CHAPTER FIVE

THE CRAZYMAN SHELTER (CMS)

5.1 INTRODUCTION

This chapter presents the results of the analysis of the Crazyman Shelter firstly per spit of the 20,000 year sequence, and then in phases representing the time periods corresponding to the four phases of the predictive model (see Chapter 2). Comparisons will initially be made between raw material percentages and artefact categories per excavated spit (referred to as spit from now on) in order to gain a general view of the artefact sequence. Following this, comparisons will be made between the time periods representing the four phases of the predictive model with a more in depth analysis of the flakes, flaked pieces and cores per phase.

5.2 RADIOCARBON DATES

The Crazyman Shelter is the oldest dated site in the Coonabarabran/Warrumbungle region and the oldest dated shelter on the Northwestern slopes of NSW. The occupational deposit dates from 20310 (calibrated) BP to less than 1380 (calibrated) BP. All artefacts selected for comparison in this chapter come from one excavated square - N41 (1 metre by 1 metre). All spits were of equal volume (40 litres). Eight radiocarbon dates have been obtained from this deposit. These samples were collected from depths ranging from 27 mm below the surface to 1360 mm (bedrock). All the charcoal samples returned radiocarbon dates in sequence, suggesting a minimum of disturbance in the site after the artefacts were discarded.

The following table lists the depth of the samples and the uncalibrated radiocarbon dates obtained from square N41.

Depth in mm	spit	date	reference
27	2	1500 ± 60 BP	BETA-77501
67	5	1730 ± 60 BP	BETA-28452
526	23	4490 ± 60 BP	BETA-28453
855	H	4990 ± 70 BP	BETA-33075
1005	L	5450 ± 70 BP	BETA-41164
1220	Q	6560 ± 60 BP	BETA-48098
1315	S	10610 ± 80 BP	BETA-77502
1360	T	17140 ± 140 BP	BETA-33076

UNCALIBRATED RADIOCARBON DATES

TABLE 5.1

The radiocarbon dates were next converted to calibrated dates, so that comparable rates of deposition could be calculated. All dates except the oldest two were calibrated by the Beta Analytical laboratory. The two oldest dates were calculated by using the computer program

Calib 3.03 (refer to Stuiver and Reimer 1993:215-230 for details of this program). The following table lists the results :

original date	av. calibrated date	range (2 sigma)	reference
	CALIBRATED RADIOCARBON DATES		
1500 ± 60 BP	1380 BP	1275-1485 BP	BETA-77501
1730 ± 60 BP	1650 BP	1415-1790 BP	BETA-28452
4490 ± 60 BP	5090 BP	4875-5310 BP	BETA-28453
4990 ± 70 BP	5760 BP	5600-5910 BP	BETA-33075
5450 ± 70 BP	6240 BP	6090-6495 BP	BETA-41164
6560 ± 60 BP	7410 BP	7295-7430 BP	BETA-48098
10610± 80 BP	12540 BP	12345-12705 BP	BETA-77502
17140 ± 140 BP	20310 BP	19783-20600 BP	BETA-33076

TABLE 5.2

These dates were checked, averaged and rounded off using the results obtained from the program Calib 3.03 (Stuiver and Reimer 1993 :215-230).

5.3 ANALYTICAL PHASES

Four analytical phases were selected comprising grouped spits that matched as near as possible the phases in the predictive mode . An age/depth graph was constructed using calibrated radiocarbon dates in conjunction with the depth at which the carbon for each radiocarbon date was obtained (see following graph).

AGE/DEPTH GRAPH (calibrated radiocarbon dates)

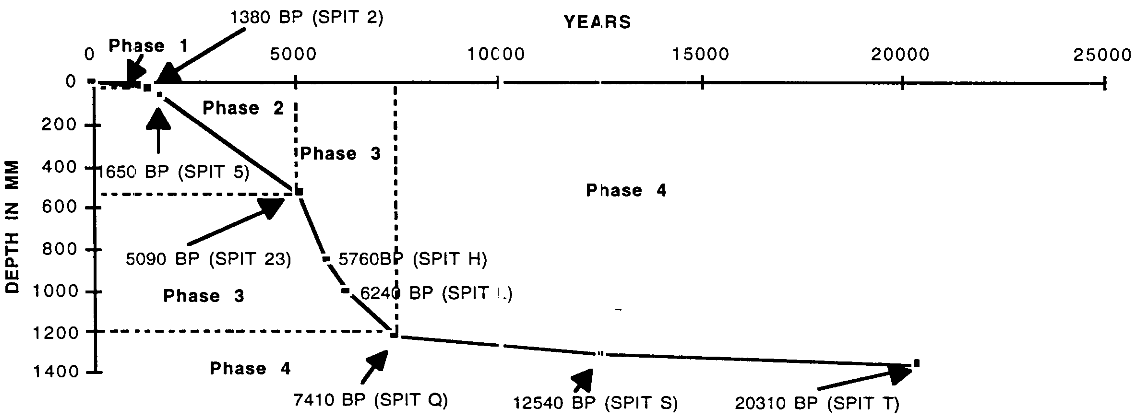


FIGURE 5.1

In order to test the predictions of the model in Chapter 2, the deposit was divided into sections corresponding approximately to the phases of the predictive model. If it is assumed that deposition in the site was consistent, and the sediment accumulated at a relatively steady rate between the dated spits, then the slope of the graph corresponds to the rate of deposition.

These four phases were :

1. Phase 4 (Late Pleistocene/Early Holocene). Represented by a very flat slope between 20310 and 7410 BP (deposit accumulating at approximately 1 mm per 100 years).
2. Phase 3 (Middle Holocene). Represented by a very steep slope between 7410 and 5090 BP (accumulating at approximately 29 mm per 100 years).
3. Phase 2 (Revised Microblade) between 5090 and 1380 BP (accumulating at approximately 13 mm per 100 years). Represented by a rate between the slopes of phases 3 and 4.
4. Phase 1 (Post Microblade), between 1380 and approximately 200 BP (contact time). Represented by a rate slightly less the previous one, but greater than phase 4 (as no radiocarbon date is available in spit 1, then this rate of accumulation must be taken with some caution).

The correspondence between phases and spits is shown in figure 5.2.

The intervals (in years) are:

1. Phase 4 - approximately 12900 years (range 13305 to 12488 years).
2. Phase 3 - approximately 2320 years (range 2555 to 2120 years).
3. Phase 2 - approximately 3710 years (range 4035 to 4035 years).
4. Phase 1 - approximately 1180 years (range 1285 to 1075 years).

The different rates of artefact deposition in these four phases were :

1. Phase 4 - 7410 BP to 20310 BP = 2.22 artefacts per kg.
2. Phase 3 - 5090 BP to 7410 BP = 3.46 artefacts per kg.
3. Phase 2 -1380 to 5090 BP = 6.42 artefacts per kg.
4. Phase 1 - 200 to 1380 BP = 7.44 artefacts per kg.

These figures show that there was an increase in artefact density per excavated kilogram from 20310 BP till contact time through each phase. This increase of artefact density could be associated with a greater use of the site by more knappers or alternatively more knapping being carried out by a relatively static number of people.

5.4 ARTEFACT DENSITY

The following graph shows the number of stone artefacts/kilogram /spit. It shows that artefact density increases after spit 23 which has a date of 5090 cal. BP (see figure 5.1).

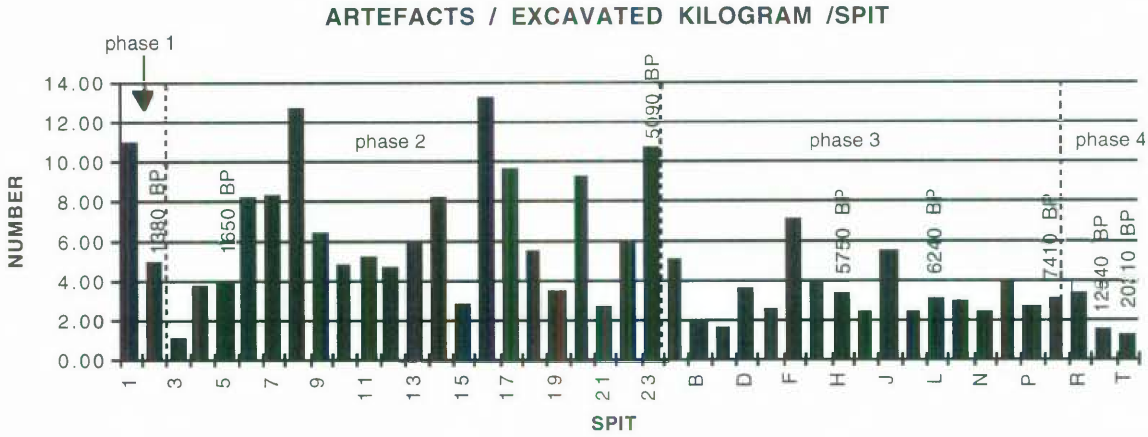


FIGURE 5.2

5.5 RAW MATERIAL

The artefacts were next divided into the three raw material groups to clearly show the spits where quartz was dominant. Table 5.3 depicts the numbers and percentages of the three raw material groups per spit.

Table 5.3 (see following page) shows that quartz was dominant between 20310 BP and 5090 BP and also between 1380 BP and contact time while fine grained was only dominant between 5090 and 1380 BP. Viewing these numbers as percentages gives a better perspective of the changes through time of raw material preferences (see Figure 5.2).

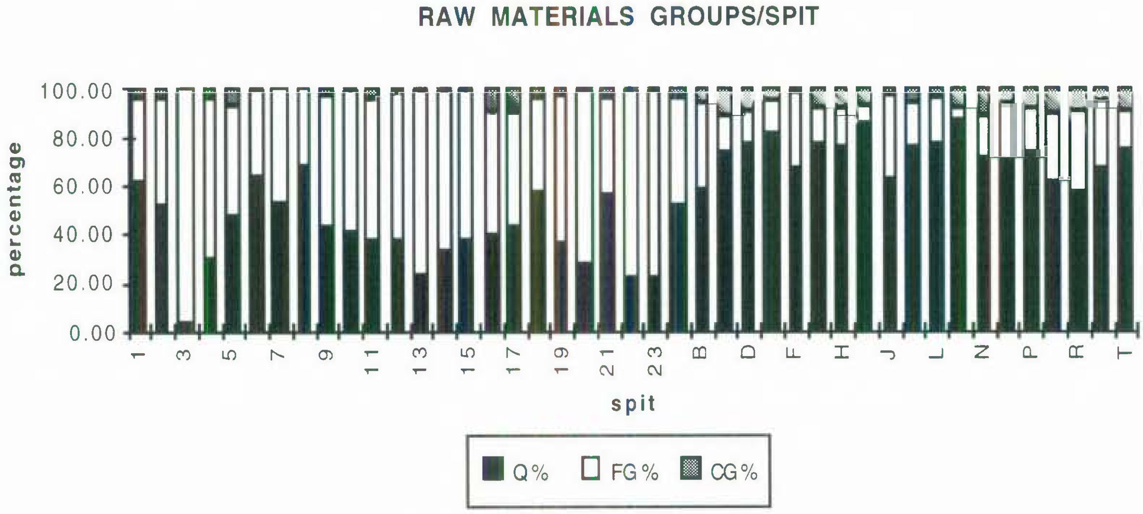


FIGURE 5.3

Figure 5.3 shows a relative stability in the percentages of the three raw material groups from 20310 BP till just prior to 5090 BP when the percentage of artefacts manufactured from fine grained material increased dramatically with a corresponding fall off in the percentages

CMS RAW MATERIAL NUMBERS AND PERCENTAGES PER SPIT
TABLE 5.3

	DEPTH	QUARTZ		FG		CG			DATE &
SPIT	in mm	NOS	Q %	NOS	FG %	NOS	CG %	TOTAL	PHASE
1	0 to 8	94	61.04	53	34.42	7	4.55	154	
2	8 to 31	51	51.52	45	45.45	3	3.03	99	1380 CAL BP
3	31 to 44	1	4.00	24	96.00	0	0.00	25	
4	44 to 62	22	29.33	50	66.67	3	4.00	75	
5	62 to 75	33	47.83	31	44.93	5	7.25	69	1650 CAL BP
6	75 to 94	129	63.86	72	35.64	1	0.50	202	
7	cleanings	59	52.68	53	47.32	0	0.00	112	
8	94 to 104	145	68.40	67	31.60	0	0.00	212	
9	104 to 130	110	43.31	139	54.72	5	1.97	254	
10	130 to 160	86	40.00	127	59.07	2	0.93	215	
11	160 to 198	83	38.07	128	58.72	7	3.21	218	
12	198 to 230	65	36.93	108	61.36	3	1.70	176	
13	230 to 259	74	22.36	255	77.04	2	0.60	331	
14	259 to 311	88	32.47	182	67.16	1	0.37	271	
15	311 to 370	36	36.73	61	62.24	1	1.02	98	
16	370 to 375	140	39.11	188	52.51	30	8.38	358	
17	375 to 401	148	42.77	166	47.98	32	9.25	346	
18	401 to 436	73	57.48	50	39.37	4	3.15	127	
19	436 to 449	31	36.05	53	61.63	2	2.33	86	
20	449 to 488	77	27.30	204	72.34	1	0.35	282	
21	cleanings	15	55.56	11	40.74	1	3.70	27	
22	488 to 504	26	21.14	96	78.05	1	0.81	123	
23	504 to 526	23	21.90	81	77.14	1	0.95	105	5090 CAL BP
A	526 to 579	104	51.23	90	44.33	9	4.43	203	
B	579 to 626	48	57.83	30	36.14	5	6.02	83	
C	626 to 685	53	73.61	11	15.28	8	11.11	72	
D	686 to 726	113	76.87	21	14.29	13	8.84	147	
E	726 to 766	102	80.95	18	14.29	6	4.76	126	
F	766 to 810	231	66.38	111	31.90	6	1.72	348	
G	810 to 852	149	76.02	32	16.33	15	7.65	196	
H	852 to 887	113	75.33	25	16.67	12	8.00	150	5760 CAL BP
I	887 to 918	91	85.05	9	8.41	7	6.54	107	
J	918 to 958	135	62.79	75	34.88	5	2.33	215	
K	958 to 984	90	75.63	22	18.49	7	5.88	119	
L	984 to 1031	85	77.27	21	19.09	4	3.64	110	6240 CAL BP
M	1031 to 1067	103	87.29	6	5.08	9	7.63	118	
N	1067 to 1094	72	70.59	18	17.65	12	11.76	102	
O	1094 to 1145	125	69.44	45	25.00	10	5.56	180	
P	1145 to 1188	91	73.39	23	18.55	10	8.06	124	
Q	1188 to 1234	84	60.87	40	28.99	14	10.14	138	7410 CAL BP
R	1234 to 1281	100	57.47	58	33.33	16	9.20	174	
S	1281 to 1342	51	66.23	22	28.57	4	5.19	77	12540 CAL BP
T	1342 to 1360	23	74.19	5	16.13	3	9.68	31	20310 CAL BP
total	**********	3572	52.65	2926	43.12	287	4.23	6785	**********

*NOTE spit 15 dug to level of spit 22 in small portion of excavation to isolate small burrow in corner.

of artefacts made from quartz (the percentage of coarse grained material was the highest in the period 20310 BP to 12540 BP but percentages of coarse grained material were always less than 10% in any spit). The percentage of fine grained artefacts falls away in the surface levels and this trend was also found at nearby Kawambarai cave (Gaynor 1987:137). These raw material trends were consistent with the predictive model.

