	14.4	1.6	-	15.2	3.6	100.0	
Flakes	f	268	443	31	-	65	4	811	30.7
	%	33.0	54.6	3.8	-	8.0	0.5	99.9	
TOTAL	f	1530	887	50	-	159	19	2645	100.1
	%	57.8	33.5	1.9	-	6.0	0.7	99.9	

<u>SITE:</u>		<u>TYPE OF SITE:</u>						<u>AREA SAMPLED:</u>	
WDSP/C		Deflation						189 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	33	32	2	3	5	1	76	36.5
	%	43.4	42.1	2.6	3.9	6.6	1.3	99.9	
Chunks	f	19	7	3	1	19	1	50	24.0
	%	38.0	14.0	6.0	2.0	38.0	2.0	100.0	
Flakes	f	26	44	5	1	5	1	82	39.4
	%	31.7	53.7	6.1	1.2	6.1	1.2	100.0	
TOTAL	f	78	83	10	5	29	3	208	99.9
	%	37.5	39.9	4.8	2.4	13.9	1.4	99.9	

<u>SITE:</u>		<u>TYPE OF SITE:</u>						<u>AREA SAMPLED:</u>	
PTH 6		Deflation						18 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	143	17	-	-	1	-	161	44.8
	%	88.8	10.6	-	-	0.6	-	100.0	
Chunks	f	19	2	-	-	-	-	21	5.8
	%	90.5	9.5	-	-	-	-	100.0	
Flakes	f	51	115	4	2	5	-	177	49.3
	%	28.8	65.0	2.3	1.1	2.8	-	100.0	
TOTAL	f	213	134	4	2	6	-	359	99.9
	%	59.3	37.3	1.1	0.6	1.7	-	100.0	

<u>SITE:</u>		GB 26		<u>TYPE OF SITE:</u>			Deflation	<u>AREA SAMPLED:</u> 9 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.
Chips	f	194	99	6	3	2	-	304	48.1
	%	63.8	32.6	2.0	1.0	0.7	-	100.1	
Chunks	f	103	50	2	4	21	-	180	28.5
	%	57.2	27.8	1.1	2.2	11.7	-	100.0	
Flakes	f	48	85	3	3	9	-	148	23.4
	%	32.4	57.4	2.0	2.0	6.1	-	99.9	
TOTAL	f	345	234	11	10	32	-	632	100.0
	%	54.6	37.0	1.7	1.6	5.1	-	100.0	

<u>SITE:</u>		KFN 6		<u>TYPE OF SITE:</u>			Deflation	<u>AREA SAMPLED:</u> 72 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips chunks, fl.
Chips	f	1596	250	18	6	5	1	1876	50.9
	%	85.1	13.3	1.0	0.3	0.3	0.1	100.1	
Chunks	f	435	77	3	1	15	2	533	14.5
	%	81.6	14.4	0.6	0.2	2.8	0.4	100.0	
Flakes	f	512	667	72	7	11	5	1274	34.6
	%	40.2	52.4	5.7	0.5	0.9	0.4	100.1	
TOTAL	f	2543	994	93	14	31	8	3683	100.0
	%	69.0	27.0	2.5	0.4	0.8	0.2	99.9	

SITE:		HK 2		TYPE OF SITE:			Deflation		AREA SAMPLED: 9 m ²	
CLASS		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.	
Chips	f	227	22	1	-	-	-	250	54.5	
	%	90.8	8.8	0.4	-	-	-	100.0		
Chunks	f	82	15	-	-	1	-	98	21.4	
	%	83.7	15.3	-	-	1.0	-	100.0		
Flakes	f	52	58	-	-	1	-	111	24.2	
	%	46.8	52.3	-	-	0.9	-	100.0		
TOTAL	f	361	95	1	-	2	-	459	100.1	
	%	78.6	20.7	0.2	-	0.4	-	99.9		

SITE:		AND 6		TYPE OF SITE:			Deflation		AREA SAMPLED: 9 m ²	
CLASS		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.	
Chips	f	227	64	1	5	3	-	300	42.3	
	%	75.7	21.3	0.3	1.7	1.0	-	100.0		
Chunks	f	156	44	2	17	17	-	236	33.3	
	%	66.1	18.6	0.8	7.2	7.2	-	99.9		
Flakes	f	81	74	1	8	9	-	173	24.4	
	%	46.8	42.8	0.6	4.6	5.2	-	100.0		
TOTAL	f	464	182	4	30	29	-	709	100.0	
	%	65.4	25.7	0.6	4.2	4.1	-	100.0		

