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LATER STONE AGE OPEN-AIR SITES ON BLOUBOS, NORTHERN CAPE

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ABSTRACT

A large Later Stone Age open-air, surface site north of Upington was sampled to investigate what evidence such sites can provide about the original occupants. The analysis suggests that it was intermittently frequented over an extended period by groups of herders who usually lived along the Orange River and who exploited the local resources when surface water was available after rains. The results emphasize the potential value of such open-air sites for documenting subsistence strategies in the wider southern Kalahari desert.

INTRODUCTION

The archaeological value of surface assemblages has long been underestimated by workers in the field, and mainly restricted to their use in locating stratified, subsurface sites. The potential and expanding role of surface assemblages has, however, been emphasized by Lewarch and O'Brien (1981). Formation process research has proven that few artefacts, whether they are retrieved from the surface or subsurface, are found *in situ*. Neither surface scatters nor deposits are strictly speaking "'fossilized' records of the past", since all material remains "enter the archaeological context as surficial exposures" (Lewarch & O'Brien 1981:312).

Sporadic mention of surface scatters on sand dunes in the vicinity of Upington in the Northern Cape has been made in the past (Rudner 1953; Rudner & Rudner 1959; Clark 1959; Sampson 1972; 1974). Sampson (1972:262) made specific mention of surface scatters in Namibia, Botswana and around Upington containing high proportions of backed blades, endscrapers and segments with associated pottery. Clark (1959) recorded similar stone tool types and grouped them under the SWA or Kalahari Wilton variant. In 1959 I. and J. Rudner referred to thin-walled Khoisan pottery found at sites near Upington. More recently Smith (1995:265) commented on the emerging importance of surface sites and recommended the survey and collection of surface scatters in the area, as was done by Sampson in the Seacow River valley. He also briefly discusses a number of sites in the area, such as Droëgrond (Smith 1995).

In early historical times the riverine area was a hunter-herder contact zone (Penn 1995). Both Beaumont (Beaumont *et al.* 1995) and Smith (1995) differentiate between hunter and herder sites in the Northern Cape. A closer investigation of surface scatters may, therefore, contribute to our understanding of the subsistence strategies of these hunters and herders in the region and ultimately reveal their utilisation of the resources of the landscape. The surface site BB5 was chosen as focus for a project concerned with the distintion between the two types of sites.

THE SITES

As shown in Figure 1, the farm Bloubos is located between the Orange and the Kuruman Rivers. To the west the area is bound by the derelict southward stretch of the Molopo River, and to the east by the Langeberg and Korannaberg. The farm lies within 100 km north-north-west of Upington in the southernmost part of the Kalahari desert. North of the Orange River there are no permanent water sources, but after local showers the numerous pans in the landscape may carry water for a while.

Site Bloubos 5

Bloubos site BB5 (28.08S 20.48E), is a surface scatter lying on the lower slope of a linear dune adjacent to a sizeable pan. The surface scatter that consists of a substantial number of utilised stone artefacts, formal tools, grinding tools, cores and waste material, was chosen because of its size and its apparent undisturbed nature. A grid consisting of ninety six 5 x 5 m squares was placed over the scatter and all the archaeological material from eighteen randomly chosen blocks was collected for typological and metric analysis.

Site Bloubos 7

Bloubos site BB7 (28.04S 20.51E) lies some 10 km from BB5 on the northern portion of the farm in quite a

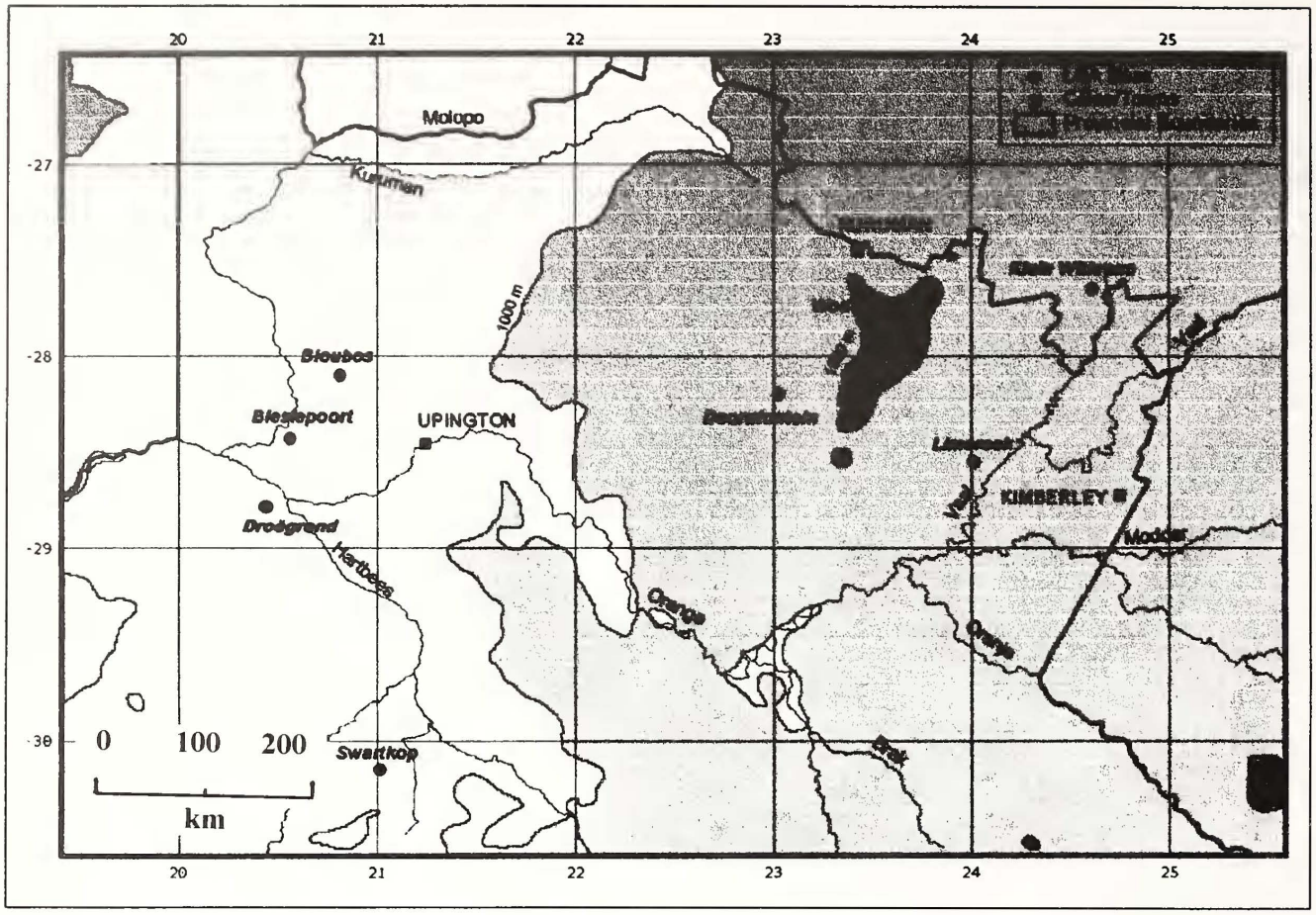

Fig. 1. Topographic map of the study area indicating the locations of Bloubos, Biesiepoort 2 and Swartkop 1. Other contemporaneous sites are also indicated (southern latitudes, eastern longitudes).