The density of artefacts, however, declined at Kawambarai cave towards the surface but this was not the case at the Crazyman Shelter (CMS phases 1 & 2 = 7.44 artefacts/kg, KACA phases 1-5 = 4.13 artefacts/kg (spit 5 at KACA equates to c.1000 (uncalibrated) BP (Gaynor 1987:137)). This could suggest that site use of the Crazyman Shelter by the inhabitants of this area was more constant over this period than was the case at Kawambarai cave. This site use could be related to population pressures as floor space at the Crazyman Shelter is less restricted than the floor space at Kawambarai cave. The floor space at Kawambarai cave is restricted by the cave dimensions and would only accommodate possibly one or two family groups at a time (dimensions of the cave were 13.5 metres by 4 metres (Gaynor 1987:20)). Site function would also affect the technological characteristics of the artefacts.

5.6 ARTEFACT CATEGORIES

Comparisons of the proportion of each category in each spit per each raw material group give some indication of the amount of reduction that was taking place at that time period. The artefacts were divided into the selected categories according to the definitions in Chapter Three. The following tables outline the numbers recorded in each categories per raw material group for each spit. The categories are identified with the number 1 to 8, which was the designated number at the time of the actual recording . These were :

1. Conchoidal flake (1).
2. Lamellate (2).
3. Flaked Piece (3).
4. Core (4).
5. Amorphous block (5).
6. Grindstone (6).
7. Hammerstone or Anvil (7).
8. Microdebitage (8).

Percentages of each category per each raw material group are given each spit (see following tables) .

CMS QUARTZ ARTEFACT NUMBERS AND PERCENTAGES PER SPIT
TABLE 5.4

QUARTZ ARTEFACT CATEGORIES										QUARTZ ARTEFACT CATEGORY PERCENTAGES								
spit	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**total**	**spit**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	22		5	19				48	94	**1**	23.40	0.00	5.32	20.21	0.00	0.00	0	51.06
2	24		4	12				11	51	**2**	47.06	0.00	7.84	23.53	0.00	0.00	0	21.57
3	1								1	**3**	100.00	0.00	0.00	0.00	0.00	0.00	0	0.00
4	7		3	9				3	22	**4**	31.82	0.00	13.64	40.91	0.00	0.00	0	13.64
5	12		4	7				10	33	**5**	36.36	0.00	12.12	21.21	0.00	0.00	0	30.30
6	22		56	8				43	129	**6**	17.05	0.00	43.41	6.20	0.00	0.00	0	33.33
7	1		22	8				28	59	**7**	1.69	0.00	37.29	13.56	0.00	0.00	0	47.46
8	42		53	13	1			36	145	**8**	28.97	0.00	36.55	8.97	0.69	0.00	0	24.83
9	13		53	40				4	110	**9**	11.82	0.00	48.18	36.36	0.00	0.00	0	3.64
10	3		53	28	1			1	86	**10**	3.49	0.00	61.63	32.56	1.16	0.00	0	1.16
11	12		38	30				3	83	**11**	14.46	0.00	45.78	36.14	0.00	0.00	0	3.61
12	8		15	41				1	65	**12**	12.31	0.00	23.08	63.08	0.00	0.00	0	1.54
13	9		33	32					74	**13**	12.16	0.00	44.59	43.24	0.00	0.00	0	0.00
14	10		56	19				3	88	**14**	11.36	0.00	63.64	21.59	0.00	0.00	0	3.41
15	2		14	20					36	**15**	5.56	0.00	38.89	55.56	0.00	0.00	0	0.00
16	9		87	36				8	140	**16**	6.43	0.00	62.14	25.71	0.00	0.00	0	5.71
17	14		101	33					148	**17**	9.46	0.00	68.24	22.30	0.00	0.00	0	0.00
18	8		43	19				3	73	**18**	10.96	0.00	58.90	26.03	0.00	0.00	0	4.11
19	3		21	5				2	31	**19**	9.68	0.00	67.74	16.13	0.00	0.00	0	6.45
20	8		44	23				2	77	**20**	10.39	0.00	57.14	29.87	0.00	0.00	0	2.60
21	1		7	7					15	**21**	6.67	0.00	46.67	46.67	0.00	0.00	0	0.00
22			15	8				3	26	**22**	0.00	0.00	57.69	30.77	0.00	0.00	0	11.54
23	4		11	7				1	23	**23**	17.39	0.00	47.83	30.43	0.00	0.00	0	4.35
A	25		12	52				15	104	**A**	24.04	0.00	11.54	50.00	0.00	0.00	0	14.42
B	14		4	24		3		3	48	**B**	29.17	0.00	8.33	50.00	0.00	6.25	0	6.25
C	14	1	4	30				4	53	**C**	26.42	1.89	7.55	56.60	0.00	0.00	0	7.55
D	34		14	49	1			15	113	**D**	30.09	0.00	12.39	43.36	0.88	0.00	0	13.27
E	39		9	48				6	102	**E**	38.24	0.00	8.82	47.06	0.00	0.00	0	5.88
F	64		5	48	3			111	231	**F**	27.71	0.00	2.16	20.78	1.30	0.00	0	48.05
G	62		1	51	4			31	149	**G**	41.61	0.00	0.67	34.23	2.68	0.00	0	20.81
H	48			50	3			12	113	**H**	42.48	0.00	0.00	44.25	2.65	0.00	0	10.62
I	33		2	41				15	91	**I**	36.26	0.00	2.20	45.05	0.00	0.00	0	16.48
J	41		7	59	4			24	135	**J**	30.37	0.00	5.19	43.70	2.96	0.00	0	17.78
K	24		7	46	1			12	90	**K**	26.67	0.00	7.78	51.11	1.11	0.00	0	13.33
L	21		3	47	2			12	85	**L**	24.71	0.00	3.53	55.29	2.35	0.00	0	14.12
M	19		21	53	1			9	103	**M**	18.45	0.00	20.39	51.46	0.97	0.00	0	8.74
N	19		26	19				8	72	**N**	26.39	0.00	36.11	26.39	0.00	0.00	0	11.11
O	17		40	56	2			10	125	**O**	13.60	0.00	32.00	44.80	1.60	0.00	0	8.00
P	9		27	50				5	91	**P**	9.89	0.00	29.67	54.95	0.00	0.00	0	5.49
Q	8		27	47	1			1	84	**Q**	9.52	0.00	32.14	55.95	1.19	0.00	0	1.19
R	19		19	58				4	100	**R**	19.00	0.00	19.00	58.00	0.00	0.00	0	4.00
S	14		14	21	1			1	51	**S**	27.45	0.00	27.45	41.18	1.96	0.00	0	1.96
T	2		3	18					23	**T**	8.70	0.00	13.04	78.26	0.00	0.00	0	0.00
tota	761	1	983	1291	25	3	0	508	3572									

CMS FINE GRAINED ARTEFACT NUMBERS AND PERCENTAGES PER SPIT
TABLE 5.5

FG ARTEFACT CATEGORIES NUMBERS									
spit	1	2	3	4	5	6	7	8	total
1	20		2	8				23	53
2	19		9	9	1			7	45
3	13		6					5	24
4	18		8	9	1			14	50
5	12		10	5				4	31
6	15		39	4				14	72
7	5		29	5				14	53
8	17		29	10				11	67
9	15		80	24				20	139
10	11		70	25	1			20	127
11	18		57	41				12	128
12	12		59	25				12	108
13	16		182	29				28	255
14	16		110	20				36	182
15	10		37	14					61
16	13		118	16				41	188
17	20		100	18				28	166
18	8		32	2				8	50
19	7		25	14				7	53
20	45		115	25				19	204
21	1		5	5					11
22	8		50	5				33	96
23	11		40	12				18	81
A	27		23	20		1		19	90
B	14		3	9	2			2	30
C	4		1	6					11
D	3		5	7	1			5	21
E	6		3	7	2				18
F	70	1	4	7	1			28	111
G	20		2	10					32
H	13		1	7	1			3	25
I	4		1	3				1	9
J	31		11	8	2			23	75
K	6		4	11				1	22
L	11		1	8	1				21
M	1		1	3	1				6
N	8		8	2					18
O	3		28	11	2			1	45
P	9		11	3					23
Q	4		22	8				6	40
R	12		21	17	1		1	6	58
S	7		6	4	1			4	22
T	1			2				2	5
total	584	1	1368	478	18	1	1	475	2926

FG ARTEFACT CATEGORIES PERCENTAGES								
spit	1	2	3	4	5	6	7	8
1	37.74	0.00	3.77	15.09	0.00	0.00	0	43.40
2	42.22	0.00	20.00	20.00	2.22	0.00	0	15.56
3	54.17	0.00	25.00	0.00	0.00	0.00	0	20.83
4	36.00	0.00	16.00	18.00	2.00	0.00	0	28.00
5	38.71	0.00	32.26	16.13	0.00	0.00	0	12.90
6	20.83	0.00	54.17	5.56	0.00	0.00	0	19.44
7	9.43	0.00	54.72	9.43	0.00	0.00	0	26.42
8	25.37	0.00	43.28	14.93	0.00	0.00	0	16.42
9	10.79	0.00	57.55	17.27	0.00	0.00	0	14.39
10	8.66	0.00	55.12	19.69	0.79	0.00	0	15.75
11	14.06	0.00	44.53	32.03	0.00	0.00	0	9.38
12	11.11	0.00	54.63	23.15	0.00	0.00	0	11.11
13	6.27	0.00	71.37	11.37	0.00	0.00	0	10.98
14	8.79	0.00	60.44	10.99	0.00	0.00	0	19.78
15	16.39	0.00	60.66	22.95	0.00	0.00	0	0.00
16	6.91	0.00	62.77	8.51	0.00	0.00	0	21.81
17	12.05	0.00	60.24	10.84	0.00	0.00	0	16.87
18	16.00	0.00	64.00	4.00	0.00	0.00	0	16.00
19	13.21	0.00	47.17	26.42	0.00	0.00	0	13.21
20	22.06	0.00	56.37	12.25	0.00	0.00	0	9.31
21	9.09	0.00	45.45	45.45	0.00	0.00	0	0.00
22	8.33	0.00	52.08	5.21	0.00	0.00	0	34.38
23	13.58	0.00	49.38	14.81	0.00	0.00	0	22.22
A	30.00	0.00	25.56	22.22	0.00	1.11	0	21.11
B	46.67	0.00	10.00	30.00	6.67	0.00	0	6.67
C	36.36	0.00	9.09	54.55	0.00	0.00	0	0.00
D	14.29	0.00	23.81	33.33	4.76	0.00	0	23.81
E	33.33	0.00	16.67	38.89	11.11	0.00	0	0.00
F	63.06	0.90	3.60	6.31	0.90	0.00	0	25.23
G	62.50	0.00	6.25	31.25	0.00	0.00	0	0.00
H	52.00	0.00	4.00	28.00	4.00	0.00	0	12.00
I	44.44	0.00	11.11	33.33	0.00	0.00	0	11.11
J	41.33	0.00	14.67	10.67	2.67	0.00	0	30.67
K	27.27	0.00	18.18	50.00	0.00	0.00	0	4.55
L	52.38	0.00	4.76	38.10	4.76	0.00	0	0.00
M	16.67	0.00	16.67	50.00	16.67	0.00	0	0.00
N	44.44	0.00	44.44	11.11	0.00	0.00	0	0.00
O	6.67	0.00	62.22	24.44	4.44	0.00	0	2.22
P	39.13	0.00	47.83	13.04	0.00	0.00	0	0.00
Q	10.00	0.00	55.00	20.00	0.00	0.00	0	15.00
R	20.69	0.00	36.21	29.31	1.72	0.00	2	10.34
S	31.82	0.00	27.27	18.18	4.55	0.00	0	18.18
T	20.00	0.00	0.00	40.00	0.00	0.00	0	40.00

CMS COARSE GRAINED ARTEFACT NUMBERS AND PERCENTAGES PER SPIT
TABLE 5.6

CG ARTEFACT CATEGORIES NUMBERS

spit	1	2	3	4	5	6	7	8	total
1	1			5				1	7
2	1			2					3
3									0
4	2		1						3
5	2		1	1				1	5
6			1						1
7									0
8									0
9	1			4					5
10	1		1						2
11	3			4					7
12	2			1					3
13				2					2
14	1								1
15				1					1
16	4		13	13					30
17	1		21	9				1	32
18	1			3					4
19			1	1					2
20			1						1
21	1								1
22			1	0					1
23				1					1
A	1		2	6					9
B				5					5
C				8					8
D	1		2	7	1	1	1		13
E				6					6
F	5		1						6
G	3			11			1		15
H	4			8					12
I	1			5				1	7
J	1			4					5
K			1	4				2	7
L				4					4
M	4		1	3	1				9
N	5		1	6					12
O	1			8				1	10
P	2		1	7					10
Q	2			12					14
R			4	12					16
S	3			1					4
T			1	2					3
total	54	0	55	166	2	1	2	7	287