<u>SITE:</u>		RON 15		<u>TYPE OF SITE:</u>				Talus		<u>AREA SAMPLED:</u> 9 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.		
Chips	f	680	36	3	3	-	-	722	57.7		
	%	94.2	5.0	0.4	0.4	-	-	100.0			
Chunks	f	344	27	-	7	4	-	382	30.5		
	%	90.1	7.1	-	1.8	1.0	-	100.0			
Flakes	f	128	19	-	-	-	-	147	11.8		
	%	87.1	12.9	-	-	-	-	100.0			
TOTAL	f	1152	82	3	10	4	-	1251	100.0		
	%	92.1	6.6	0.2	0.8	0.3	-	100.0			

<u>SITE:</u>		LB 5		<u>TYPE OF SITE:</u>				Talus		<u>AREA SAMPLED:</u> 16 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.		
Chips	f	139	9	2	-	3	-	153	32.3		
	%	90.8	5.9	1.3	-	2.0	-	100.0			
Chunks	f	112	8	-	4	11	-	135	28.5		
	%	83.0	5.9	-	3.0	8.1	-	100.0			
Flakes	f	125	34	2	5	19	-	185	39.1		
	%	67.6	18.4	1.1	2.7	10.3	-	100.1			
TOTAL	f	376	51	4	9	33	-	473	99.9		
	%	79.5	10.8	0.8	1.9	7.0	-	100.0			

<u>SITE:</u>		KH 1		<u>TYPE OF SITE:</u>				Talus		<u>AREA SAMPLED:</u> 55 m ²
<u>CLASS</u>		QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.	
Chips	f	926	169	2	26	11	2	1136	49.8	
	%	81.5	14.9	0.2	2.3	1.0	0.2	100.1		
Chunks	f	373	101	7	18	25	-	524	23.0	
	%	71.2	19.3	1.3	3.4	4.8	-	100.0		
Flakes	f	327	251	7	16	17	2	620	27.2	
	%	52.7	40.5	1.1	2.6	2.7	0.3	99.9		
TOTAL	f	1626	521	16	60	53	4	2280	100.0	
	%	71.3	22.9	0.7	2.6	2.3	0.2	100.0		

<u>SITE:</u>		UK 7		<u>TYPE OF SITE:</u>				Talus		<u>AREA SAMPLED:</u> 6 m ²
<u>CLASS</u>		QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.	
Chips	f	202	53	1	-	2	-	258	50.3	
	%	78.3	20.5	0.4	-	0.8	-	100.0		
Chunks	f	58	17	1	2	2	-	80	15.6	
	%	72.5	21.3	1.3	2.5	2.5	-	100.1		
Flakes	f	86	82	-	4	3	-	175	34.1	
	%	49.1	46.9	-	2.3	1.7	-	100.0		
TOTAL	f	346	152	2	6	7	-	513	100.0	
	%	67.4	29.6	0.4	1.2	1.4	-	100.0		

<u>SITE:</u>		WB 9		<u>TYPE OF SITE:</u>			Open Koppie		<u>AREA SAMPLED:</u> 2 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.	
Chips	f	108	68	-	-	7	-	183	16.3	
	%	59.0	37.2	-	-	3.8	-	100.0		
Chunks	f	215	316	2	1	14	-	548	48.8	
	%	39.2	57.7	0.4	0.2	2.6	-	100.1		
Flakes	f	56	317	3	3	13	-	392	34.9	
	%	14.3	80.9	0.8	0.8	3.3	-	100.1		
TOTAL	f	379	701	5	4	34	-	1123	100.0	
	%	33.7	62.4	0.4	0.4	3.0	-	99.9		

<u>SITE:</u>		BRK 1		<u>TYPE OF SITE:</u>			Open Koppie		<u>AREA SAMPLED:</u> 1 m ²	
<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% chips, chunks, fl.	
Chips	f	140	28	-	-	-	-	168	48.6	
	%	83.3	16.7	-	-	-	-	100.0		
Chunks	f	61	20	-	-	1	-	82	23.7	
	%	74.4	24.4	-	-	1.2	-	100.0		
Flakes	f	46	42	-	3	5	-	96	27.7	
	%	47.9	43.8	-	3.1	5.2	-	100.0		
TOTAL	f	247	90	-	3	6	-	346	100.0	
	%	71.4	26.0	-	0.9	1.7	-	100.0		