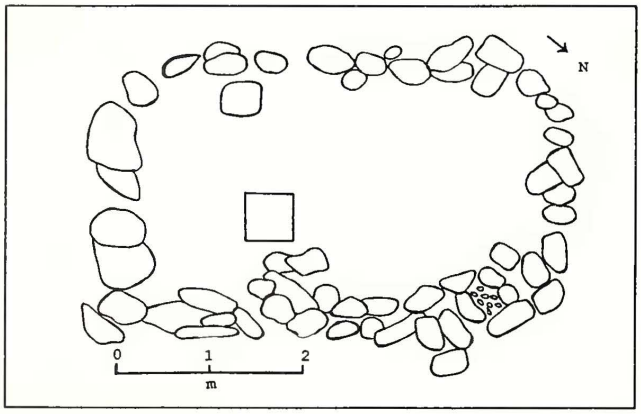

Fig. 2. Survey plan of site BB7. The position of the 0,5 m x 0,5 m test pit is indicated within the stone circle.

different environmental setting. The surface is rocky without a sand dune or pan nearby. The site, situated among boulders, comprises a definite stone circle enclosing a sandy accumulation (Fig. 2). BB7 was excavated primarily to determine how far its artefacts differ from those found at BB5 by means of typological and metric comparison. Since the intention was not the large-scale accumulation of material, only a 0,5 x 0,5 m test pit was excavated at a randomly chosen position within the circle. It was excavated in 50 mm spits down to 350 mm and in 100 mm spits down to 750 mm depth. The compaction of the reddish grey coloured deposit was medium to loose. Spits 1 to 6 were ashy whereas the surface and lower spits were of a more sandy nature. No clear stratigraphy was discerned. Utilised stone artefacts, formal stone tools, cores, waste material, decorated and undecorated ostrich eggshell (OES) fragments, OES beads, bone fragments and some ceramic and charcoal fragments were found, but there were no manuports or anvil or grinding stones.

RADIOCARBON DATES

Radiocarbon dating was performed by J.C. Vogel on OES samples from the Bloubos sites. As previously indicated by Horowitz *et al.* (1978), such OES dates need considerable adjustment. A recent evaluation of the radiocarbon ages produced on OES has revealed that the reason for this is twofold (Vogel *et al.* in press). Firstly, ostrich eggshell tends to survive for long periods in the environment and can easily be incorporated into later deposits in the same way as pebbles are. Shell from an excavated level or from a surface scatter can thus be a mixture of fragments of different ages. The result is that a date is obtained that is older than the actual age of the stone assemblage that is to be dated. Secondly, it was found that ostriches incorporate 'dead' carbonate into the shell, causing the radiocarbon age to appear, on average, 180 years too old. Dates produced with this material must therefore be adjusted by the subtraction of

180 years. The uncertainty coupled with this effect also increases the error of the dating.

Since all the Bloubos dates were obtained from OES fragments, they have to be corrected for the 180 year offset. The Pretoria Calibration Program (Talma & Vogel 1993) was used to convert the 180-year corrected dates to the historical time-scale. The data used in the present version of the program is the recently revised results for the northern hemisphere as published by Stuiver *et al.* (1998), but adjusted to account for the southern hemisphere offset and to best match the Pretoria equipment (Vogel 2000:52). The calibrated dates for the Bloubos sites are as follows:

Analysis	Site	Apparent age	Calibrated date
Pta-7381	BB5, surface	1810 ± 45 BP	Ad 416(438)536
Pta-7730	BB7, spit 2	340 ± 50 BP	>AD 1676
Pta-7755	BB7, spit6	2370 ± 45 BP	345-313, 210(186)146 BC

The Bloubos sites were obviously intermittently occupied over a considerable period of time which ended before the European influx since no artefacts of European origin were retrieved from either BB5 or BB7.

TYPOLOGICAL ANALYSIS OF ARTEFACTS

The classification scheme for artefacts used in this study consists of five classes namely flakes, cores, formal tools, manuports and waste material. The flake class is divided into complete and broken flakes, with the former subclassed into blades, points, and irregular flakes. Blades are those flakes with a length of at least twice the breadth and with parallel sides. However, a flake with a length twice that of the breadth, but with a thickness equalling the breadth, is not classed as a blade. Broken flakes are blade flakes with either the proximal or distal end, or both ends, snapped off. Utilised flakes are those with damage visible to the naked eye along the working edge of the artefact. Unutilised flakes are classed as waste material.

Artefacts belonging to the core class have three or more negative flaking scars as defined by Deacon (1984a:371). Cores are subdivided into irregular cores and blade cores, the latter either being conical or flat.

The formal tool class includes lithic artefacts with secondary retouch. This class is subdivided into scrapers, segments, backed blades and points. The scraper class is subdivided into sidescrapers, endscrapers, side- and endscrapers, double side- or endscrapers, round scrapers and concave scrapers. No distinction was made between scrapers and adzes in this study. Adzes have been defined as being made on flakes or pebbles, having one or more straight or concave working edge, and as generally being larger than scrapers (Deacon 1984a:391). They are also said to be similar to hafted Australian woodworking tools (Clark 1959:233-234). Clark (1959:201) however, does not distinguish between the functions of scrapers and adzes. It furthermore seems that the shape of adzes is dependent on the extent of use, and may "vary significantly" (Humphreys & Thackeray 1983:304).

Manuports refer to unutilised material brought to a site for tool manufacture. Waste material refers to the unretouched and unutilised byproducts which result from tool manufacture (Deacon 1984a:370). Other lithic remains include upper grinding stones, hammer stones and anvil stones. In other words, all unflaked, utilised lithics.

BB5 artefacts

A complete list of the artefacts retrieved from BB5 is given in the lithic inventory in Table 1 and a selection of formal stone tool types are illustrated in Figure 3. In total 10878 lithic pieces were collected from BB5. 51% of this total is classified as utilised stone artefacts (cores included), 38% as waste material, and 11% as manuports. The amount of waste material present at BB5 is small (Deacon & Deacon 1999:112-113). For the purpose of this study, only utilised and retouched stone artefacts and cores were taken into account to determine relative frequencies. Figure 4 provides a breakdown of these classes from, among others, the Bloubos sites. As indicated in Figure 4, the majority of utilised flakes in the assemblage are irregular although blade flakes are well represented. An interesting feature of the broken flakes is that the distal ends are more numerous than either the proximal or medial parts. One would expect a roughly equal number of proximal and distal sections and somewhat less medial pieces. It is noteworthy that 154 (65,8%) of BB5 scrapers were manufactured on the proximal ends of broken flakes. This figure accounts for the deficiency of proximal ends of flakes and it is thus postulated that broken flakes with bulbs of percussion were selected for the manufacture of scrapers.

In total the utilised artefacts which include irregular flakes, blade flakes and broken flakes represent the largest portion of the artefact assemblage by far (85,1%). Irregular cores are more numerous than blade cores (Fig. 5). This occurrence correlates with the proportion of irregular to blade flakes.

The 332 formal tools from BB5 represent a substantial 6,0% of the stone tool assemblage. As shown in Figure 6, the class is dominated by scrapers although all the other subclasses are represented. The majority of scrapers are endscrapers which represent some 50% of the formal tool class. The scrapers differ from one another with regard to angle of retouch.

Backed blades represent 25% of the formal assemblage while only two points were found. These points had clear retouch on converging sides. Blades that end in a point but have mainly parallel sides and/or lack of

Table 1. Inventory of stone artefacts from site BB5.