CG ARTEFACT CATEGORIES PERCENTAGES

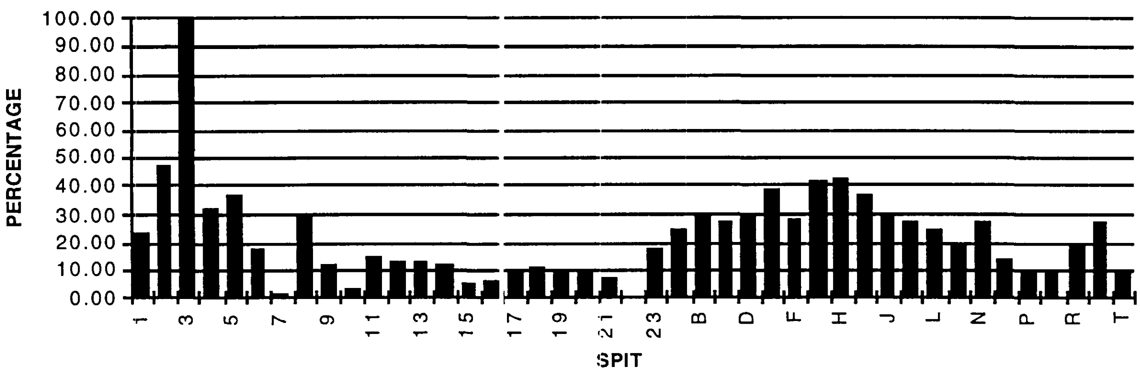
spit	1	2	3	4	5	6	7	8
1	14.29	0.00	0.00	71.43	0.00	0.00	0	14.29
2	33.33	0.00	0.00	66.67	0.00	0.00	0	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
4	66.67	0.00	33.33	0.00	0.00	0.00	0	0.00
5	40.00	0.00	20.00	20.00	0.00	0.00	0	20.00
6	0.00	0.00	100.00	0.00	0.00	0.00	0	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
9	20.00	0.00	0.00	80.00	0.00	0.00	0	0.00
10	50.00	0.00	50.00	0.00	0.00	0.00	0	0.00
11	42.86	0.00	0.00	57.14	0.00	0.00	0	0.00
12	66.67	0.00	0.00	33.33	0.00	0.00	0	0.00
13	0.00	0.00	0.00	100.00	0.00	0.00	0	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
15	0.00	0.00	0.00	100.00	0.00	0.00	0	0.00
16	13.33	0.00	43.33	43.33	0.00	0.00	0	0.00
17	3.13	0.00	65.63	28.13	0.00	0.00	0	3.13
18	25.00	0.00	0.00	75.00	0.00	0.00	0	0.00
19	0.00	0.00	50.00	50.00	0.00	0.00	0	0.00
20	0.00	0.00	100.00	0.00	0.00	0.00	0	0.00
21	100.00	0.00	0.00	0.00	0.00	0.00	0	0.00
22	0.00	0.00	100.00	0.00	0.00	0.00	0	0.00
23	0.00	0.00	0.00	100.00	0.00	0.00	0	0.00
A	11.11	0.00	22.22	66.67	0.00	0.00	0	0.00
B	0.00	0.00	0.00	100.00	0.00	0.00	0	0.00
C	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
D	7.69	0.00	15.38	53.85	7.69	7.69	8	0.00
E	0.00	0.00	0.00	100.00	0.00	0.00	0	0.00
F	83.33	0.00	16.67	0.00	0.00	0.00	0	0.00
G	20.00	0.00	0.00	73.33	0.00	0.00	7	0.00
H	33.33	0.00	0.00	66.67	0.00	0.00	0	0.00
I	14.29	0.00	0.00	71.43	0.00	0.00	0	14.29
J	20.00	0.00	0.00	80.00	0.00	0.00	0	0.00
K	0.00	0.00	14.29	57.14	0.00	0.00	0	28.57
L	0.00	0.00	0.00	100.00	0.00	0.00	0	0.00
M	44.44	0.00	11.11	33.33	11.11	0.00	0	0.00
N	41.67	0.00	8.33	50.00	0.00	0.00	0	0.00
O	10.00	0.00	0.00	80.00	0.00	0.00	0	10.00
P	20.00	0.00	10.00	70.00	0.00	0.00	0	0.00
Q	14.29	0.00	0.00	85.71	0.00	0.00	0	0.00
R	0.00	0.00	25.00	75.00	0.00	0.00	0	0.00
S	75.00	0.00	0.00	25.00	0.00	0.00	0	0.00
T	0.00	0.00	33.33	66.67	0.00	0.00	0	0.00

A number of trends were visible when the percentages of the four main artefact categories (flakes, flaked pieces, cores and microdeb tage) were graphed.

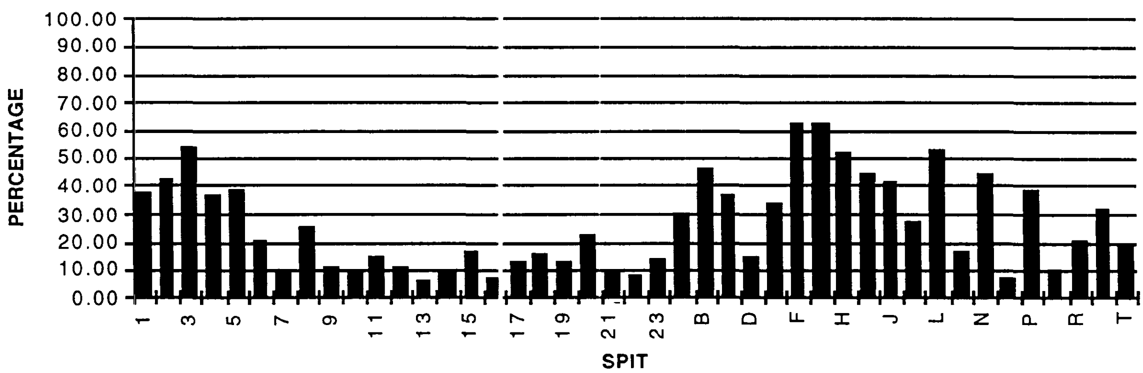
5.6.1 Flakes

The following graphs depict the percentages of quartz, fine grained and coarse grained artefacts that flakes per spit per each raw material assemblage. These graphs revealed similarities of trends between the percentages of quartz and fine grained in each raw material assemblage.

QUARTZ FLAKE PERCENTAGE/SPIT



FG FLAKE PERCENTAGE/SPIT



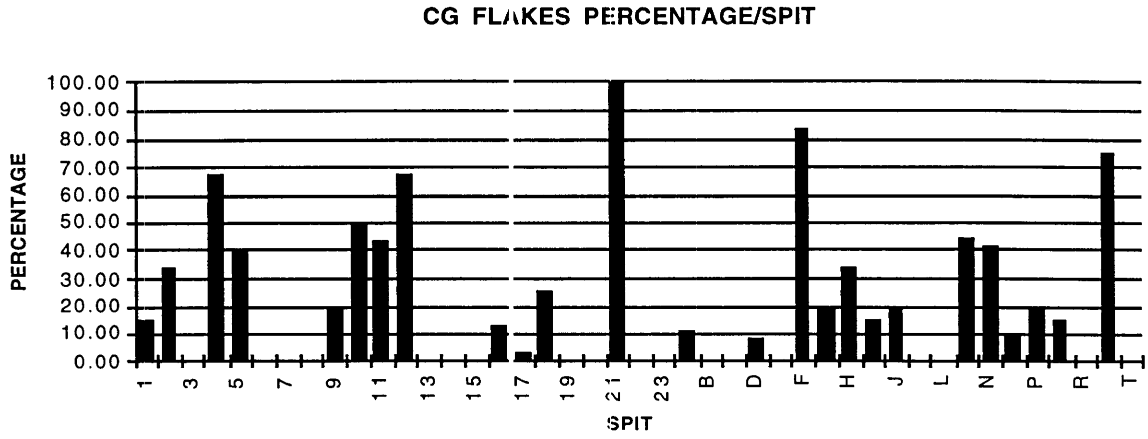


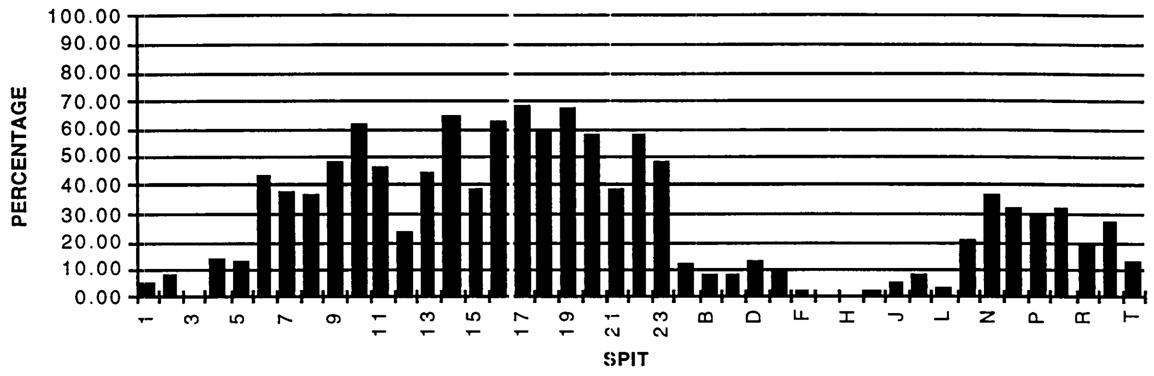
FIGURE 5.4

The coarse grained percentages did not correlate with the trend noted in the quartz and fine grained. The largest percentages in the quartz and fine grained occurred around phases G and H (H has a radiocarbon date of 5760 BP). This date is before the appearance of backed artefacts in the sequence which occurred at approximately 4750 BP. The percentage of flakes again rise after 1380 BP (spit 2). No backed artefacts were found in spits 1 or 2, suggesting that the fall in the discard rate of flakes may have been associated with the manufacture of backed artefacts, many of which were probably removed from the site for use elsewhere.

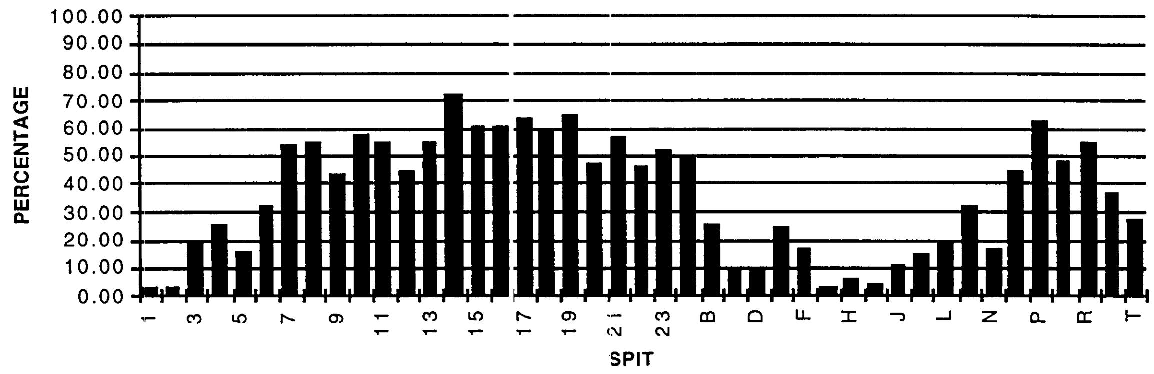
5.6.2 Flaked pieces

The percentages of quartz, fine grained and coarse grained flaked pieces per spit per raw material assemblage also show similarities between the quartz and fine grained but the trends were approximately the reverse of the flakes (see following figures). Again the coarse grained flaked pieces showed no trends or similarities with the other two groups. This suggests that many of the flaked pieces were also the result of backing artefacts but much less reduction was taking place before this period and also following the apparent cessation of backed blade manufacture.

QUARTZ FLAKED PIECES PERCENTAGES/SPIT



FG FLAKED PIECES PERCENTAGE/SPIT



CG FLAKED PIECES PERCENTAGE/SPIT

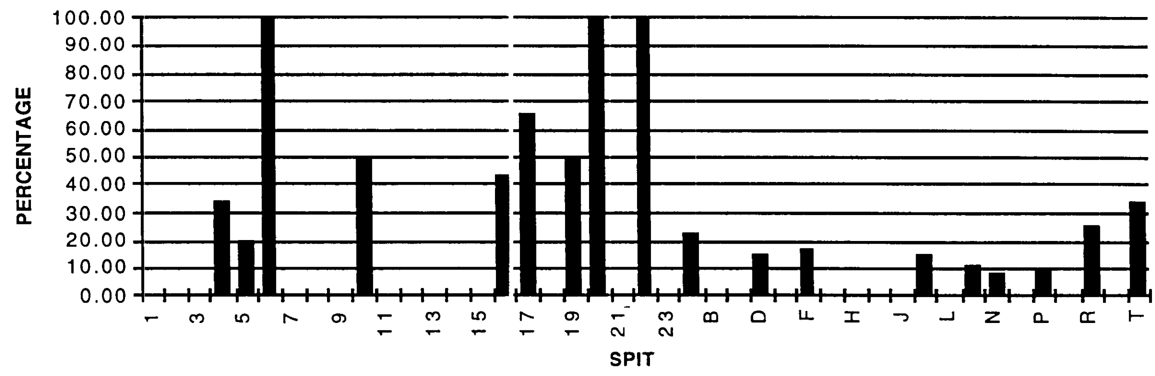
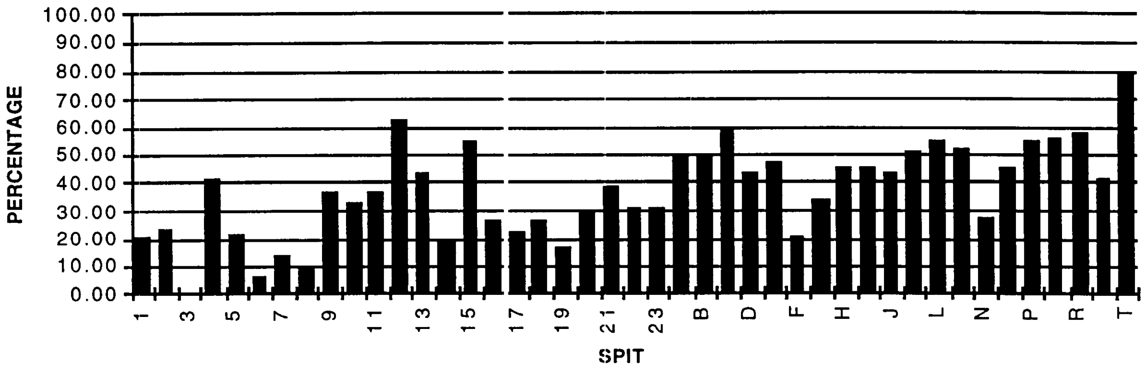


FIGURE 5.5

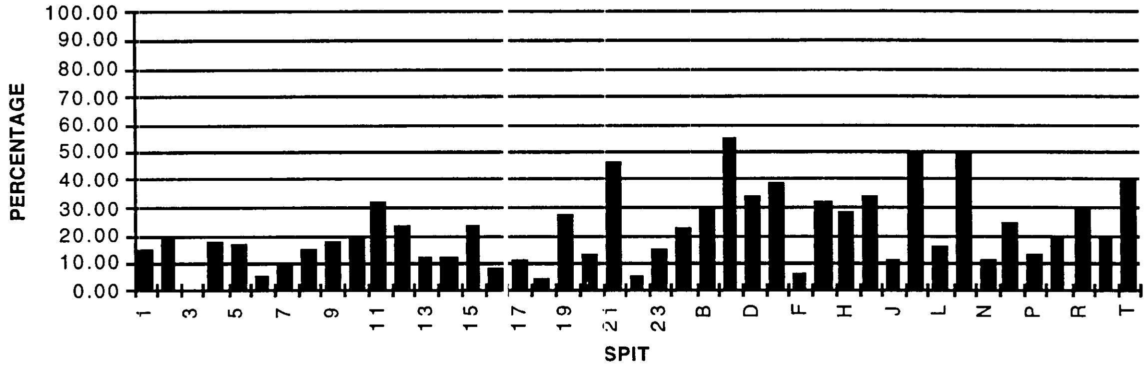
5.6.3 Cores

The following graphs depict the percentages of the quartz, fine grained and coarse grained cores per spit per raw material assemblage. These do not show any similarities between the quartz and fine grained. A trend was observed in the quartz core percentage generally decreasing from the oldest (T) to the youngest spit (1). A slight general decrease occurred in the percentage from spit (T) to spit (1), but there were many inconsistencies in between.