APPENDIX 8

FREQUENCIES OF CORES IN RAW MATERIAL CLASSES

CORES

SITE	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL
KMD/F	f 9	3	3	-	-	-	15
	% 60.0	20.0	20.0	-	-	-	100.0
209/A	f 42	2	1	-	-	-	45
	% 93.3	4.4	2.2	-	-	-	99.9
LPV/E	f 57	27	3	-	1	-	88
	% 64.8	30.7	3.4	-	1.1	-	100.0
KK/H	f 128	48	6	-	4	1	187
	% 68.4	25.7	3.2	-	2.1	0.5	99.9
KK/K	f 23	22	1	-	1	2	49
	% 46.9	44.9	2.0	-	2.0	4.1	99.9
KK/I	f 30	18	2	-	-	-	50
	% 60.0	36.0	4.0	-	-	-	100.0
WDSP/C	f 1	1	-	1	-	-	3
	% 33.3	33.3	-	33.3	-	-	99.9
PTH/6	f 6	4	-	-	-	-	10
	% 60.0	40.0	-	-	-	-	100.0
GB/26	f 34	17	1	-	5	-	57
	% 59.6	29.8	1.8	-	8.8	-	100.0
KFN/6	f 79	41	6	-	3	-	129
	% 61.2	31.8	4.7	-	2.3	-	100.0
HK/2	f 13	9	2	-	3	-	27
	% 48.1	33.3	7.4	-	11.1	-	99.9
LV/3	f 28	12	2	3	-	-	45
	% 62.2	26.7	4.4	6.7	-	-	100.0
AND/6	f 27	7	-	1	1	-	36
	% 75.0	19.4	-	2.8	2.8	-	100.0
RON/15	f 41	1	-	-	-	-	42
	% 97.6	2.4	-	-	-	-	100.0

CORES

SITE	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL
LB/5	f 17	3	1	-	-	-	21
	% 81.0	14.3	4.8	-	-	-	100.1
KH/1	f 30	6	-	-	-	-	36
	% 83.3	16.7	-	-	-	-	100.0
UK/7	f 10	11	1	-	-	-	22
	% 45.5	50.0	4.5	-	-	-	100.0
RON/10	f 12	2	-	-	-	-	14
	% 85.7	14.3	-	-	-	-	100.0
KH/3	f 4	4	-	-	-	-	8
	% 50.0	50.0	-	-	-	-	100.0
WB/9	f 6	10	-	-	-	-	16
	% 37.5	62.5	-	-	-	-	100.0
BRK/1	f 7	13	-	-	-	-	20
	% 35.0	65.0	-	-	-	-	100.0

APPENDIX 9

FREQUENCIES OF CLASSES OF THE UTILISED CATEGORY

IN RAW MATERIAL CLASSES

SITE: KMD/F

TYPE OF SITE: Deflation

AREA SAMPLED: 153 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL UTILISED	%
P.esquill.	f	6	1	1	-	-	-	8	19.5
	%	75.0	12.5	12.5	-	-	-	100.0	
Utilised	f	3	18	2	-	-	-	23	56.1
	%	13.0	78.3	8.7	-	-	-	100.0	
G.st.upper	f	-	-	-	-	2	-	2	4.9
G.st.lower	F	-	-	-	-	2	-	2	4.9
G.st.frag	f	-	-	-	-	5	-	5	12.2
Hammerst.	f	-	-	-	-	1	-	1	2.4
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	9	19	3	-	10	-	41	100.0
	%	22.0	46.3	7.3	-	24.4		100.0	

SITE: 209/A

TYPE OF SITE: Deflation

AREA SAMPLED: 144 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	19	4	-	-	-	-	23	31.5
	%	82.6	17.4	-	-	-	-	100.0	
Utilised	f	18	15	4	-	-	-	37	50.7
	%	48.6	40.5	10.8	-	-	-	99.9	
G.st.upper	f	-	-	-	-	4	-	4	5.5
G.st.lower	f	-	-	-	1	4	-	5	6.8
G.st.frag	f	-	-	-	-	1	-	1	1.4
Hammerst.	f	1	-	-	-	2	-	3	4.1
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	38	19	4	1	11	-	73	100.0
	%	52.1	26.0	5.5	1.4	15.1	-	100.1	

SITE: WDSP/C

TYPE OF SITE: Deflation

AREA SAMPLED: 189 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	4	-	-	-	-	-	4	30.8
	%	100.0	-	-	-	-	-	100.0	
Utilised	f	2	2	1	2	-	-	7	53.8
	%	28.6	28.6	14.3	28.6	-	-	100.1	
G.st.upper	f	-	-	-	-	2	-	2	15.4
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	6	2	1	2	2	-	13	100.0
	%	46.2	15.4	7.7	15.4	15.4	-	100.1	

SITE: PTH 6

TYPE OF SITE: Deflation

AREA SAMPLED: 72 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	6	1	-	-	-	-	7	17.5
	%	85.7	14.3	-	-	-	-	100.0	
Utilised	f	10	21	2	-	-	-	33	82.5
	%	30.3	63.6	6.1	-	-	-	100.0	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	16	22	2	-	-	-	40	100.0
	%	40.0	55.0	5.0	-	-	-	100.0	