SQUARE	D2	E6	F3	F4	H2	H3	H4	H5	H6	I1	I2	I3	I4	I5	I6	J1	J4	J6	BB5	FREQUENCY	
ARTEFACT TYPE																				%	%
UTILISED FLAKES	27	219	177	185	634	469	353	332	145	141	371	355	355	246	118	20	267	314	4728		85.1
COMPLETE FLAKES	23	178	149	163	569	346	287	262	110	120	302	270	293	211	112	15	213	252	3875	69.8	
Irregulars	21	110	107	112	372	250	208	178	85	86	208	187	220	178	95	9	168	184	2778	50.0	
Blades	2	68	42	51	197	96	79	84	25	34	94	83	73	33	17	6	45	68	1097	19.7	
BROKEN FLAKES	4	41	28	22	65	123	66	70	35	21	69	85	62	35	6	5	54	62	853	15.4	
Proximal	3	20	8	8	22	27	9	20	9	5	5	16	15	7	2	2	10	16	204	3.7	
Medial		12	6	8	16	10	12	17	6	7	26	20	17	9	1	3	14	18	202	3.6	
Distal	1	9	14	6	27	86	45	33	20	9	38	49	30	19	3		30	28	447	8.0	
FORMAL TOOLS	1	14	11	26	46	45	30	23	7	2	20	23	29	8	3	5	14	25	332		6.0
SCRAPERS	1	9	6	15	36	29	25	22	6	2	15	11	24	8	3	3	9	10	234	4.2	
Endscrapers			2	1	24	25	25	22	4	2	12	9	18	5	2		6	8	165	3.0	
Side- and endscrapers		9	4	8	3				2							2			28	0.5	
Sidescrapers					9	3					3		6	3					24	0.4	
Dbl sidescrapers												1			1		2	1	5	0.1	
Dbl endscrapers						1						1							2	0.0	
Round scrapers				4												1	1	1	7	0.1	
Concave scrapers	1			2															3	0.1	
BACKED PIECES		5	5	11	10	16	5	1	1		5	12	5			2	5	15	98	1.8	
Backed blades		5	5	9	9	15	5		1		3	8	5			1	4	13	83	1.5	
Segments				2	1	1					2	4					1	2	13	0.2	
Points								1								1			2	0.0	
CORES	3	9	10	15	41	57	43	57	16	14	20	27	44	30	29	2	28	34	479		8.6
Irregular cores	2	9	8	14	34	42	40	55	16	13	14	21	39	22	26	2	26	26	409	7.4	
Blade cores	1		2	1	7	15	3	2		1	6	6	5	8	3		2	8	70	1.3	
OTHER	1	1		3	1	2		2		1	1	1	1					2	16		0.3
Hammer stones		1			1													1	3	0.1	
Upper grinding stones	1			3		2					1		1					1	9	0.2	
Anvil stones								2		1		1							4	0.1	
TOTAL	32	243	198	229	722	573	426	414	168	158	412	406	429	284	150	27	309	375	5555		100
WASTE MATERIAL			37		309	277	410	474	132	135	513	484	404	244	84		282	306	4091		
MANUPORTS			38		211	115	75	117	75	46	80	103	153	55	24		82	58	1232		
GRAND TOTAL	32	243	273	229	1242	965	911	1005	375	339	1005	993	986	583	258	27	673	739	10878		

Table 2. Inventory of stone artefacts from site BB7.

SPIT	1 to 5	6 to 11	BB7	FREQUENCY	
ARTEFACT TYPE				%	%
UTILISED FLAKES	292	162	454		94.0
COMPLRTE FLAKES	210	129	339	70.2	
Irregulars	155	87	242	50.1	
Blades	55	42	97	20.1	
BROKEN FLAKES	82	33	115	23.8	
Proximal	32	9	41	8.5	
Medial	17	11	28	5.8	
Distal	33	13	46	9.5	*
FORMAL TOOLS	8	5	13		2.7
SCRAPERS	3		3	0.6	
Side and endscrapers	1		1	0.2	
Sidescrapers	2		2	0.4	
BACKED PIECES	5	5	10	2.1	
Backed blades	4	3	7	1.4	
Segments		2	2	0.4	
Points	1		1	0.2	*
CORES	13	3	16		3.3
Irregular cores	13	2	15	3.1	
Blade cores		1	1	0.2	*
TOTAL	313	170	483		100
WASTE MATERIAL	125	57	182		
GRAND TOTAL	438	227	665		

retouch on both sides were not classed as points. The backing on blades may sometimes end near the middle of the flake. The extremely delicate and finely made segments from BB5 represent 3,9% of the formal tool assemblage.

Other stone tools found at BB5 include anvil stones, hammer stones and upper and lower grinding stones. The four anvil stones have indentations on one or both sides indicating utilisation. Only three hammer stones were recorded. These stones fit easily into the hand and have utilisation damage on one or both ends. The presence of hammer and anvil stones along with waste material and manuports indicates that stone tools were manufactured on the site. Upper and lower grinding stones point to food preparation on site BB5.

Only a small ceramic sample, possibly the result of casual collection in the past, was retrieved from BB5. Fragments of thickened bases, lugs and decorated rim sherds, now unfortunately out of context, have in the past been collected on Bloubos. The twelve potsherds from the site have a light reddish brown colour, fine texture and grit temper. All the sherds are slightly burnt. These sherds do not seem to belong to a single vessel. Their average thickness of 5,6 mm and general appearance place them in the range of Khoi pottery (Rudner 1979; Beaumont, Smith & Vogel 1995:255).

BB7 artefacts

An inventory of the artefacts recovered from BB7 is given in Table 2 and examples of formal stone tools illustrated in Figure 3. The artefacts from the different spits are homogeneous and are for that reason discussed as a single unit. Interestingly, the test pit produced a

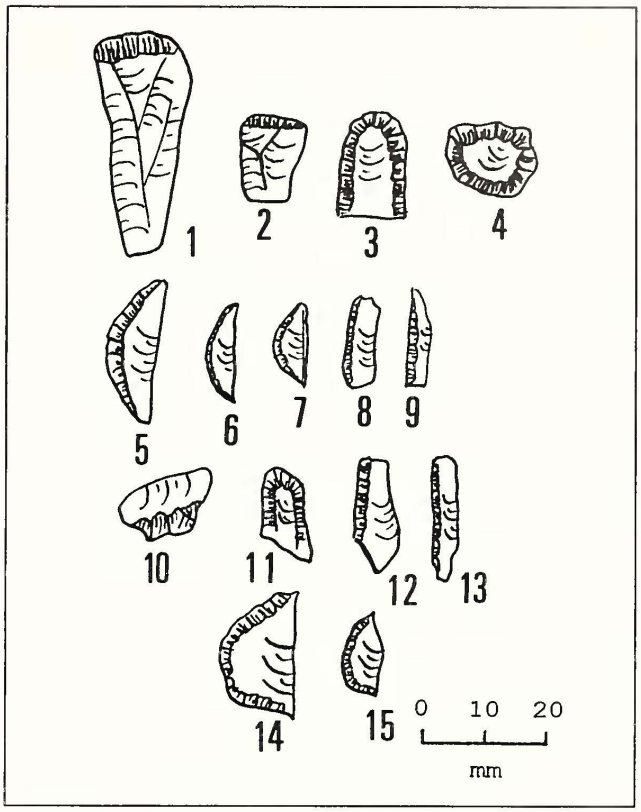

Fig. 3. Selected formal stone tool types from BB5 and BB7. 1-4: scrapers (BB5); 5-7: segments (BB5); 8-9: backed blades (BB5); 10-11: scrapers (BB7); 12-13: backed blades (BB7); 14-15: segments (BB7).