QUARTZ CORE PERCENTAGE/SPIT



FG CORE PERCENTAGE/SPIT



CG CORE PERCENTAGE/SPIT

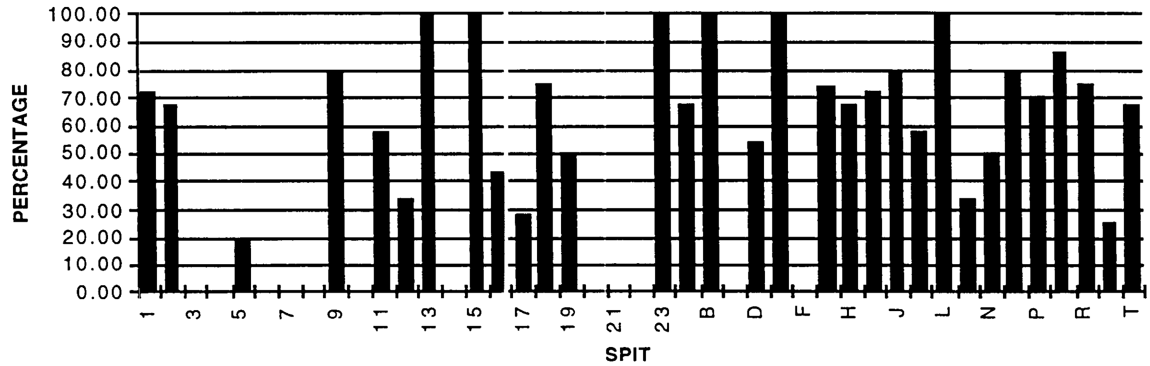
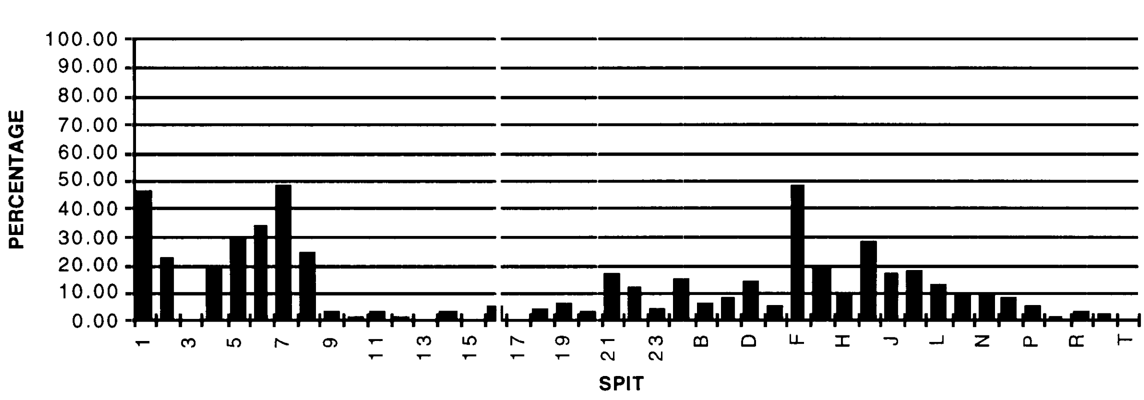
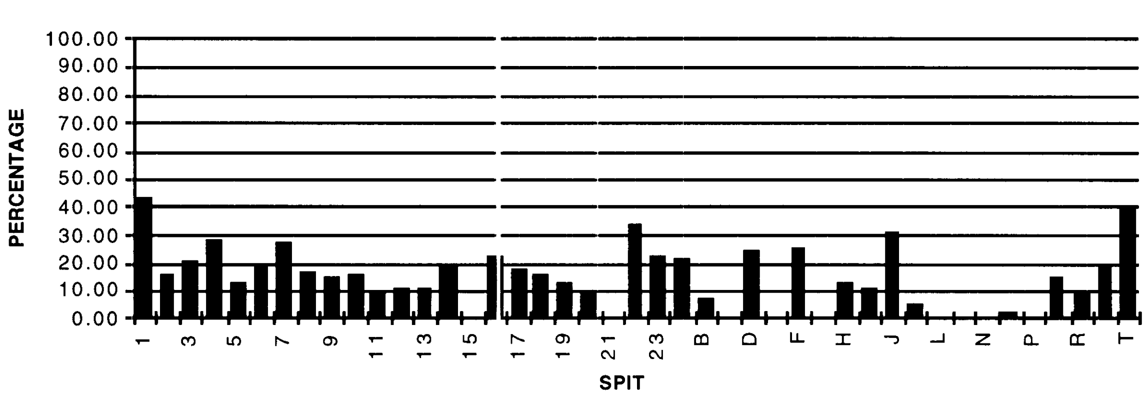


FIGURE 5.6

5.6.4 Microdebitage

The following figures show that the percentage of quartz, fine grained and coarse grained microdebitage per spit per raw material assemblage. It was generally under 20% between spit 23 to spit 1 in fine grained. The quartz percentages, however, varied, with a general rise between the oldest spit (T) to spit F, but then it fell away between spit E and spit 7 and was generally under 10%. Between spit 8 and spit 1 the percentage was above 20% (except in spit 3). Coarse grained microdebitage was only present in five spits of which none were adjoining. It is obvious that coarse grained was not being reduced to any great extent in any of the spits.





CG MICRODEBITAGE PERCENTAGE/SPIT

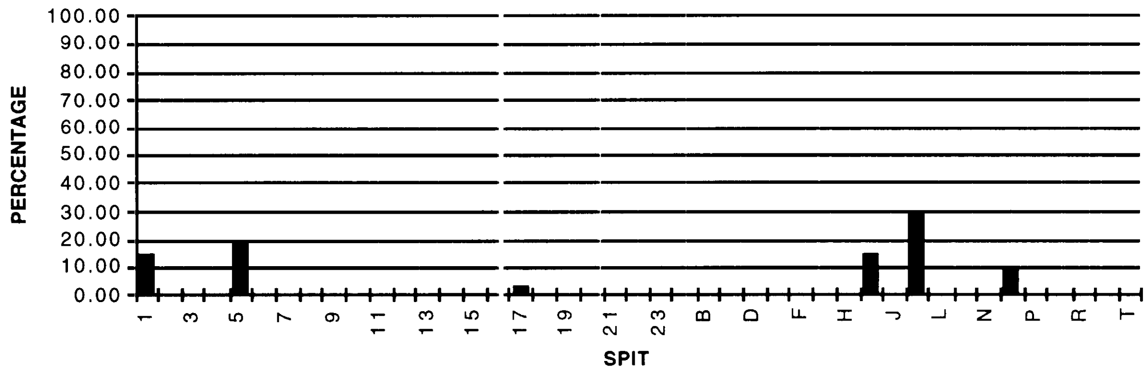


FIGURE 5.7

5.6.5 Summary of four main artefact categories

There are similar trends through time in artefact category percentages in quartz and fine grained flakes and flaked pieces. There are reverse trends between the flakes and flaked pieces in both the quartz and fine grained. There are no correlations with the coarse grained percentages in any of the four main artefact categories with quartz and fine grained. There are no correlations between the quartz and fine grained for core and microdebitage percentages. There is a trend, however, in the quartz core percentages that generally decline in the percentages from the oldest to the youngest spit. The analysis now continues using the four analytical phases selected earlier in this chapter which corresponded to units approximating the ages of the four phases of the predictive model (see Chapter Two).

5.7 PREFERENCE FOR RAW MATERIAL

5.7.1 Raw material numbers and percentages

The raw material group numbers and associated artefact densities of the Crazyman Shelter were then condensed into the four phases selected for the analysis. The results were as follows:

	RAW MATERIAL				
Date	**quartz**	**FG**	**CG**	**total**	**arts/kg**
phase 1	145	98	10	253	7.44
phase 2	1464	2146	102	3712	6.42
phase 3	1789	597	152	2538	3.40
phase 4	174	85	23	282	2.22
GR. TOTAL	**3572**	**2926**	**287**	**6785**	

TABLE 5.7

The previous table shows that quartz was the dominant material prior to 5090 BP. Quartz regained its dominance between 1380 and 200 BP. This phase (1) had the highest density of artefacts per kilogram in the site.

Converting these numbers to percentages (see following graph) shows more dramatically the rise in the popularity of the fine grained material in phase 2 and the fall off in quartz in the same period. The percentage of coarse grained although under 10 % in all four phases, decreases from phase 3 through to phase 2. The graph also shows the largest percentage of quartz artefacts occurred in phase 3 (7410 to 5090 BP).

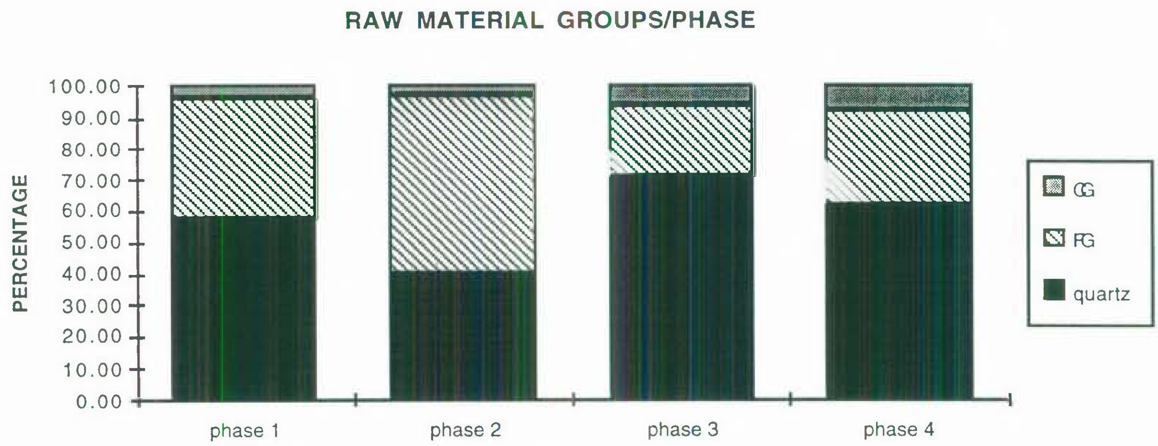


FIGURE 5.8

In order to ascertain its there were statistically significance associations between raw material and the phases, chi square tests were carried out. The calculations were as follows :

phase	obs. quartz	exp.	obs. FG	exp.	obs. CG	exp.	total
1	145	133	98	109	10	11	253
2	1464	1954	2146	1601	102	157	3712
3	1789	1336	597	1095	152	107	2538
4	174	148	85	122	23	12	282
calculations		1.047		1.13		0.046	2.223
		122.965		185.698		19.276	327.939
		153.485		226.137		18.566	398.188
		4.394		11.022		10.276	25.692
							754.042

degrees of freedom = 6.

Observed value for chi square for 6 degrees of freedom at 0.05 is 12.5916, so the conclusion is that raw material is significantly associated with phase. In particular, in phase 3, there are much fewer fine grained and more quartz than expected and in phase 2, there are more fine grained and less quartz than expected by chance. This may indicate a preference for fine grained material in phase 2 and quartz for phase 3. The frequency of raw materials in phase 4 and 1 is fairly close to expected.

5.8 BACKED ARTEFACTS

The following table records the Backed blades found in the Crazyman Shelter. They all belong to spits from phase 2.

BACKED BLADE FREQUENCY

spit	9	11	12	13	14	15	16	17	18	20	total
quartz	1		1	1	3	1	2	2			11
FG		1	1	2	1		1	2	1	6	15

TABLE 5.8

Most researchers of Aboriginal stone artefacts in Southeastern Australia, come across these artefacts in assemblages that are dated to somewhere between 5000 and 1000 (uncalibrated) BP (White and O'Connell 1982:117-120). In some areas they are found at later dates (see Hiscock 1986), but there are no ethnographic accounts of their manufacture or for that matter their use. In all probability they ceased being manufactured before Europeans arrived in any particular area. The date of their first appearance in a site is of some consequence as most of these artefacts first appear some time after the 5000 (uncalibrated) BP date. The first backed artefact (it was manufactured from fine grained) appeared at the Crazyman Shelter in phase 2 at a depth of about 37 mm from the bottom of the phase (this equates to approximately 4750 (calibrated) BP according to the age/depth graph in figure 5.1).

This use of fine grained material in phase 2 may then be connected with the manufacture of backed artefacts as this material is easier to control in any knapping procedures (personal experience) but quartz was also used in their manufacture. The low percentage of flakes and the high percentage of flaked pieces in this phase may be an indication of backed blade production. This low number of backed blades (26) in the total assemblage, may be related to the quality of artefacts made, as backed artefacts would hardly be left in a site unless they were broken, imperfect, lost or worn out and discarded. Kuhn (1994:435-436) has argued that the most economical way to have carried raw material around the landscape was by way of a number of flakes. The large fall in the percentage of flakes in quartz and fine grained in this phase may well relate to economies of transportation in this phase.