SITE: GB 26

TYPE OF SITE: Deflation

AREA SAMPLED: 108 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	17	1	-	-	-	-	18	15.8
	%	94.4	5.6	-	-	-	-	100.0	
Utilised	f	17	54	11	-	10	-	92	80.7
	%	18.5	58.7	12.0	-	10.9	-	100.1	
G.st.upper	f	-	-	-	-	2	-	2	1.8
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	2	-	2	1.8
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	34	55	11	-	14	-	114	100.1
	%	29.8	48.2	9.6	-	12.3	-	99.9	

SITE: KFN 6

TYPE OF SITE:

Deflation

AREA SAMPLED:198 m

%

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	83	7	-	2	-	-	92	34.1
	%	90.2	7.6	-	2.2	-	-	100.0	
Utilised	f	40	92	14	2	2	-	150	55.6
	%	26.7	61.3	9.3	1.3	1.3	-	99.9	
G.st.upper	f	-	-	-	-	6	-	6	2.2
G.st.lower	f	-	-	-	1	7	-	8	3.0
G.st.frag	f	-	-	-	-	7	-	7	2.6
Hammerst.	f	-	-	-	-	6	-	6	2.2
Anvil	f	-	-	-	-	1	-	1	0.4
TOTAL	f	123	99	14	5	29	-	270	100.1
	%	45.6	36.7	5.2	1.9	10.7	-	100.1	

SITE: HK 2

TYPE OF SITE: Deflation

AREA SAMPLED: 36 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	5	-	-	-	-	-	5	19.2
		%100.0	-	-	-	-	-	100.0	
Utilised	f	5	11	-	-	1	-	17	65.4
		% 29.4	64.7	-	-	5.9	-	100.0	
G.st.upper	f	-	-	-	-	2	-	2	7.7
G.st.lower	f	-	-	-	-	1	-	1	3.8
G.st.frag	f	-	-	-	-	1	-	1	3.8
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	10	11	-	-	5	-	26	99.9
		% 38.5	42.3	-	-	19.2	-	100.0	

SITE: LV 3

TYPE OF SITE: Talus

AREA SAMPLED: 66 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	9	1	1	-	-	-	11	21.2
	%	81.8	9.1	9.1	-	-	-	100.0	
Utilised	f	10	29	-	1	1	-	41	78.8
	%	24.4	70.7	-	2.4	2.4	-	99.9	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.fragm	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	19	30	1	1	1	-	52	100.0
	%	36.5	57.7	1.9	1.9	1.9	-	99.9	

SITE: AND 6

TYPE OF SITE: Talus

AREA SAMPLED: 40 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	16	-	-	-	-	-	16	18.8
		%100.0	-	-	-	-	-	100.0	
Utilised	f	14	49	4	1	-	1	69	81.2
		% 20.3	71.0	5.8	1.4	-	1.4	99.9	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	30	49	4	1	-	1	85	100.0
		% 35.3	57.6	4.7	1.2	-	1.2	100.0	

SITE: RON 15

TYPE OF SITE: Talus

AREA SAMPLED: 77 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	16	1	-	-	1	-	18	33.3
	%	88.9	5.6	-	-	5.6	-	100.1	
Utilised	f	13	21	-	1	1	-	36	66.7
	%	36.1	58.3	-	2.8	2.8	-	100.0	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	29	22	-	1	2	-	54	100.0
	%	53.7	40.7	-	1.9	3.7	-	100.0	

SITE: LB 5

TYPE OF SITE: Talus

AREA SAMPLED: 66 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	6	-	-	-	-	-	6	10.0
		%100.0	-	-	-	-	-	100.0	
Utilised	f	15	33	2	1	1	-	52	86.7
		% 28.8	63.4	3.8	1.9	1.9	-	99.8	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	2	-	2	3.3
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	21	33	2	1	3	-	60	100.0
		% 35.0	55.0	3.3	1.7	5.0	-	100.0	

SITE: KH 1

TYPE OF SITE: Talus

AREA SAMPLED: 55 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	3	1	-	-	-	-	4	10.8
	%	75.0	25.0	-	-	-	-	100.0	
Utilised	f	6	24	1	2	-	-	33	89.2
	%	18.2	72.7	3.0	6.1	-	-	100.0	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	9	25	1	2	-	-	37	100.0
	%	24.3	67.6	2.7	5.4	-	-	100.0	