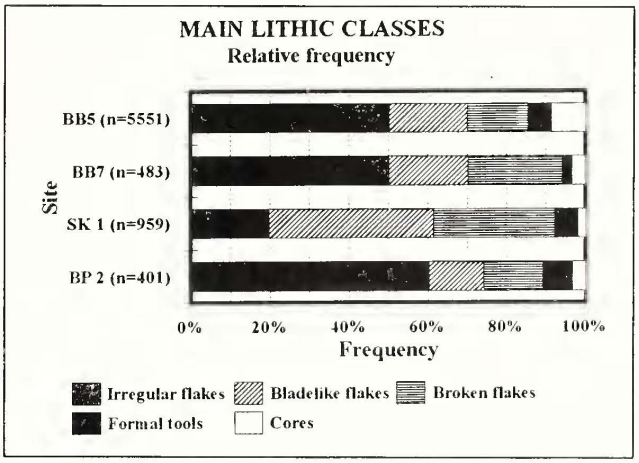

Fig. 4. Relative frequencies of the main lithic classes of sites BB5, BB7, Biesiepoort 2 (BP2) and Swartkop 1 (SK1) show little difference between the samples with the exception of the large number of bladelike flakes retrieved from Swartkop.

lower percentage of waste material than BB5 (27% compared to 38%), and no manuports.

The distribution of the 483 utilised artefacts between and within the main artefact classes is compared with the values for BB5 and other relevant sites in Figures 4 to 6. The frequencies of the irregular and blade flakes are virtually identical to those of BB5, while there are

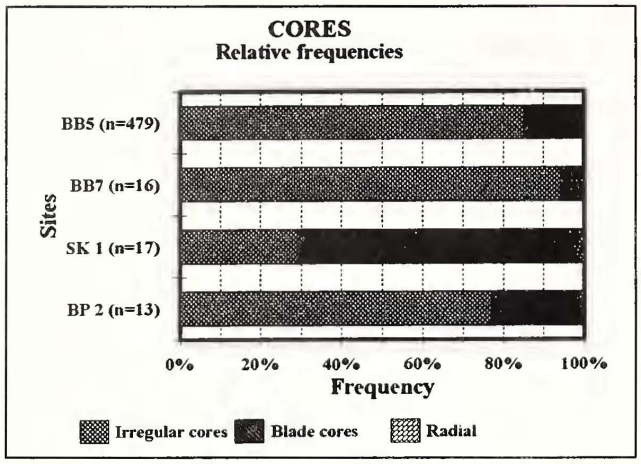

Fig. 5. Relative frequencies of the core classes of sites BB5, BB7, Biesiepoort 2 (BP2) and Swartkop 1 (SK1). The number of blade cores in the Swartkop sample corresponds to the large dicated in Fig.5.

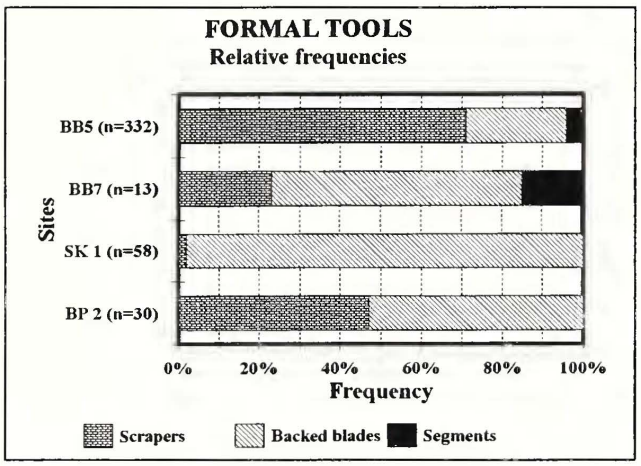

Fig. 6. Relative frequencies of the formal tool classes of sites BB5, BB7, Biesiepoort 2 (BP2) and Swartkop 1 (SK1). The breakdown of the formal component of BB7 shows that the same tool types as at BB5 are present. The Swartkop sample clearly belongs to a different industry while Biesiepoort is more similar to BB5 in terms of the division between scrapers and backed pieces.

relatively more broken flakes and less formal tools (only three scrapers) and cores. Furthermore, there is an almost equal number of proximal and distal ends in the broken flake class.

The small number of formal tools (thirteen) from BB7 makes any comparison of the frequencies within this category with BB5 meaningless. It suffices to mention that all three retouched types, scrapers, backed blades and segments, are present. Spits 8 to 11 contained no formal tools.

Several potsherds were recovered from BB7. Fourteen sherds picked up from the surface probably belonged to a single vessel since they all possess a similar rough texture, reddish brown colour and thickness, and are all slightly burnt. Spits1 to 5 contained nine potsherds. These differ somewhat in colour but they all have grit temper and a fine texture. A single rim sherd was found. No potsherds were excavated from spits 6 to 11. Since spit 6 (dated to 2370 ± 45) predates or coincides with the advent of pottery in the Northern Cape, this is to be expected (Beaumont & Vogel 1984: 91). The average thickness of the sherds retrieved from BB7 is 6 mm while the potsherds collected from the surface have an average thickness of 10,4 mm. Based on average thickness, the thicker sherds probably represent ceramics of more recent origin, while the excavated thinner ones clearly belong to the Khoi ceramic tradition (Rudner 1979; Deacon 1984b:273-274).

Three ostrich eggshell beads were found in spits 3 and 6 while four decorated OES fragments came from spits 2 and 4. The fragments are decorated with diagonal and cross-hatched incisions.

There are some differences in artefact frequency between sites BB5 and BB7. BB7 is characterised by relatively less cores and waste material than BB5. Furthermore, no manuports, anvil or hammer stones were retrieved from BB7. Since the two sites evidently belong to the same industry, this may be due to sampling error, but it may also be attributed to differing site functions. As the BB5 sample includes several anvil, hammer and grinding stones as well as cores and waste material, it is possible that this was a manufacturing site. On the other hand, the stone circle at BB7 may be interpreted as a habitation site.

METRIC ANALYSIS OF ARTEFACTS

Two different methods for measuring artefacts were used in this study. Firstly, artefacts were directly sorted into a set of shape and size classes and then the lengths and breadths of each individual artefact was measured and the means calculated so that the two techniques could be compared. The length was taken as the longest measurement from the striking platform to the opposite end of the stone artefact. Breadth was taken as the longest measurement at right angles to this. When no striking platform or bulb of percussion was visible, the longest dimension of the flake was taken as the length. Using a logarithmic scale, the size classes as defined by Vogel (unpublished) are: *lxb*: class 0,5 (<50 mm²), class 1 (50-100 mm²), class 2 (100-200 mm²), class 4 (200-400 mm²), class 8 (400-800 mm²), class 16 (800-600 mm²), *etc*. For the length/breadth ratios the appropriate logarithmic subdivision is taken as: *l/b*: class A (1-1.4), class B (1.4-2), class C (2-2.8), class D (2.8-4), *etc*. The dimensions of the classes are chosen to be just clearly distinguishable from each other.

The term 'microlithic' is used to describe stone tools which measure less than 200 mm² with a 'microlithic index' defined as the percentage of artefacts measuring less than that. Similarly, the 'blade index' is defined as the percentage of stone tools with a length greater than twice the breadth, *i.e. l/b* >2.

BB5 artefacts

As may be seen in Table 3, the stone artefacts from BB5 have a wide range of sizes and shapes. Using the

Table 3. Size and shape of the stone artifacts from site BB5.