5.9 DEGREE OF REDUCTION

5.9.1 Artefact categories

Variability in the degree of reduction of the raw material is an indicator of human behaviour. To this end, artefacts were divided into their respective categories, with some categories being of greater importance than others for the degree of reduction. Numbers were allocated to each artefact type in the recording of each assemblage. These numbers are also used in the following tables. Although there are very few numbers were recorded in some artefact types, these types were used in past analyses (Gaynor 1987, Wall 1993), and some comparisons were desirable. Whether the artefacts were present in large numbers or not, is a result in itself, especially as there were some reasonable numbers recorded in the past (for example - lamellates - see Gaynor 1987). Lamellates are connected with many assemblages that contain bipolar cores and bipolar knapping is known to have been carried out on quartz pebbles in the region (Gaynor 1987, Wall 1993). The artefacts recorded in each category is listed in the following table :

ARTEFACT CATEGORIES/PHASE

LEGEND 1= flakes, 2= lamellates, 3= flaked pieces, 4= cores, 5= amorphous blocks, 6= grindstone, 7= hammerstone or anvil, 8= microdebitage

quartz numbers

	1	2	3	4	5	6	7	8	total
phase 1	46	0	09	31	0	0	0	59	145
phase 2	189	0	729	393	02	0	0	151	1464
phase 3	491	1	209	772	22	3	0	293	1789
phase 4	35	0	36	97	01	0	0	05	174
totals	761	1	983	1291	25	3	0	508	3572

fine grained numbers

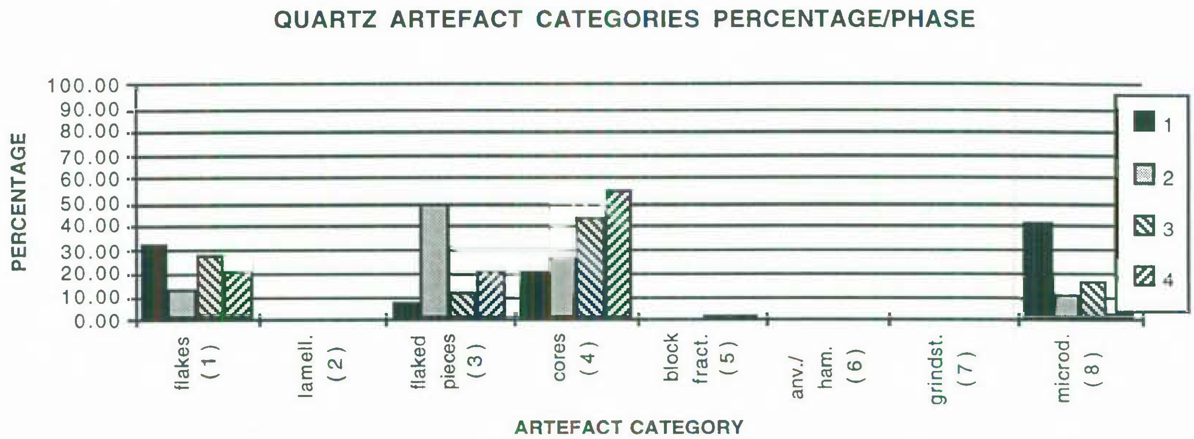
	1	2	3	4	5	6	7	8	total
phase 1	39	0	39	17	01	0	0	30	98
phase 2	291	0	1201	308	02	0	0	344	2146
phase 3	234	1	129	130	13	1	0	89	597
phase 4	20	0	27	23	01	0	1	12	85
totals	582	1	1368	478	19	1	1	475	2626

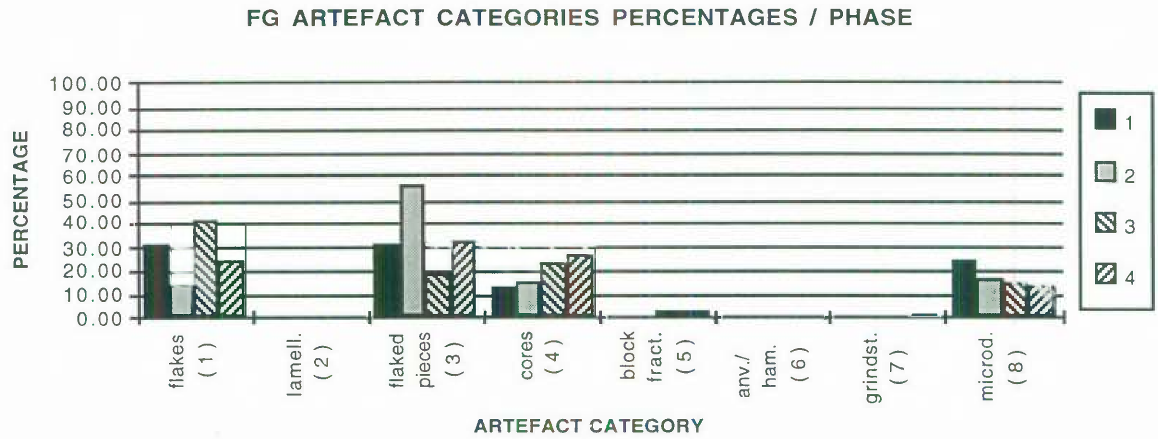
coarse grained numbers

	1	2	3	4	5	6	7	8	total
phase 1	02	0	0	07	0	0	0	1	10
phase 2	19	0	41	40	0	0	0	2	102
phase 3	30	0	09	104	1	3	1	4	152
phase 4	03	0	05	15	0	0	0	0	23
totals	54	0	55	166	1	3	1	7	287

TABLE 5.9

This data can be represented graphically as follows(with raw scores converted to percentages of artefacts per phase).





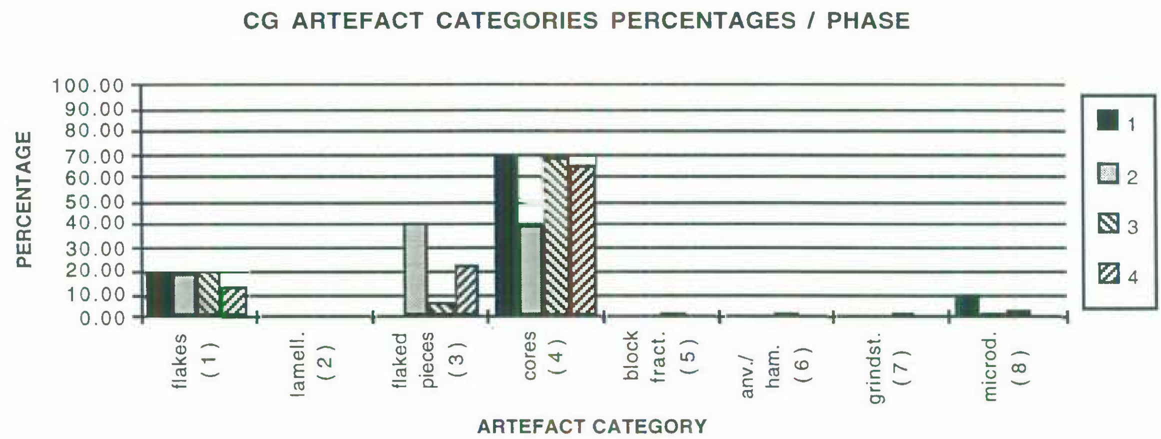


FIGURE 5.9

5.9.2 Flakes (1)

The graphs show that :

a) The flake percentages for quartz and fine grained were nearly identical in phases 1 and 2 (about 30 and 12 %), but were slightly higher in fine grained in phases 3 and 4. There were substantial rises in the quartz and fine grained percentages from phase 2 to phase 1 (quartz - 13% to 32% and fine grained - from 14 to 31%).

(b) Flake percentages for coarse grained were consistent in phases 1, 2 and 3 but were lower in phase 4 (the oldest phase). The percentages were, however, different to quartz and fine grained in all phases.

(c) Flake percentages are higher in all three raw material groups in phase 4 than in phase 3.

(d) Overall the lowest percentage of flakes per assemblage is in phase 2 but this part of the analysis does not tell us what type of flakes have been recovered - complete flakes or ones that have been broken (and there are two type of breaks). The flakes will be analysed later in this chapter. These tables show that analysing just the fine grained section of the assemblage as far as flake percentages were concerned would have been given a fair indication of the percentage of flakes in quartz but not in coarse grained.

5.9.2 Lamellates (2)

Very low percentages of lamellates were present at the Crazyman Shelter in all phases, so analysing only the fine grained would have given a similar result to analysing the entire assemblage.

5.9.3 Flaked pieces (3)

a) By far the highest percentages of flaked pieces per raw material assemblage were in phase 2. The fine grained percentage in phase 2 was the highest at 56%, closely followed by the quartz percentage (50%) and coarse grained (40%). The percentages of quartz flaked pieces in phases 3 and 4, were much lower than that of fine grained in those phases (quartz 12% & 21% and fine grained 32% and 32%.

b) Overall the lowest percentages of flaked pieces in all raw material groups were in phase 1. Further analysis of these flaked pieces seemed to be of value, as they seem to be closely connected with the degree of reduction of the raw material. Analysing only the fine grained for the flaked pieces would not have given a representative finding in this part of the assemblage. Further analysis of flaked pieces will be carried out later in this chapter.

5.9.4 Cores (4)

Phase 1 had the lowest percentages of quartz and fine grained cores per assemblage. There were decreasing percentages in fine grained and quartz cores from phase 4 through to phase 1 but the coarse grained percentages do not follow this trend with core percentages between 60 and 70 % in phases 4, 3, and 1 but falling to 39% in phase 2. This small percentage of quartz and fine grained cores in phase 1 may be connected with more reduction of the raw material than in the other phases. Further analysis of all cores will be carried out later in this chapter in an effort to pinpoint the likely cause or causes of these differences in raw material percentages.

5.9.5 Amorphous blocks (5)

Most block fractures occurred in phase 3 but overall percentages were nil or very small in all phases. These block fractures may be related to the quality of material used or knapping skills, but there seemed little difference between the fine grained and quartz percentages.

5.9.6 Grindstone (6)

There were five artefacts showed signs of grinding, these were all in phase 3.

5.9.7 Anvil/hammerstone (7)

There were three artefacts that belonged to this category in the whole assemblage and these were recorded in phases 3 and 4.

5.9.8 Microdebitage (8)

Percentages of microdebitage in all four phases for fine grained were reasonably close (range 12 to 24%). This similarity was also evident in coarse grained but percentages for coarse grained were very low in all phases (range 0 to 10%). The quartz percentage of microdebitage was very low in phase 4 (3%) but was the largest in phase 1. This percentage was much larger than the fine grained in this phase (quartz 41%, fine grained 24%).

5.10 DEGREE OF REDUCTION

5.10.1 Core Classes

The cores were divided into classes as described in Chapter 3. These were reasonably simple classifications combining cortex and rotation of cores, but because of the difficulty with analysing quartz artefacts, it was necessary to use a simple method to make some valid comparisons between the fine grained and the quartz. This method was used to give a clear indication if the knappers in the site were reducing the raw materials differently in each phase (i.e. the rotated cores without cortex were being reduced more than those cores with cortex whether rotated or not). The following table (5.10) denotes the cores in their respective classes per raw material group.

QUARTZ CORE CLASSES

phase	1	2	3	4
cortex & not rotated	4	123	339	65
cortex &rotated	10	123	265	19
no cortex and not rotated	1	41	9	3
no cortex and rotated	16	106	157	10
total	**31**	**393**	**770**	**97**

FINE GRAINED CORE CLASSES

	1	2	3	4
cortex & not rotated	1	33	16	5
cortex &rotated	1	58	21	6
no cortex and not rotated	0	46	6	4
no cortex and rotated	15	170	88	8
total	**17**	**307**	**131**	**23**

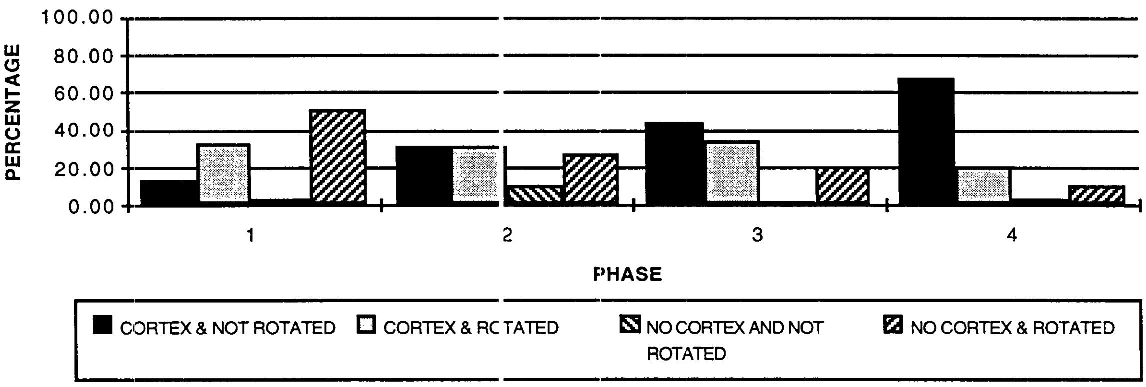
COARSE GRAINED CORE CLASSES

phase	1	2	3	4
cortex & not rotated	1	8	30	5
cortex &rotated	4	15	41	6
no cortex and not rotated	2	14	29	3
no cortex and rotated	0	3	4	1
total	**7**	**40**	**104**	**15**

TABLE 5.10

When this table is converted to percentages, certain trends are evident (see following graphs).