SITE: UK 7

TYPE OF SITE: Talus

AREA SAMPLED: 84 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	2	6	-	-	-	-	8	8.3
	%	25.0	75.0	-	-	-	-	100.0	
Utilised	f	32	48	4	1	-	-	85	88.5
	%	37.6	56.4	4.7	1.2	-	-	99.9	
G.st.upper	f	-	-	-	-	2	-	2	2.1
G.st.lower	f	-	-	-	-	1	-	1	1.0
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
<hr/>									
TOTAL	f	34	54	4	1	3	-	96	99.9
	%	35.4	56.3	4.2	1.0	3.1	-	100.0	

SITE: RON 10

TYPE OF SITE: Open Koppie

AREA SAMPLED: 150 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	5	-	-	-	-	-	5	17.9
	%	100.0	-	-	-	-	-	100.0	
Utilised	f	8	12	1	1	1	-	23	82.1
	%	34.8	52.2	4.3	4.3	4.3	-	99.9	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	13	12	1	1	1	-	28	100.0
	%	46.4	42.9	3.6	3.6	3.6	-	100.1	

SITE: KH 3

TYPE OF SITE: Open Koppie

AREA SAMPLED: 27 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	6	-	-	-	-	-	6	27.3
		%100.0	-	-	-	-	-	100.0	
Utilised	f	2	14	-	-	-	-	16	72.7
		% 12.5	87.5	-	-	-	-	100.0	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	8	14	-	-	-	-	22	100.0
		% 36.4	63.6	-	-	-	-	100.0	

SITE: WB 9

TYPE OF SITE: Open Koppie AREA SAMPLED: 2 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	% UTILISED
P.esquill.	f	3	-	-	-	-	-	3	9.7
		%100.0	-	-	-	-	-	100.0	
Utilised	f	3	25	-	-	-	-	28	90.3
		% 10.7	89.3	-	-	-	-	100.0	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	6	25	-	-	-	-	31	100.0
		% 19.4	80.6	-	-	-	-	100.0	

SITE: BRK 1

TYPE OF SITE: Open Koppie

AREA SAMPLED: 8 m²

<u>CLASS</u>		QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	UTILISED
P.esquill.	f	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-
Utilised	f	2	20	-	-	1	-	23	100.0
	%	8.7	87.0	-	-	4.3	-	100.0	
G.st.upper	f	-	-	-	-	-	-	-	-
G.st.lower	f	-	-	-	-	-	-	-	-
G.st.frag	f	-	-	-	-	-	-	-	-
Hammerst.	f	-	-	-	-	-	-	-	-
Anvil	f	-	-	-	-	-	-	-	-
TOTAL	f	2	20	-	-	1	-	23	100.0
	%	8.7	87.0	-	-	4.3	-	100.0	

APPENDIX 10

FREQUENCIES OF FORMAL TOOLS IN RAW MATERIAL CLASSES

SITE: 209/A

TYPE OF SITE: Deflation

AREA SAMPLED: 144 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	44	4	-	-	-	-	48	48.0
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	44	4	-	-	-	-	48	48.0
Backed blades	3	1	1	-	-	-	5	5.0
Backed points	-	-	-	-	-	-	-	-
Segments	10	-	-	-	-	-	10	10.0
Misc.backed	2	2	-	-	-	-	4	4.0
TOTAL BACKED	15	3	1	-	-	-	19	19.0
Drills	-	2	-	-	-	-	2	2.0
Adzes	-	5	-	-	-	-	5	5.0
M.R.P.	19	3	1	-	-	-	23	23.0
Unifac.point	-	1	-	-	-	-	1	1.0
Bored stone	-	-	-	-	2	-	2	2.0
TOTAL FORMAL f	78	18	2	-	2	-	100	100.0
%	78.0	18.0	2.0	-	2.0	-	100.0	

SITE: KK/K

TYPE OF SITE: Deflation

AREA SAMPLED: 180 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	26	54	-	-	1	-	81	35.4
Backed scraper	-	29	-	-	-	-	29	12.7
TOTAL SCRAPERS	26	83	-	-	1	-	110	48.0
Backed blades	-	23	1	-	-	-	24	10.5
Backed points	-	12	-	-	-	-	12	5.2
Segments	6	6	1	-	-	-	13	5.7
Misc.backed	2	21	-	-	-	-	23	10.0
TOTAL BACKED	8	62	2	-	-	-	72	31.4
Drills	-	9	1	-	-	-	10	4.4
Adzes	-	-	-	-	-	-	-	-
M.R.P.	7	28	1	-	-	1	37	16.2
TOTAL FORMAL f	41	182	4	-	1	1	229	100.1
%	17.9	79.5	1.8	-	0.4	0.4	100.0	