SIZE mm²/100	Irregular flakes	Blade flakes	Broken flakes	Scrapers	Backed blades	Segments	Irregular cores	Blade cores	Total	Frequency %
0.5	59	76	67	5	13	0	0	0	220	4.0
1	249	186	245	12	29	9	0	0	730	13.2
2	490	266	316	74	29	3	0	2	1180	21.3
4	646	322	186	94	14	1	13	7	1283	23.1
8	581	172	35	33	0	0	65	29	915	16.5
16	424	50	3	7	0	0	97	17	598	10.8
32	252	21	1	5	0	0	131	8	418	7.5
64	86	4	0	4	0	0	81	6	181	3.3
128	2	0	0	0	0	0	17	0	19	0.3
256	1	0	0	0	0	0	5	1	7	0.1
Total	**2790***	**1097**	**853**	**234**	**85****	**13**	409	70	5551	100
SHAPE										
A	401	0	133	23	0	1	46	8	612	11.0
B	2389	0	417	119	8	1	357	58	3349	60.2
C	0	732	220	61	25	5	6	3	1052	19.1
D	0	294	72	23	33	5	0	1	428	7.7
E	0	66	11	6	12	1	0	0	96	1.7
F	0	5	0	2	7	0	0	0	14	0.3
Total	2790	1097	853	234	85	13	409	70	5551	100

* Hammer and upper grinding stones included in total ** Points included in total

Vogel scale, the stone artefacts vary from being <50 mm² to 25600 mm² in size. Overall, however, the majority of artefacts fall in the 200 and 400 mm² size range. Formal tools show a more limited distribution on the scale than the irregular flakes, blade flakes and cores. For obvious reasons the broken flakes tend to be more microlithic, with an index of 56,9% as compared to 38,5% at BB5. This is partly due to the smaller proportion of cores and the larger proportion of broken flakes, but the blade flakes are, on average, also slightly smaller.

The distribution in the shape classes is similar to that at BB5 with 53% of the artefacts falling into class B, *i.e.* with a *l/b* ratio between 1.4 to 2. Since there are only thirteen formal tools, statistical comparison with BB5 is not meaningful. It is however noted that only one formal tool does not fall into the microlithic category. The majority of the artefacts from both BB5 and BB7 were manufactured from chalcedony, chert, jasper, quartzite and quartz. The chalcedony and chert nodules probably originated from the Orange River (Smith 1995:292; Beaumont pers. Comm.). There are no obvious differences between the sizes of artefacts manufactured from different stone types except that the microlithic formal tools tend to be made from fine-grained material.

GRID BLOCK COMPARISONS

Based on typological and metric comparisons, BB5 and BB7 obviously represent the remains of groups with the same stone tool tradition and span approximately the same time period. It is therefore concluded that they belong to the same LSA industry. However, the relevance of this comparison relies on an analysis that was conducted in order to determine the homogeneity of the Bloubos sample. Figure. 8 shows the lithic composition of the individual grid blocks on BB5. After comparing the material from each grid block, it was found that they broadly correspond in terms of typology and size and shape, and it is concluded that little chronological depth exists on the site.

The grid block comparisons also clearly illustrate the need for at least 200 to 250 artefacts as a meaningful sample. Grid blocks with samples of less than this number produced erratic results, whereas greater numbers of artefacts did not significantly alter results. (see Figure 9 for comparative distribution histograms of the size and shape of stone artefacts of some of the grid blocks on BB5).

SITE COMPARISONS

Swartkop and Doornfontein

As summarised by Penn (1995), early European travellers in the 'frontier zone' recorded the presence of two different groups, the hunters or San and the herders or Khoi, living in relative close proximity to each other along the Orange River during the 18th century. These two distinct socio-economic systems had survived in the region since the introduction of domestic stock and ceramics some 2000 years ago. Both Beaumont (Beaumont *et al.*1995) and Smith (1995) find that they can, on the basis of the material remains, distinguish between prehistoric sites occupied by groups exhibiting these two lifestyles in the Northern Cape.

Beaumont (Beaumont *et al.* 1995:255) has defined the Swartkop Industry as representing the hunters and the Doornfontein Industry as representative of pastoralists. He sees the Swartkop aggregates as a direct development of the earlier Springbokoog Industry which is a Northern Cape variant of the Wilton Complex and is characterised by cryptocrystalline silicates, mainly chalcedony, representing up to 30% of raw material, and by high frequencies of backed blades. The Swartkop assemblages he describes as containing acicular blade

Table 4. Size and shape of the stone artefacts from site BB7. Spits 1 to 5. Spits 6 to 11.

Table 4.1. Spits 1 to 5.

Size mm²/100	Irregular flakes	Blade flakes	Broken flakes	Scrapers	Backed blades*	Segments	Irregular cores	Blade cores	Total	Frequency %
0.5	3	0	5	0	2	0	0	0	10	3.2
1	23	12	21	1	2	0	1	0	60	19.2
2	47	25	44	2	1	0	1	0	120	38.3
4	48	13	12	0	0	0	6	0	79	25.2
8	26	3	0	0	0	0	2	0	31	9.9
16	7	2	0	0	0	0	2	0	11	3.5
32	1	0	0	0	0	0	1	0	2	0.6
Total	**155**	**55**	**82**	**3**	**5**	**0**	**13**	**0**	**313**	**100**
Shape										
A	27	0	14	1	0	0	4	0	46	14.7
B	128	0	30	1	0	0	8	0	167	53.4
C	0	32	25	1	1	0	1	0	60	19.2
D	0	14	12	0	1	0	0	0	27	8.6
E	0	9	1	0	1	0	0	0	11	3.5
F	0	0	0	0	2	0	0	0	2	0.6
Total	**155**	**55**	**82**	**3**	**5**	**0**	**13**	**0**	**313**	**100**

* Points included in total

Table 4.2. Spits 6 to 11.

Size mm²/100	Irregular flakes	Blade flakes	Broken flakes	Scrapers	Backed blades	Segments	Irregular cores	Blade cores	Total	Frequency %
0.5	0	2	2	0	0	0	0	0	4	2.4
1	12	7	8	0	1	1	0	0	29	17.1
2	22	12	15	0	2	0	1	0	52	30.6
4	22	13	6	0	0	1	0	1	43	25.3
8	20	3	2	0	0	0	1	0	26	15.3
16	4	5	0	0	0	0	0	0	9	5.3
32	7	0	0	0	0	0	0	0	7	4.1
Total	**87**	**42**	**33**	**0**	**3**	**2**	**2**	**1**	**170**	**100**
Shape										
A	11	0	8	0	0	0	0	0	19	11.2
B	76	0	10	0	0	1	2	0	89	52.4
C	0	22	7	0	2	1	0	0	32	18.8
D	0	13	6	0	0	0	0	1	20	11.8
E	0	7	2	0	1	0	0	0	10	5.9
F	0	0	0	0	0	0	0	0	0	0.0
Total	**87**	**42**	**33**	**0**	**3**	**2**	**2**	**1**	**170**	**100**

with "consistently high proportions (above 60%) of backed blades amongst the formal lithics", and with undeco-rated, grass-tempered ceramics (Beaumont *et al.* 1995: 242). In time the ceramics are found to increase and the backed blades to decrease. The sites are usually situated on pan and stream margins, near water in dune hollows and on the flanks of koppies. The Swartkop "can be confidently linked, by way of a degenerate terminal phase, to the /Xam" (Beaumont *et al.* 1995: 242, 255).