QUARTZ CORE CLASSES/PHASE



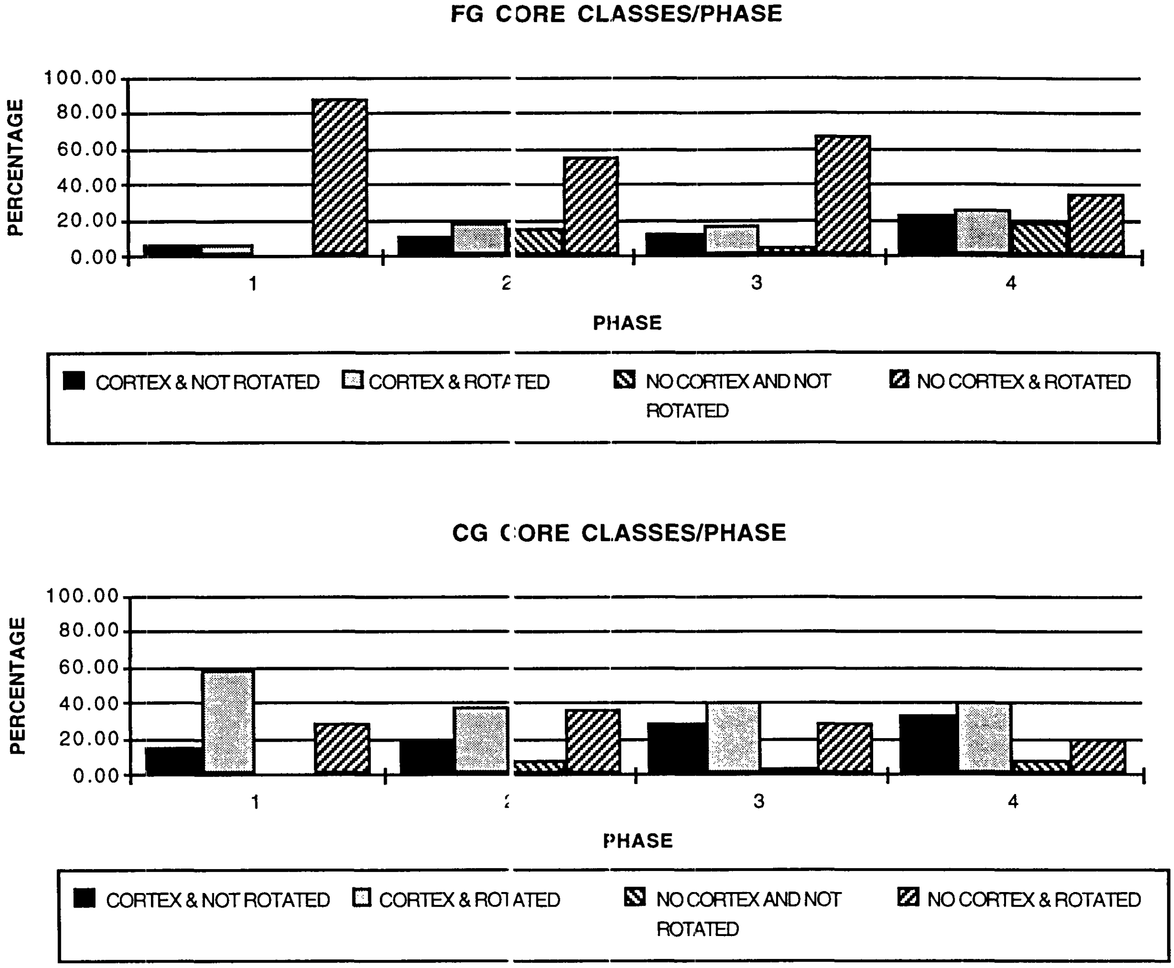


FIGURE 5.10

The trends evident in the graphs were :

1. There are decreasing percentages in the cortex and not rotated class in all three raw material groups from the oldest phase through to the youngest phase (4 to 1). The fine grained material has much higher percentages in the "no cortex and rotated" class in phase 1 than in the other three phases. fine grained also has a greater percentage in this class in all four phases than the quartz and the coarse grained indicating it was reduced more over the whole sequence than the quartz and coarse grained.

2. In quartz and coarse grained, there were increasing percentages of cores in the "no cortex and rotated" class from phase 4 through to phase 1. This suggests that more economical use of the local raw material was occurring over time. This could perhaps be related to population pressures and/or knapping skills. The ability to reduce quartz and quartzite to a stage where there is an absence of cortex and the core has been rotated requires some skill and time.

3.There were falls of percentages of cores in the "cortex and not rotated" class in quartz, fine grained and coarse grained from phase 4 through to phase 1, but the falls were much more pronounced in the quartz than in the fine grained and coarse grained.

4. In the fourth class - "no cortex and not rotated", all percentages are under 11% in quartz, under 15% in fine grained and under 8% in coarse grained. This class was not as informative as the other classes because of its small sample size. It is quite difficult to reduce a core to this stage without rotation. These small percentages may well represent a high knapping skill in some of the population.

There are some conclusions to be drawn from the above information on core classes. The main one is that the percentages of fine grained material in all classes were not consistent with the percentages of the other two raw material groups in those phases. Analysing only the fine grained material, however, would have picked up a number of trends. The main one being that there was greater reduction and so perhaps more economical use of raw material in phases 1 and 2 than in phases 3 and 4.

The high values of fine grained material in the "no cortex and rotated" class in phases 1, 2 and 3 (all over 55%) suggests that this material was being discarded more frequently on site than quartz and coarse grained cores. This could be related to a number of factors including :

1) restriction of access to the fine grained, so this material was reduced more than more accessible material.
2) special type(s) of artefacts were being made with the fine grained leading to specialised core discard.
3) Greater skill of the knappers in extracting more usable artefacts from the cores.

5.10.2 Core statistics

CORE LENGTH STATISTICS

quartz length	**phase 1**	**phase 2**	**phase 3**	**phase 4**
Mean	15.94	16.8	12.7	11.38
Range	31	40	49	25
Minimum	05	05	05	05
Maximum	36	45	54	30
Count	31	393	770	97

fine grained length	**phase 1**	**phase 2**	**phase 3**	**phase 4**
Mean	13.94	15.3	14.88	12.21
Range	30	50	33	25
Minimum	06	05	05	07
Maximum	36	50	38	32
Count	17	373	130	23

coarse grained length	phase 1	phase 2	phase 3	phase 4
Mean	17.57	27.7	22.59	18.67
Range	25	68	66	38
Minimum	10	06	06	07
Maximum	35	06	72	45
Count	7	40	104	15

CORE WIDTH STATISTICS

quartz width	phase 1	phase 2	phase 3	phase 4
Mean	11.38	11.4	8.90	8.20
Range	28	28	40	17
Minimum	03	03	02	04
Maximum	31	31	42	21
Count	423	393	770	97

fine grained width	phase 1	phase 2	phase 3	phase 4
Mean	10.03	10.1	10.02	8.31
Range	31	31	27	24
Minimum	02	02	04	04
Maximum	33	33	31	28
Count	324	308	130	23

coarse grained width	phase 1	phase 2	phase 3	phase 4
Mean	18.45	19.9	15.92	11.70
Range	49	47	47	33
Minimum	03	05	05	04
Maximum	52	52	52	37
Count	47	40	103	15

CORE THICKNESS STATISTICS

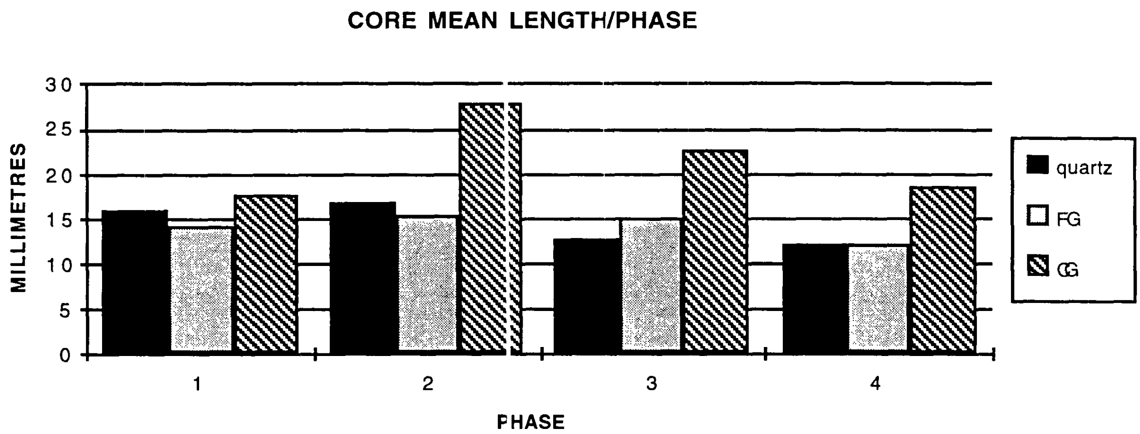
quartz thickness	phase 1	phase 2	phase 3	phase 4
Mean	6.33	6.63	5.55	4.96
Range	32	32	39	10
Minimum	01	01	01	02
Maximum	33	33	40	12
Count	423	393	770	97

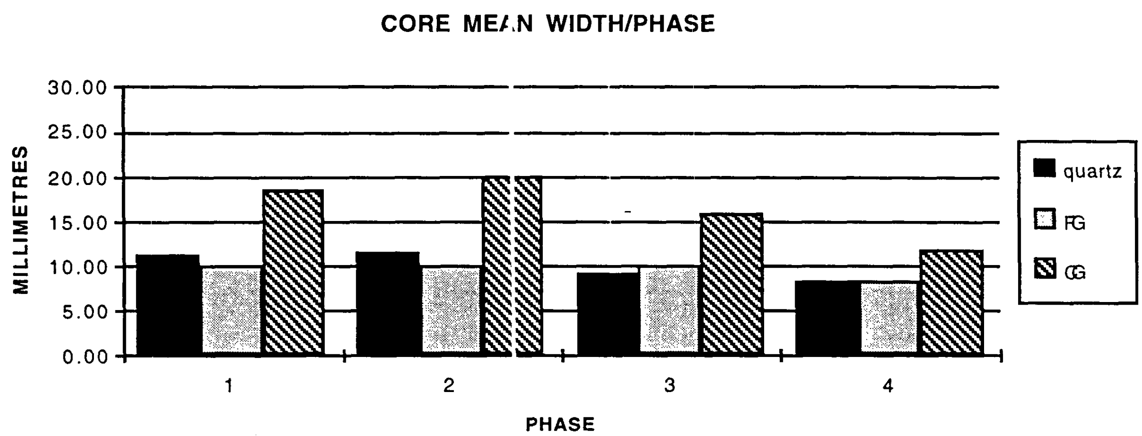
fine grained thickness	phase 1	phase 2	phase 3	phase 4
Mean	5.76	5.20	6.06	5.09
Range	26	33	23	20
Minimum	01	01	01	02
Maximum	27		24	22
Count	324	308	130	23

coarse grained thickness	phase 1	phase 2	phase 3	phase 4
Mean	10.45	11.5	9.02	7.34
Range	41	40	40	25
Minimum	02	03	02	02
Maximum	43	40	42	27
Count	47	40	103	15

TABLE 5.11

There are a number of trends in the means in this table which are highlighted in the following graphs.





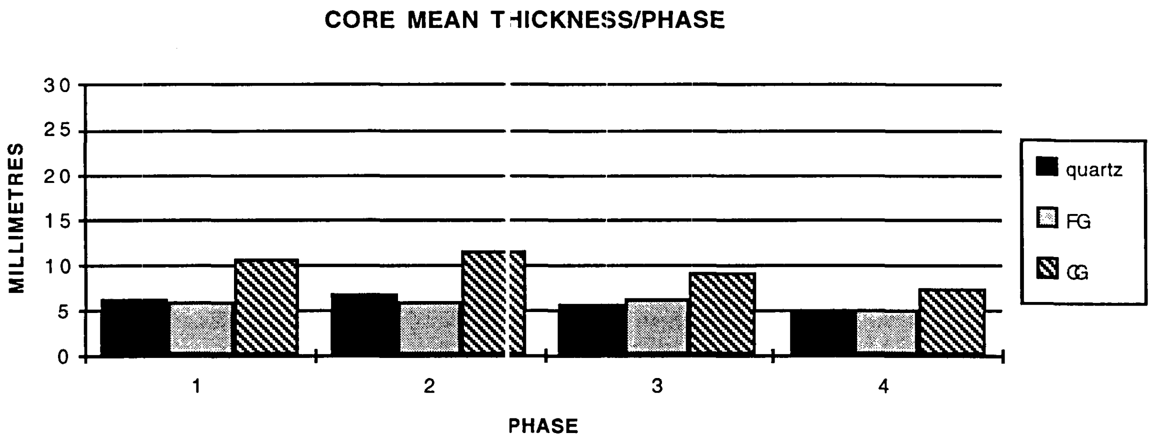


FIGURE 5.11

The trends visible in the graphs were :

1. The mean lengths, widths and thickness of quartz and coarse grained get larger from phase 4 through to phase 2, but decrease in phase 1 (this decrease is only slight in quartz).

2. fine grained means were different inasmuch as the lengths, widths and thickness were about equal for each dimension in phases 1 and 2 but were smaller in phases 3 and 4. In this respect analysing the means of only the fine grained cores would have missed some valuable information in the quartz and coarse grained. The quartz and coarse grained results revealed that, on the average, larger cores were being discarded in phase 2 and progressively into phase 1 whereas the fine grained means of the three dimensions were about the same in phases 1 and 2.

3. The maximum mean length of all three raw materials occurred in phase 2. The range of lengths was greatest in phase 2 for fine grained and coarse grained (45 and 68 respectively) whereas quartz had its greatest range in phase 3 (49).

4. phase 4 has the smallest range in lengths, widths and thicknesses in quartz and fine grained. This suggests that there was less pressure on stone resources than in the three younger phases. This may have been because the knappers probably had a better selection of raw material and were able to choose sizes that would take a minimum of reduction to obtain the desired length of flake. Using only the fine grained for inferences of this particular facet of human behaviour would have obtained a similar result.

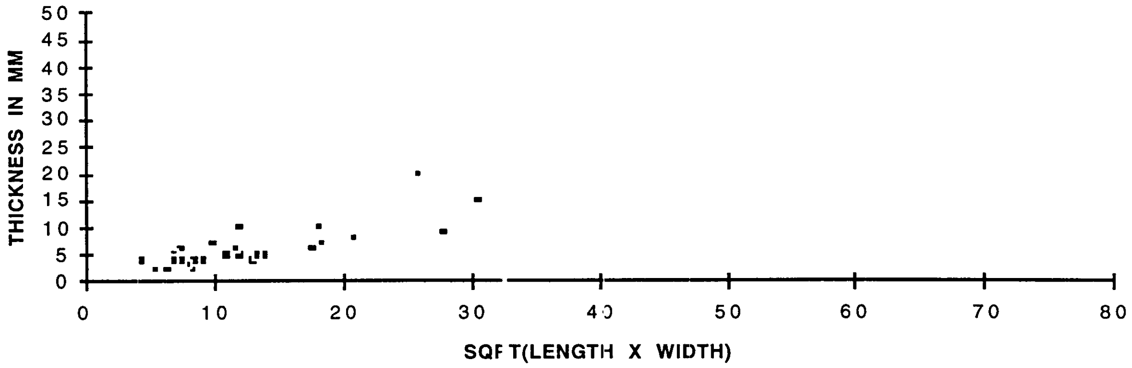
5.10.3 Core Reduction charts

The dimensions of the cores in each raw material group were used to construct Reduction Charts for each phase. As described in 2.3, the square root of length multiplied by width is plotted against the thickness in a scattergram. This enables a visual representation of the sizes of cores when discarded. This can be responsible for detecting changes in reduction of the raw material and detecting differences between quartz, the fine grained and coarse grained materials. The Reduction charts of cores in each raw material group can be then used to detect changes between the phases and also in comparing the reduction of cores between the raw material groups in each phase. All charts were constructed using the same axis dimensions, so comparisons could be made between all phases and the 5 surface assemblages discussed in Chapter 6. These axis were determined using the largest representation in any of the charts. This meant that the Y axis was 50 mm and the X axis was 80 mm. The charts were constructed regardless of the number of cores in each particular raw material per phase in this chapter or per site in Chapter 6.