SITE: KK/I

TYPE OF SITE: Deflation

AREA SAMPLED: 180 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	45	114	5	-	1	-	165	46.5
Backed scraper	-	21	1	-	-	-	22	6.2
TOTAL SCRAPERS	45	135	6	-	1	-	187	52.7
Backed blades	2	24	2	-	-	-	28	7.9
Backed points	-	3	1	-	-	-	4	1.1
Segments	6	17	-	-	2	-	25	7.0
Misc. backed	6	27	1	-	-	-	34	9.6
TOTAL BACKED	14	71	4	-	2	-	91	25.6
Drills	-	4	-	-	-	-	4	1.1
Adzes	-	1	-	-	-	-	1	0.3
M.R.P.	22	47	2	-	1	-	72	20.3
TOTAL FORMAL	f 81	258	12	-	4	-	355	100.0
	% 22.8	72.7	3.4	-	1.1	-	100.0	

SITE: WDSP/C

TYPE OF SITE: Deflation

AREA SAMPLED: 189 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	1	5	-	-	-	-	6	54.6
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	1	5	-	-	-	-	6	54.6
Backed blades	-	1	-	-	-	-	1	9.1
Backed points	1	1	-	-	-	-	2	18.2
Segments	-	-	-	-	-	-	-	-
Misc.backed	1	-	-	-	-	-	1	9.1
TOTAL BACKED	2	2	-	-	-	-	4	36.4
Drills	-	-	-	-	-	-	-	-
Adzes	-	-	-	-	-	-	-	-
M.R.P.	1	-	-	-	-	-	1	9.1
TOTAL FORMAL	f 4	7	-	-	-	-	11	100.1
	% 36.4	63.6	-	-	-	-	100.0	

SITE: PTH/6

TYPE OF SITE: Deflation

AREA SAMPLED: 72 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	<u>TOTAL</u>	
							f	%
Convex scraper	7	13	1	-	-	-	21	42.0
Backed scraper	-	3	-	-	-	-	3	6.0
TOTAL SCRAPERS	7	16	1	-	-	-	24	48.0
Backed blades	1	7	-	-	-	-	8	16.0
Backed points	-	1	-	-	-	-	1	2.0
Segments	3	-	1	-	-	-	4	8.0
Misc. backed	-	2	-	-	-	-	2	4.0
TOTAL BACKED	4	10	1	-	-	-	15	30.0
Drills	-	-	-	-	-	-	-	-
Adzes	-	6	-	-	-	-	6	12.0
M.R.P.	-	4	-	-	-	-	4	8.0
Bored stone	-	-	-	-	1	-	1	2.0
TOTAL FORMAL	f 11	36	2	-	1	-	50	100.0
	% 22.0	72.0	4.0	-	2.0	-	100.0	

SITE: GB 26

TYPE OF SITE: Deflation

AREA SAMPLED: 108 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	14	34	2	-	-	-	50	51.0
Backed scraper	-	2	-	-	-	-	2	2.0
TOTAL SCRAPERS	14	36	2	-	-	-	52	53.1
Backed blades	1	10	1	-	-	-	12	12.3
Backed points	-	1	-	-	-	-	1	1.0
Segments	2	-	-	-	-	-	2	2.0
Misc.backed	2	2	-	-	-	-	4	4.1
TOTAL BACKED	5	13	1	-	-	-	19	19.4
Drills	-	-	-	-	-	-	-	-
Adzes	-	7	1	-	-	-	8	8.2
M.R.P.	5	12	-	-	1	1	19	19.4
TOTAL FORMAL f	24	68	4	-	1	1	98	100.0
%	24.5	69.4	4.1	-	1.0	1.0	100.0	

SITE: KFN/6

TYPE OF SITE: Deflation

AREA SAMPLED: 198 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	117	70	19	1	1	-	208	48.5
Backed scraper	4	19	3	-	-	-	26	6.1
TOTAL SCRAPERS	121	89	22	1	1	-	234	54.6
Backed blades	10	22	1	-	-	-	33	7.7
Backed points	1	11	-	-	-	-	12	2.8
Segments	7	3	1	-	-	-	11	2.6
Misc.backed	11	19	1	1	-	-	32	7.5
TOTAL BACKED	29	55	3	1	-	-	88	20.5
Drills	-	5	2	-	-	-	7	1.6
Adzes	1	43	4	-	-	-	48	11.2
M.R.P.	26	26	-	-	-	-	52	12.1
TOTAL FORMAL	f 177	218	31	2	1	-	429	100.1
	% 41.3	50.8	7.2	0.5	0.2	-	100.0	