The ceramic Doornfontein assemblages, on the other hand, are characterised as having only a small proportion of formal lithics and a predominance of course irregular flakes, often on quartz (Beaumont *et al.* 1995:247; Smith 1995:300). The abundant associated ceramics are usually thin-walled, grit-tempered and well fired (Beaumont *et al.* 1995:246-247). The assemblages also contain grinding grooves, large bone points, ostrich eggshell beads and simple geometric-decorated ostrich eggshell.Temporal shifts within the industry are limited. Later sites tend to contain grass-tempered ceramics, larger OES beads and more copper objects. Sites usually occur near the Orange River or at water sources close to it. The pottery "can be associated with the Khoi by way of the historic record" (Beaumont *et al.*1995:255).

The characterisation of the material remains on both hunter and herder sites will still need refinement in both a temporal and spatial sense, since there are obvious discrepancies in the literature. Thus Smith (1995:281, 284, 291) reports equal numbers of scrapers, backed blades and segments in the finds on the open site of Droëgrond B, some 55 km south-west of Kakamas, has a date of 400 ± 120 BP (Pta-2396). At this site the which he sees as a "hunters' camping place" and whichbacked blades, therefore, do not predominate, but the tables do seem to show a predominance of blade cores (Smith 1995:285).

In order to compare the Bloubos finds with other sites in the region and possibly to identify the occupants, I analysed the lithics from two of Beaumont's sites:

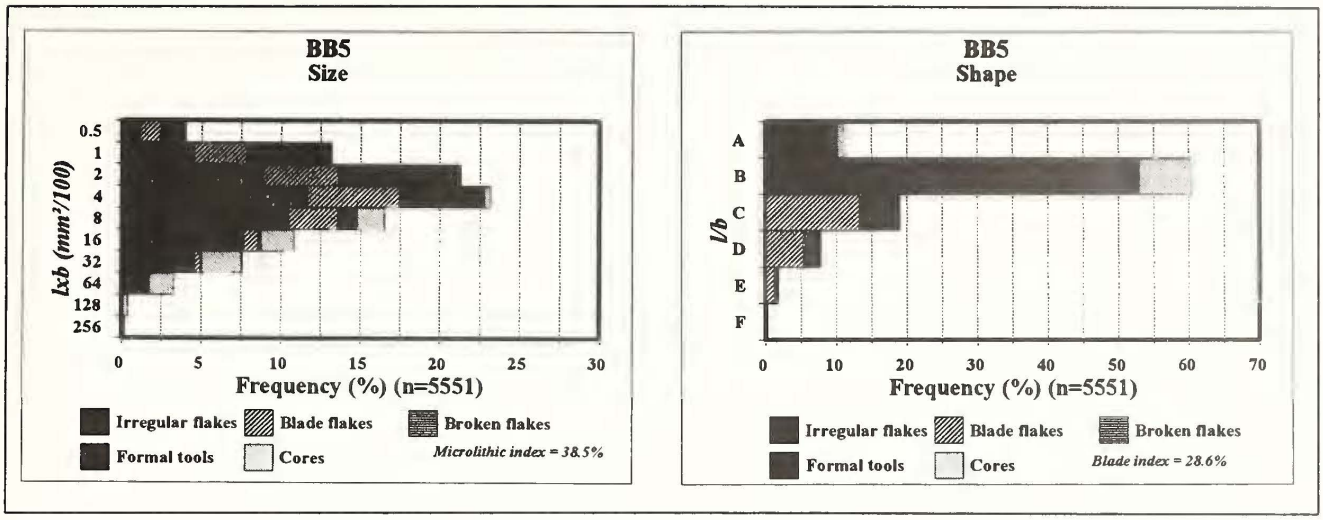

Fig. 7. Distribution histograms of size and shape classes of BB5 stone tools (see text for a definition of the size and shape classes). Although the BB5 sample is predominantly macrolithic, the whole assemblage tends towards the microlithic side of the scale (≤2). The tight distribution in terms of size and shape indicates a relatively limited time-scale for the site.

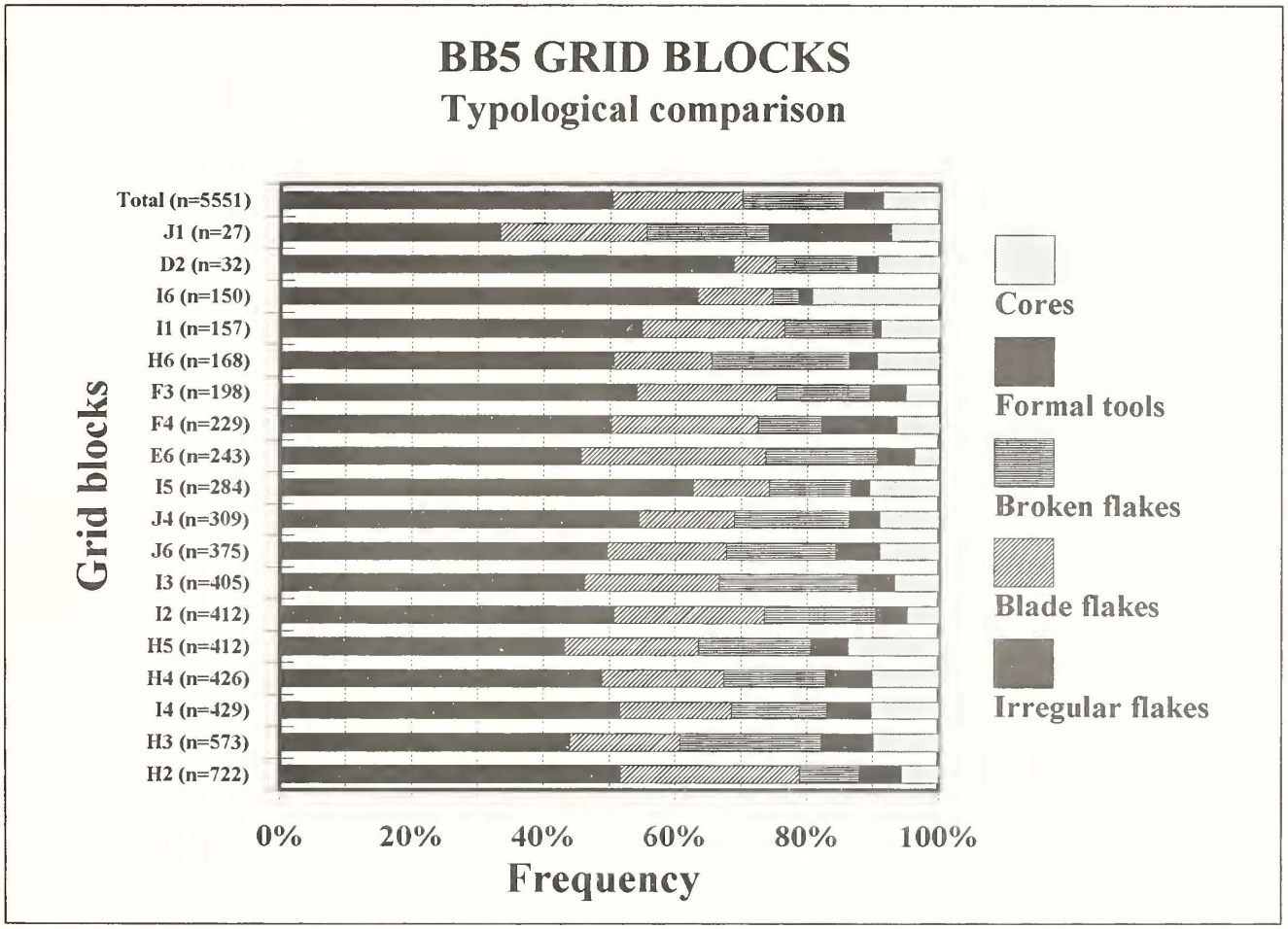

Fig. 8. Relative frequencies of the artefact types retrieved from the individual grid blocks on BB5. Thecorrespondence indicates the typological homogeneity of the site.