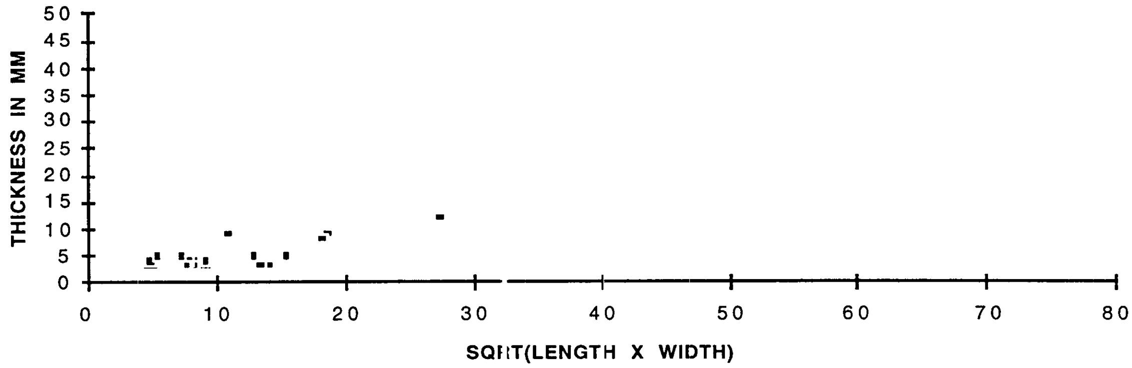
The Reduction charts in the following pages are grouped one page per phase.

These charts show that in phase 4 (the oldest phase), all but one of the fine grained cores occur between 5 and 15 on the X axis, while quartz is distributed between 5 and 25. In phase 3, the fine grained cores occur between the 5 and 30 on the X axis while quartz is between 5 and 48. This implies that some of the quartz cores were not reduced to the extent of the fine grained. This, however, is not repeated in phase 2 and phase 1 where the spread of the quartz and fine grained cores is roughly the same on the X axis. The spread of the coarse grained cores in all phases except phase 1, is much greater than the quartz and fine grained cores. In phase 1 the spread of coarse grained cores on the X axis is about the same (between 5 and 30). These charts show that in phases 3 and 4 quartz was not being reduced as much as the fine grained but there is very little difference in phase 2 and 1. This signifies the growing importance of quartz from the beginning of phase 2 (about 5000 BP) to contact time.

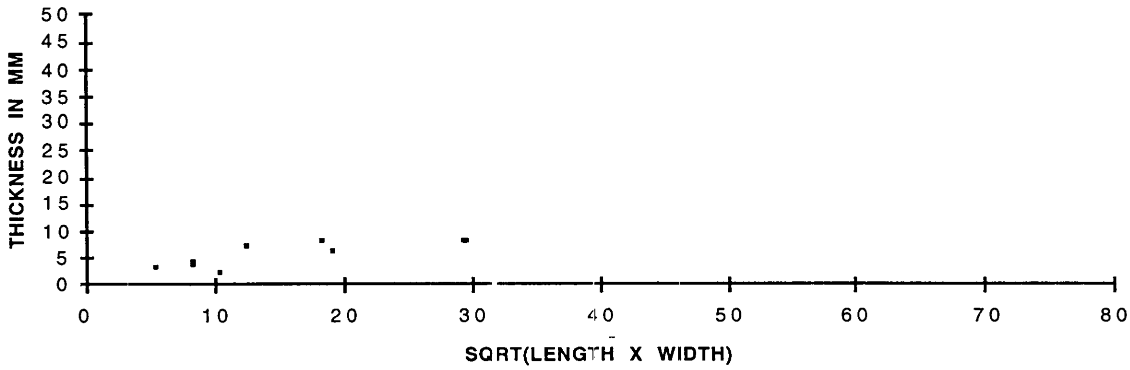
CMS PHASE 1 QUARTZ CORES REDUCTION CHART



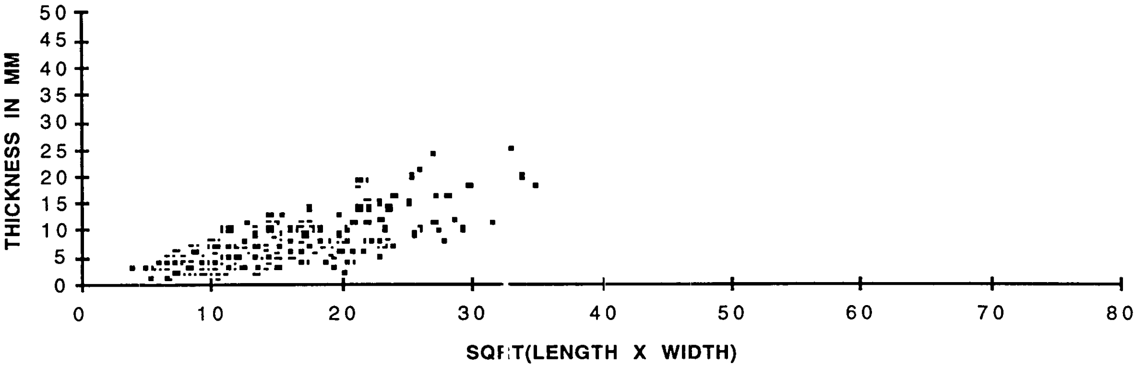
CMS PHASE 1 FINE GRAINED CORES REDUCTION CHART



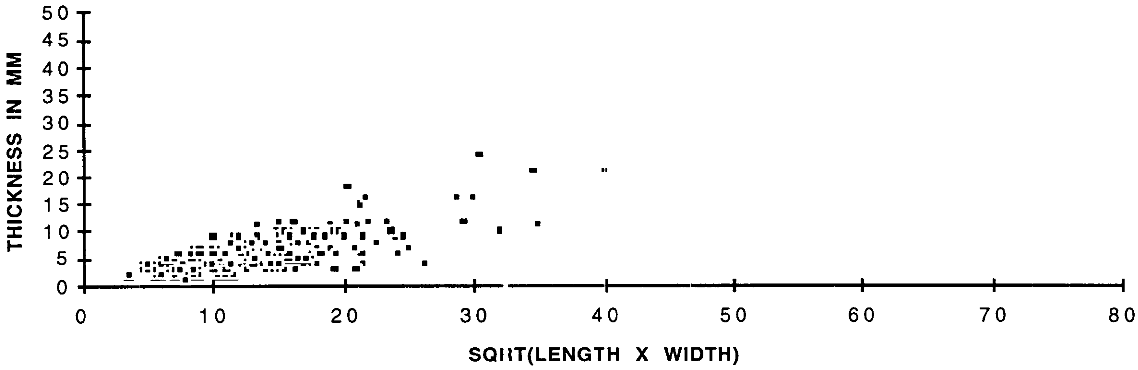
CMS PHASE 1 COARSE GRAINED CORES REDUCTION CHART



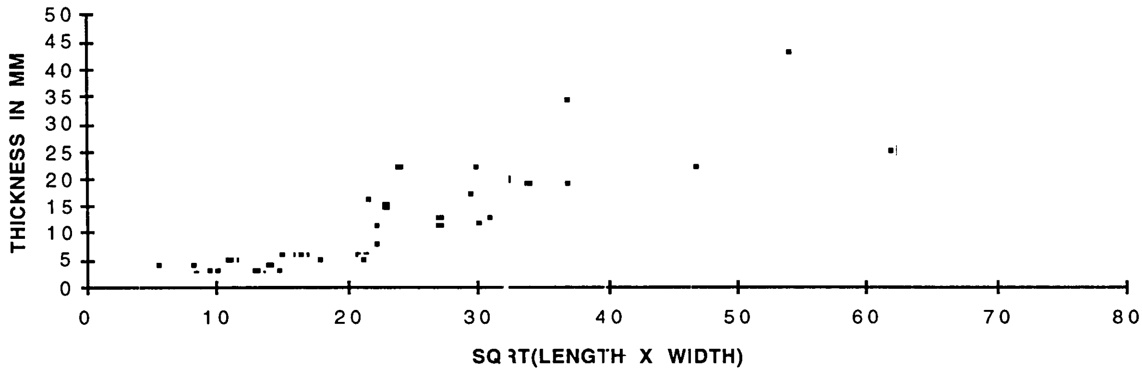
CMS PHASE 2 QUARTZ CORES REDUCTION CHART



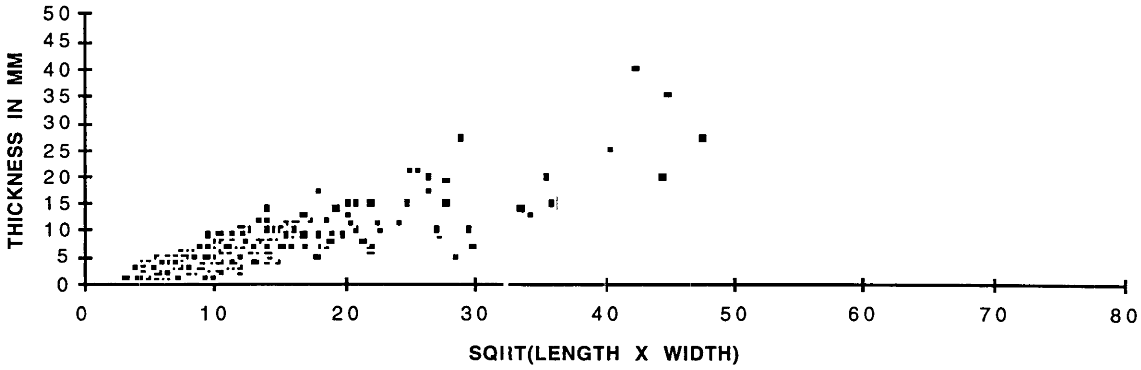
CMS PHASE 2 FINE GRAINED CORES REDUCTION CHART



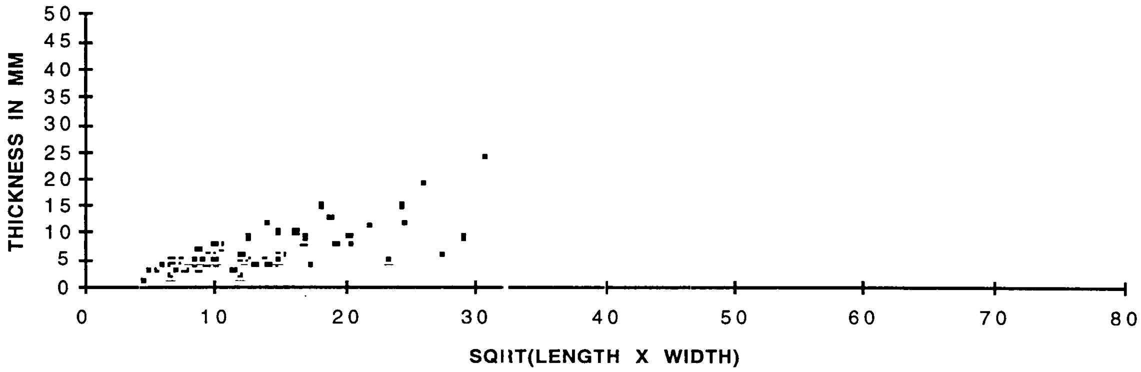
CMS PHASE 2 COARSE GRAINED CORES REDUCTION CHART



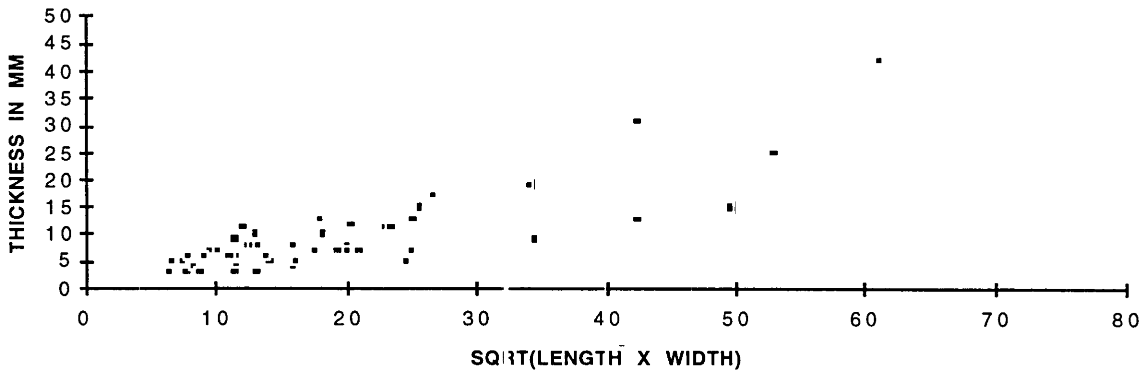
CMS PHASE 3 QUARTZ CORES REDUCTION CHART



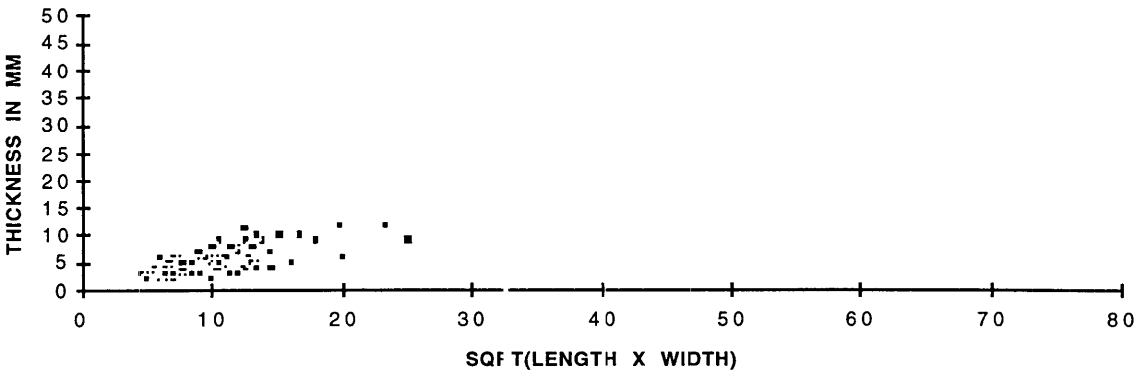
CMS PHASE 3 FINE GRAINED CORES REDUCTION CHART