SITE: HK/2

TYPE OF SITE: Deflation

AREA SAMPLED: 36 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	35	6	-	-	-	-	41	55.4
Backed scraper	1	-	-	-	-	-	1	1.4
TOTAL SCRAPERS	36	6	-	-	-	-	42	56.8
Backed blades	-	2	-	-	-	-	2	2.7
Backed points	1	-	-	-	-	-	1	1.4
Segments	-	-	-	-	-	-	-	-
Misc.backed	2	-	-	-	-	-	2	2.7
TOTAL BACKED	3	2	-	-	-	-	5	6.8
Drills	-	-	-	-	-	-	-	-
Adzes	-	12	2	-	-	-	14	18.9
M.R.P.	6	7	-	-	-	-	13	17.6
TOTAL FORMAL f	45	27	2	-	-	-	74	100.1
%	60.8	36.5	2.7	-	-	-	100.0	

SITE: LV/3

TYPE OF SITE: Talus

AREA SAMPLED: 66 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	4	16	-	1	-	-	21	36.8
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	4	16	-	1	-	-	21	36.8
Backed blades	-	2	-	-	-	-	2	3.5
Backed points	-	3	-	-	-	-	3	5.3
Segments	1	2	-	-	-	-	3	5.3
Misc.backed	1	-	-	-	-	-	1	1.8
TOTAL BACKED	2	7	-	-	-	-	9	15.8
Drills	-	-	-	-	-	-	-	-
Adzes	-	16	2	2	-	-	20	35.1
M.R.P.	2	5	-	-	-	-	7	12.3
TOTAL FORMAL	f 8	44	2	3	-	-	57	100.1
	% 14.0	77.2	3.5	5.3	-	-	100.0	

SITE: AND/6

TYPE OF SITE: Talus

AREA SAMPLED: 40 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	6	17	-	1	-	-	24	53.3
Backed scraper	-	2	-	-	-	-	2	4.4
TOTAL SCRAPERS	6	19	-	1	-	-	26	57.8
Backed blades	-	-	-	-	-	-	-	-
Backed points	-	-	-	-	-	-	-	-
Segments	-	-	-	-	-	-	-	-
Misc.backed	-	1	-	-	-	-	1	2.2
TOTAL BACKED	-	1	-	-	-	-	1	2.2
Drills	-	-	-	-	-	-	-	-
Adzes	-	6	-	3	-	-	9	20.0
M.R.P.	2	4	1	-	1	-	8	17.8
Unifac.point	-	1	-	-	-	-	1	2.2
TOTAL FORMAL f	8	31	1	4	1	-	45	99.9
%	17.8	68.9	2.2	8.9	2.2	-	100.0	

SITE: RON/15

TYPE OF SITE: Talus

AREA SAMPLED: 77 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	10	6	1	-	-	-	17	36.2
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	10	6	1	-	-	-	17	36.2
Backed blades	-	1	-	-	-	-	1	2.1
Backed points	-	-	-	-	-	-	-	-
Segments	2	-	-	-	-	-	2	4.3
Misc. backed	2	-	-	-	-	-	2	4.3
TOTAL BACKED	4	1	-	-	-	-	5	10.6
Drills	-	-	-	-	-	-	-	-
Adzes	-	19	1	1	-	-	21	44.7
M.R.P.	2	2	-	-	-	-	4	8.5
TOTAL FORMAL f	16	28	2	1	-	-	47	100.1
%	34.0	59.6	4.3	2.1	-	-	100.0	

SITE: LB/5

TYPE OF SITE: Talus

AREA SAMPLED: 66 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN. SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	3	7	-	-	-	-	10	33.3
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	3	7	-	-	-	-	10	33.3
Backed blades	-	2	-	-	-	-	2	6.7
Backed points	-	-	-	-	-	-	-	-
Segments	-	-	-	-	-	-	-	-
Misc. backed	-	-	-	-	-	-	-	-
TOTAL BACKED	-	2	-	-	-	-	2	6.7
Drills	-	-	-	-	-	-	-	-
Adzes	-	9	1	2	-	-	12	40.0
M.R.P.	3	3	-	-	-	-	6	20.0
TOTAL FORMAL f	6	21	1	2	-	-	30	100.0
	% 20.0	70.0	3.3	6.7	-	-	100.0	

SITE: KH/1

TYPE OF SITE: Talus

AREA SAMPLED: 55 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	3	12	1	1	-	-	17	73.9
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	3	12	1	1	-	-	17	73.9
Backed blades	-	-	-	-	-	-	-	-
Backed points	-	1	-	-	-	-	1	4.4
Segments	-	-	-	-	-	-	-	-
Misc.backed	-	-	-	-	-	-	-	-
TOTAL BACKED	-	1	-	-	-	-	1	4.4
Drills	-	-	-	1	-	-	1	4.4
Adzes	-	1	1	-	1	-	3	13.0
M.R.P.	-	1	-	-	-	-	1	4.4
TOTAL FORMAL f	3	15	2	2	1	-	23	100.1
	% 13.0	65.2	8.7	8.7	4.4	-	100.0	