Swartkop 1, the type-site representing the hunters and Biesiepoort 2, a typical herder site (see Figure 1 for location). Swartkop 1 has a radiocarbon date of 670±50 BP (Pta-4106), while Biesiepoort 2 has dates of 1390 ±70 BP (Pta-4772) and 2050±50 BP (Pta-4764) (Beaumont *et al.*1995:245, 247). The artefacts from the different spits showed no variation and were pooled together for analysis.

Table 5. BB5 metric data of stone artefacts (mm).

ARTEFACT TYPE	MEAN	ST. DEV.	MEDIAN	RANGE	VOGEL SCALE
IRREGULAR FLAKES (n=2778)					
Length (mm)	26.2	15.4	22.0	5-119	
Breadth (mm)	18.3	11.5	15.0	1-80	
***lxb* (sqmm)**	640		338		386
l/b	1.50		1.43		1.50
BLADE FLAKES (n=1097)					
Length (mm)	23.6	10.3	22.0	7-106	
Breadth (mm)	9.3	4.8	9.0	2-47	
***lxb* (sqmm)**	256		200		208
l/b	2.67		2.55		2.46
BROKEN FLAKES (n=853)					
Length (mm)	15.1	5.5	14.0	4-52	
Breadth (mm)	8.8	3.5	8.0	2-31	
***lxb* (sqmm)**	143		112		127
l/b	1.77		1.71		1.82
SCRAPERS (n=234)					
Length (mm)	23.0	12.1	20.8	7-90	
Breadth (mm)	13.5	8.8	11.9	3-71	
***lxb* (sqmm)**	397		240		238
l/b	1.87		1.69		1.88
BACKED BLADES (n=83)					
Length (mm)	16.8	5.3	16.0	8-31	
Breadth (mm)	5.9	2.7	5.3	2-15	
***lxb* (sqmm)**	107		80		102
l/b	3.26		3.01		3.09
SEGMENTS (n=13)					
Length (mm)	14.4	3.2	14.07	10-20	
Breadth (mm)	5.8	2.3	5.42	4-10	
***lxb* (sqmm)**	86.7		65		66
l/b	2.70		2.60		2.73

Comparison of the typologicalresults with Bloubos is shown in Figures 4 to 6. The proportions of the main classes (utilised flakes, cores and formal tools) are similar at all three sites, while Swartkop shows a higher proportion of utilised blade flakes and blade cores than the other two sites. In the formal tool categories, the complete predominance of backed pieces in the Swartkop collection differs markedly from Biesiepoort

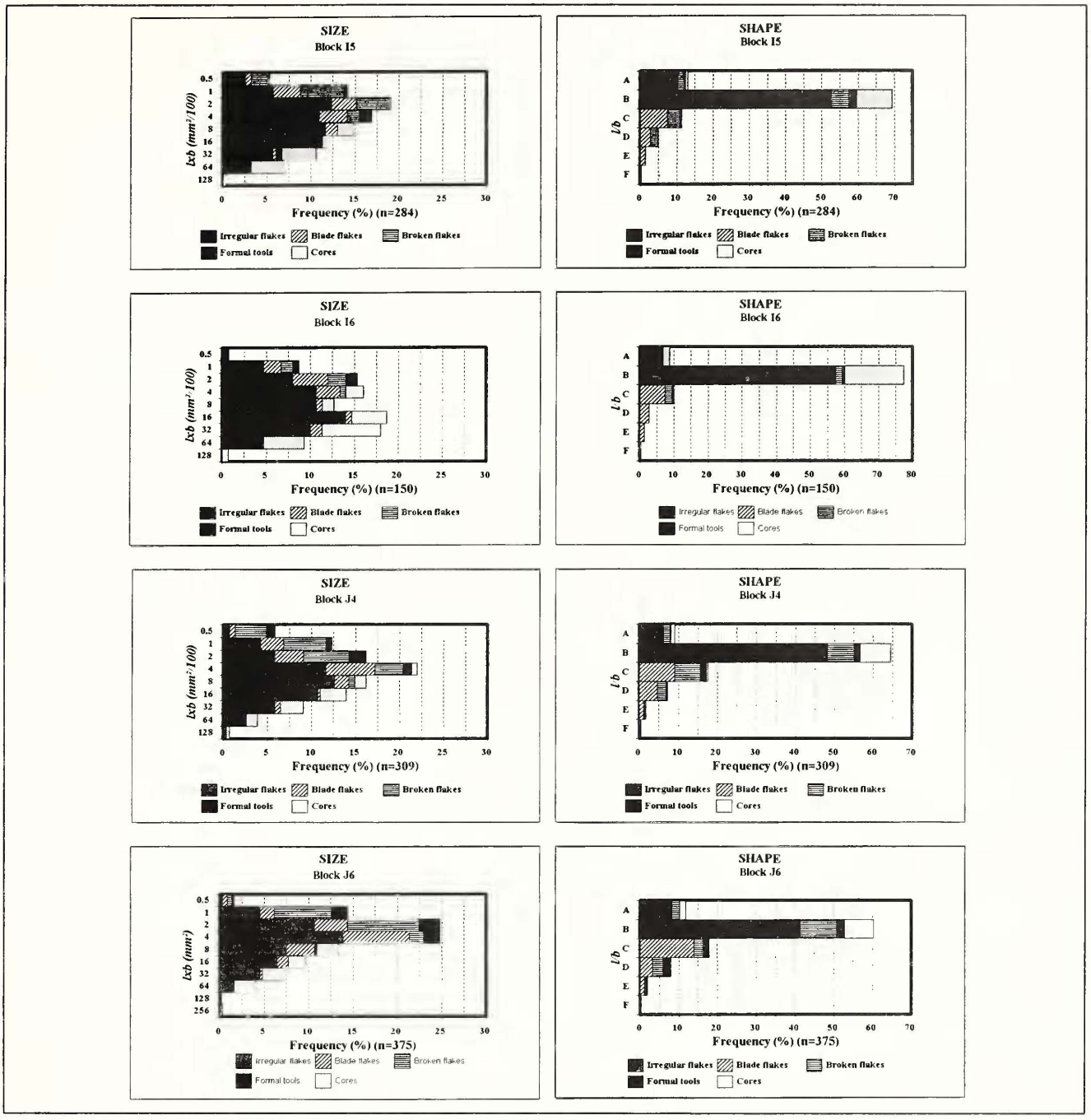

Fig. 9. Comparative distribution histograms of the size and shape of stone artefacts from some grid blocks on BB5 indicate that variation in individual sample sizes influences the distribution of artefacts within classes. Samples with less than 200 to 250 artefacts are less evenly distributed than those with more.

and Bloubos.

The metric analysis (Fig.10) shows that the Biesiepoort 2 artefacts are slightly smaller than those from Bloubos, presumably because they were primarily made from quartz. The Swartkop 1 artefacts (Fig. 11) are larger, mainly due to the greater number of relatively large blades, and clearly show this blade predominance in the shape categories.

Despite the fact that the Doornfontein herder industry is said to have a small formal lithic component, these comprise 7,4% of the utilised pieces at Biesiepoort 2 (2,5% including waste), compared to 6,0% at BB5 (3,0% including waste) and 6,0% (2,2% including waste) at Swartkop 1. This suggests that there is some leeway in the size of the formal tool components of herder sites. Overall the conclusion is that the lithics from Bloubos are very similar to those from the herder site at Biesiepoort and differ from those at the hunter site Swartkop 1

DISCUSSION AND CONCLUSIONS

Hunters or herders

The differences between the Swartkop and Biesiepoort assemblages are perceived as the result of divergent subsistence strategies. Composition of the

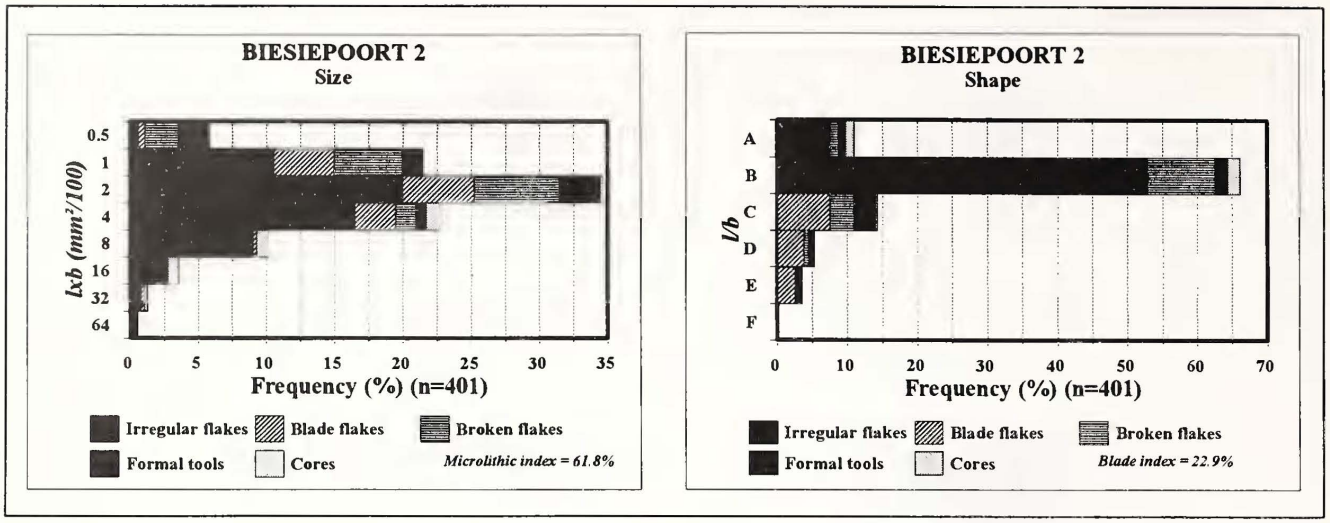

Fig. 10. Distribution histograms of size and shape classes of Biesiepoort 2 stone tools. Although the sample peaks on the microlithic end of the size histogram, the general distribution between both the size and shape classes is similar to those of BB5.

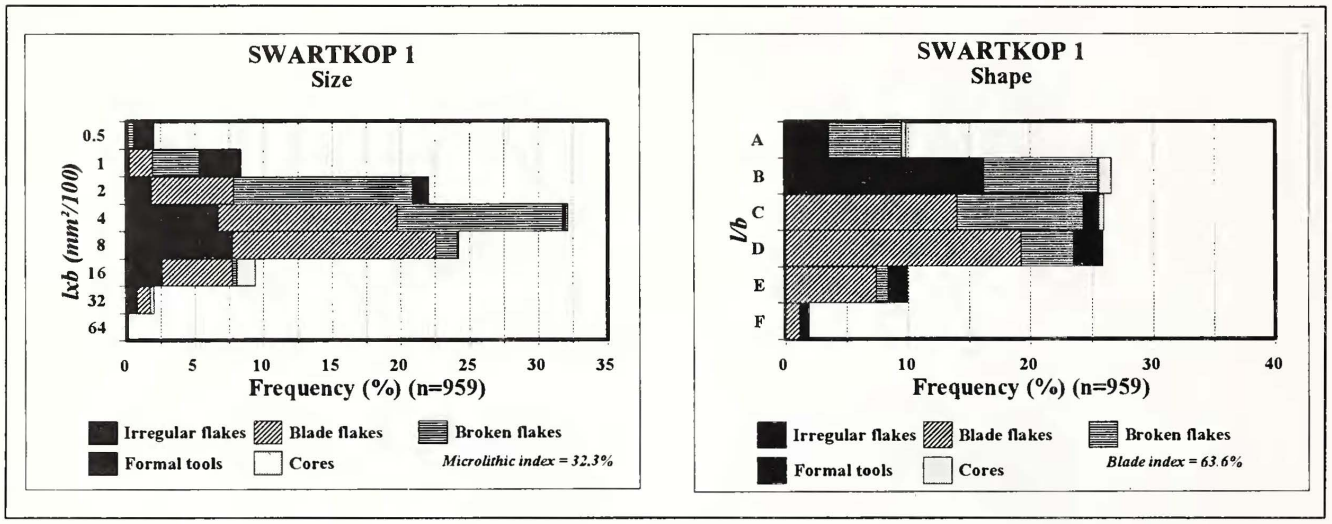

Fig. 11. Distribution histograms of size and shape classes of Swartkop 1 stone tools. The bladelike nature of this assemblage is clearly visible in the shape distribution histogram.

lithics from BB5 implies that the site was predominantly occupied by herders and not a hunter camp site. Due to the lack of permanent water it would only have been visited after local rains had supplied grazing and surface water in the desert. The opportunity to hunt and forage in the area provided an additional attraction to the pastoralists. Bloubos thus provides evidence that the pastoralists living along the Orange River intermittently exploited the resources of the landscape up to two days trek away from the river.

Methodology

The Vogel scale is an innovative alternative to conventional measuring techniques.It places the artefacts directly into size and shape classes which are just recognizably different and the variation in the shape and size of objects is directly visually shown. It eliminates the need to measure each individual artefact and provides a more detailed presentation of the distribution than the conventional presentation of mean, standard deviation and range. The Vogel scheme is a precise, standardised measuring method applicable to any collection of artefacts. Simultaneously, some leeway within size and shape classes is provided for which minimizes the influence of a few very large and/or small artefacts on the calculated mean value of a collection.

Bloubos open-air sites

The artefact analysis revealed that when samples of some 250 or more utilised artefacts are analysed, the results for the individual grid blocks are similar while smaller samples show larger variation. The conclusion is that one needs at least 200 to 250 utilised artefacts to obtain a representative sample. Since the samples from the grid blocks are more or less homogeneous, a smaller sample from BB5 would have been adequate.

Another interesting observation is the high frequency of scrapers manufactured on broken flakes with the bulb of percussion still visible. As indicated in Table 1, more or less equal numbers of proximal and distal fragments of broken flakes would be expected, but the distal ends predominate. This discrepancy indicates that the proximal ends were preferably selected for manufacturing scrapers.

Bloubos was, although not permanently, intensively occupied during the past 2000 years. The numbers and sizes of LSA surface scatters in the area confirm that the region played an important role during the LSA. This emphasizes that the recording of open-air sites in the environment are necessary to obtain a complete record of the utilisation of resources in the landscape - something that the sole reliance on cave sites does not produce.

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