SITE: UK/7

TYPE OF SITE: Talus

AREA SAMPLED: 84 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	8	29	-	-	-	-	37	44.1
Backed scraper	-	1	-	-	-	-	1	1.2
TOTAL SCRAPERS	8	30	-	-	-	-	38	45.2
Backed blades	-	-	-	-	-	-	-	-
Backed points	-	1	-	-	-	-	1	1.2
Segments	-	-	-	-	-	-	-	-
Misc. backed	3	-	-	-	-	-	3	3.6
TOTAL BACKED	3	1	-	-	-	-	4	4.8
Drills	-	-	-	-	-	-	-	-
Adzes	-	31	2	-	-	-	33	39.3
M.R.P.	3	3	1	1	-	1	9	10.7
TOTAL FORMAL f	14	65	3	1	-	1	84	100.1
	% 16.7	77.4	3.6	1.2	-	1.2	100.1	

SITE: KH/3

TYPE OF SITE: Open Koppie

AREA SAMPLED: 27 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	-	9	-	-	-	-	9	64.3
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	-	9	-	-	-	-	9	64.3
Backed blades	-	-	1	-	-	-	1	7.1
Backed points	-	-	-	-	-	-	-	-
Segments	-	-	-	-	-	-	-	-
Misc.Backed	-	-	-	-	-	-	-	-
TOTAL BACKED	-	-	1	-	-	-	1	7.1
Drills	-	-	-	-	-	-	-	-
Adzes	-	-	-	-	-	-	-	-
M.R.P.	1	3	-	-	-	-	4	28.6
TOTAL FORMAL f	1	12	1	-	-	-	14	100.0
%	7.1	85.7	7.1	-	-	-	99.9	

SITE RON/10

TYPE OF SITE: Open Koppie AREA SAMPLED: 150 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	6	3	-	-	-	-	9	47.4
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	6	3	-	-	-	-	9	47.4
Backed blades	-	-	-	-	-	-	-	-
Backed points	-	-	-	-	-	-	-	-
Segments	-	-	-	-	-	-	-	-
Misc. backed	-	1	-	-	-	-	1	5.3
TOTAL BACKED	-	1	-	-	-	-	1	5.3
Drills	-	-	-	-	-	-	-	-
Adzes	-	4	-	1	-	-	5	26.3
M.R.P.	-	3	-	-	-	-	3	15.8
Unifac.point	-	1	-	-	-	-	1	5.3
TOTAL FORMAL f	6	12	-	1	-	-	19	100.1
%	31.6	63.2	-	5.3	-	-	100.1	

SITE: WB/9

TYPE OF SITE: Open Koppie

AREA SAMPLED: 2 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	1	4	-	-	-	-	5	22.7
Backed scraper	-	-	-	-	-	-	-	-
TOTAL SCRAPERS	1	4	-	-	-	-	5	22.7
Backed blades	-	1	-	-	-	-	1	4.6
Backed points	-	-	-	-	-	-	-	-
Segments	-	6	-	-	-	-	6	27.3
Misc.backed	-	-	-	-	-	-	-	-
TOTAL BACKED	-	7	-	-	-	-	7	31.8
Drills	-	-	-	-	-	-	-	-
Adzes	-	-	-	-	-	-	-	-
M.R.P.	-	8	-	-	1	-	9	40.9
Unifac.point	-	1	-	-	-	-	1	4.6
TOTAL FORMAL f	1	20	-	-	1	-	22	100.1
%	4.6	90.9	-	-	4.6	-	100.1	

SITE: BRK/1

TYPE OF SITE: Open Koppie

AREA SAMPLED: 8 m²

<u>CLASS</u>	QTZ	SILC	CCS	IN.SH.	QTZITE	OTHER	TOTAL	
							f	%
Convex scraper	2	8	-	-	-	-	10	41.7
Backed scraper	-	1	-	-	-	-	1	4.2
TOTAL SCRAPERS	2	9	-	-	-	-	11	45.8
Backed blades	-	-	-	-	-	-	-	-
Backed points	-	-	-	-	-	-	-	-
Segments	-	-	-	-	-	-	-	-
Misc.backed	-	1	-	-	-	-	1	4.2
TOTAL BACKED	-	1	-	-	-	-	1	4.2
Drills	-	-	-	-	-	-	-	-
Adzes	-	10	-	1	-	-	11	45.8
M.R.P.	-	1	-	-	-	-	1	4.2
TOTAL FORMAL	f 2	21	-	1	-	-	24	100.1
	% 8.3	87.5	-	4.2	-	-	100.0	