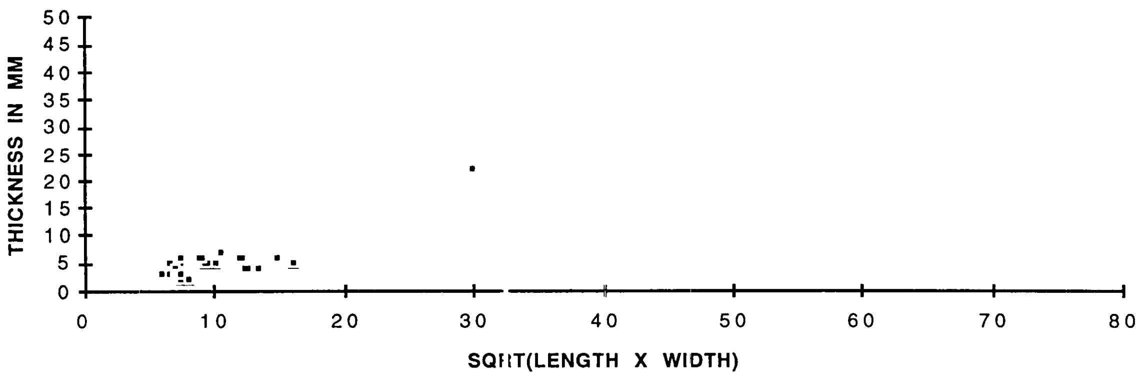
CMS PHASE 3 COARSE GRAINED CORES REDUCTION CHART



CMS PHASE 4 QUARTZ CORES REDUCTION CHART



CMS PHASE 4 FINE GRAINED CORES REDUCTION CHART



CMS PHASE 4 COARSE GRAINED CORES REDUCTION CHART

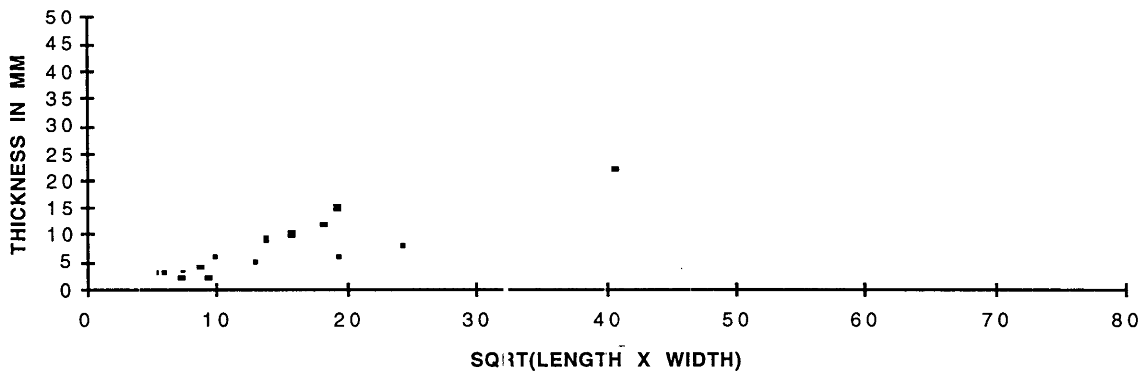


FIGURE 5.12

5.10.4 Core and flake cortex

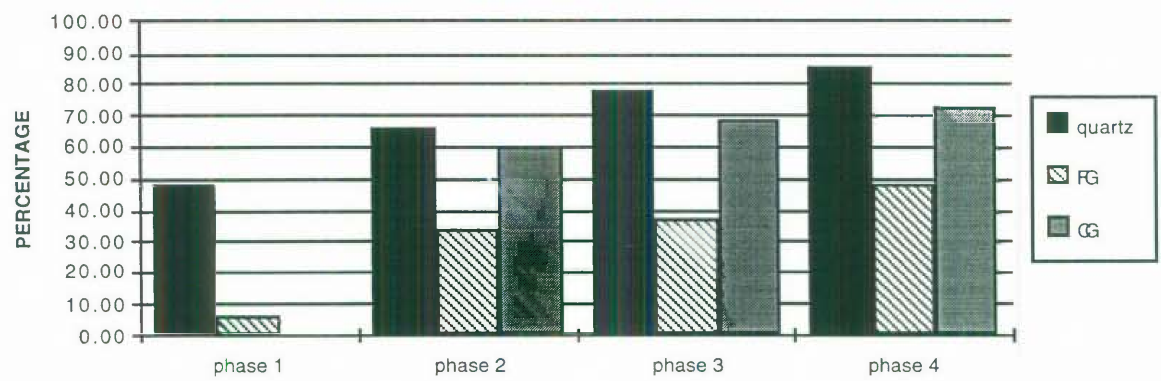
Hiscock (1984:185) has stated that from his experience at Lawn Hill in far Northwestern Queensland, the size of flakes and cores diminished as the distance from the area from which the raw material was originally quarried increased. He also stated that the amount of cortex found on flakes and cores decreased as the distance from the sources increased. Tables denoting cores and flakes with cortex are now presented, this is particularly important because the raw material sources of most fine grained artefacts have not been located at Coonabarabran and cortex and sizes of flakes and cores may be instrumental in suggesting whether the raw material is local or not.

	quartz	fine grained	coarse grained
PERCENTAGE OF CORES WITH CORTEX			
phase 1	48.28	5.88	no cores
phase 2	65.9	34.05	60.00
phase 3	77.89	37.29	67.96
phase 4	84.85	47.83	73.33
mean	68.13	34.51	66.06
PERCENT OF FLAKES WITH CORTEX			
phase 1	28.26	5.09	50.00
phase 2	17.81	16.20	26.67
phase 3	24.95	4.27	30.00
phase 4	40.00	0.00	66.67
mean	22.13	5.88	29.63

TABLE 5.12

Trends are more visible if the percentages are graphed (see figure 5.13)

CORES WITH CORTEX/PHASE



FLAKES WITH CORTEX/PHASE

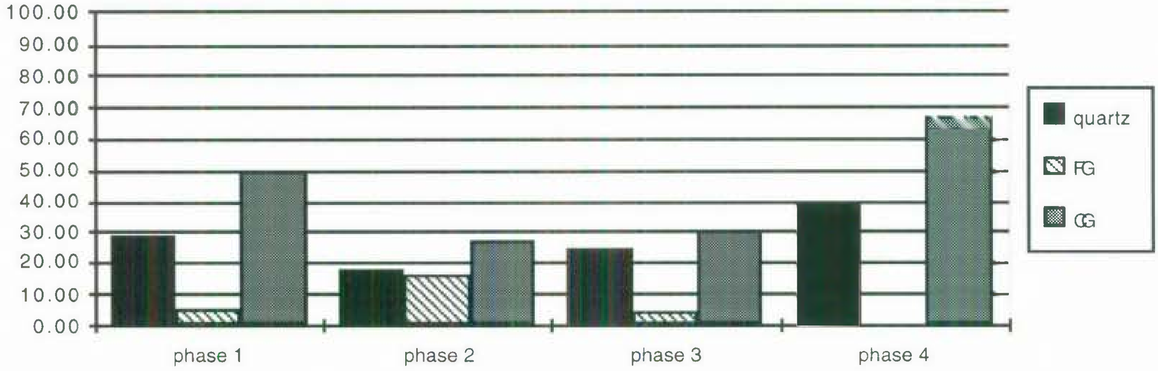


FIGURE 5.13

From these tables and graphs, a number of aspects of raw material reduction can be gleaned. These are :

1. There is a much greater percentage of cores with cortex present than the percentages of flakes with cortex in the corresponding phases in the three raw material groups.
2. The percentage of cores and flakes with cortex present, is much lower in fine grained than in the quartz and coarse grained. This would indicate that on the average, fine grained was being discarded further away from its source than the quartz and coarse grained (as the quartz and coarse grained were obtainable within 1 km of the site, this was not an unexpected result).
3. The most noticeable trend in the core graph is the decrease in the percentages of cores with cortex present from phase 4 (the oldest phase) through to phase 1 (the youngest phase) in all three raw material groups. This, however, was not the case for the flakes with cortex as they decreased in percentage from phase 4 through to phase 1 for quartz and coarse grained but the percentage rose again for phase 1.
4. Although the percentage of fine grained flakes with cortex was always under 17%, the percentage rose from phase 4 (0%) through phase 2 (16.20%), but fell in phase 1 (5.09%).
5. The mean of the percentage of cores with cortex in fine grained was about half that of quartz and coarse grained. This demonstrates that this material was being more economically reduced than the two local raw materials and suggests that the fine grained material (chert, jasper or chalcedony) was in short supply in the area or that the sources of these fine grained materials were much further away than the quartz or coarse grained.
6. The smallest percentage of cortex on quartz cores is in phase 1. This indicates that the raw material was being reduced more than in previous phases and is according to Hiscock (1984, a sign of heavier rationing than the previous phases.

5.10.5 Flake Classes

The flakes were divided into classes according to whether they were complete or displayed a certain type of breakage. The following table depicts the complete flakes per raw material group.

COMPLETE FLAKES PER RAW MATERIAL GROUP

quartz				
phase	**1**	**2**	**3**	**4**
total flakes	46	189	491	35
complete flakes	10	66	129	9
percentage complete	21.74	34.92	26.27	25.71
fine grained				
phase	**1**	**2**	**3**	**4**
total flakes	39	291	234	20
complete flakes	04	137	29	5
percentage complete	10.26	47.07	12.39	25.00
coarse grained				
phase	**1**	**2**	**3**	**4**
total flakes	02	15	29	03
complete flakes	0	06	11	03
percentage complete	0	40.00	37.93	100.00

TABLE 5.13

The number of different types of breaks on flakes per each raw material group was next obtained. These are depicted in the following table (5.14).

TYPE OF FLAKE BREAKS (in numbers)

quartz				
phase	**1**	**2**	**3**	**4**
transverse	12	50	117	14
longitudinal	14	28	178	11
t & l	8	45	69	1
unknown	2	0	0	0
total flakes	46	189	491	35
fine grained				
phase	**1**	**2**	**3**	**4**
transverse	14	91	110	13
longitudinal	12	21	64	1
t & l	9	42	24	1
unknown	0	0	0	0
total flakes	39	291	234	20

coarse grained				
phase	1	2	3	4
transverse	1	5	6	0
longitudinal	1	2	11	0
t & l	0	2	1	0
unknown	0	0	0	0
total flakes	2	15	29	3

TABLE 5.14

Trends in the table were more apparent when these numbers were converted to percentages. In this table, flakes with both types of breaks (t&l) were included in both the transverse and longitudinal percentages. The total percentages of breaks if calculated against the total number of flakes in each raw material assemblage will then exceed 100%. These were as follows :

FLAKE BREAKAGE PERCENTAGES

quartz				
phase	1	2	3	4
transverse	30.44	50.27	37.88	42.86
longitudinal	47.83	38.62	50.31	37.14
unknown	0.00	0	0	16.67
total flakes	46	189	491	35
fine grained				
phase	1	2	3	4
transverse	58.97	45.86	57.27	70.00
longitudinal	53.85	21.65	37.61	10.00
unknown	0.00	0.00	0.00	0.00
total flakes	39	291	234	20
coarse grained				
phase	1	2	3	4
transverse	50.00	46.67	24.14	0.00
longitudinal	50.00	22.67	41.38	0.00
unknown	0.00	0.00	0.00	0.00
total flakes	2	15	29	3

TABLE 5.15

This table showed a number of trends. These were :

1. The percentage of complete flakes in quartz rises from phase 4 through to phase 2 but falls in phase 1 (which is the lowest in the four phases (21.74%). Fine grained also had the lowest percentage of complete flakes (10 26%) in phase 1.

2. The percentage of transverse breaks in fine grained was fairly consistent in phases 1 and 3 (58.97% and 57.27%), but phase 1 had a much lower percentage (45.86%). Phase 4 has

the highest proportion of transverse breaks (70%). This could indicate more trampling in this time period.

3. The percentages of transverse breaks in phases 2 in quartz, fine grained and coarse grained were all within 5% of each other (quartz 50.27%, fine grained 45.86%, coarse grained 46.67%). According to Hiscock (1987:14) the percentage of transverse breaks usually indicates the degree of trampling in a site. Viewing the three different raw materials, the quartz and fine grained indicates a greater degree of trampling over the 13000 years of phase 4 than the other phases.

4. From personal experience, longitudinal flake breaks are, many times, caused by too much force being applied when producing the flake. If we take this as an indication of knapping skills, the table shows that knappers in phase 2 had more knapping control than those in phases 1 and 3. The three raw material group percentages all rise in phase 1 from those in phase 2, indicating less control over the raw material in the youngest phase. These is no overall trend.

Using the fine grained portion of the assemblage in this part of the analysis would have revealed trends that were not present in the quartz and coarse grained. Using on the fine grained portion of the assemblage, however, would have indicated that the knappers in phase 2 (1380 BP -5093 BP) had more knapping control over the raw material than those in the other phases.

5.10.6 Flake statistics

Complete (unbroken) flakes were next analysed using some basic descriptive statistics (see following table).

FLAKE LENGTH STATISTICS

(all measurements in mm)

quartz				
phase	**1**	**2**	**3**	**4**
Mean	8.50	11.69	9.00	11.63
Range	15	20	30	11
Minimum	05	05	05	07
Maximum	20	25	35	18
Count	12	74	115	11

fine grained				
phase	**1**	**2**	**3**	**4**
Mean	12.50	14.00	11.90	11.00
Range	20	26	21	19
Minimum	05	05	05	06
Maximum	25	31	26	25
Count	04	137	30	05

<u>coarse grained</u>

phase	1	2	3	4
Mean	8	14.1	19.13	16.50
Range	0	11	39	9
Minimum	8	10	07	12
Maximum	8	21	46	21
Count	01	08	08	02

FLAKE WIDTH STATISTICS

<u>quartz</u>

phase	1	2	3	4
Mean	6.00	7.27	5.92	8.13
Range	11	11	26	14
Minimum	03	02	02	04
Maximum	14	13	28	18
Count	12	74	115	08

<u>fine grained</u>

phase	1	2	3	4
Mean	8.50	8.34	8.87	7.60
Range	11	19	23	7
Minimum	04	03	02	04
Maximum	15	22	25	11
Count	04	137	30	05

<u>coarse grained</u>

phase	1	2	3	4
Mean	4	9.88	16.38	11.50
Range	0	24	28	1
Minimum	04	03	04	11
Maximum	04	27	32	12
Count	01	08	08	02

FLAKE THICKNESS STATISTICS

<u>quartz</u>

phase	1	2	3	4
Mean	1.83	2.42	2.09	2.63
Range	04	07	05	04
Minimum	01	01	01	01
Maximum	05	07	06	05
Count	12	74	115	08

<u>fine grained</u>

phase	1	2	3	4
Mean	2.00	2.82	2.83	1.60
Range	04	08	11	01
Minimum	01	01	01	01
Maximum	04	09	12	02
Count	04	137	30	05

coarse grained				
phase	**1**	**2**	**3**	**4**
Mean	3.00	2.13	5.25	3.50
Range	0	02	13	3
Minimum	03	01	1	2
Maximum	03	03	14	5
Count	01	08	8	2

TABLE 5.16

This table shows :

1) A number of flake attributes were their largest in phase 3. These were :

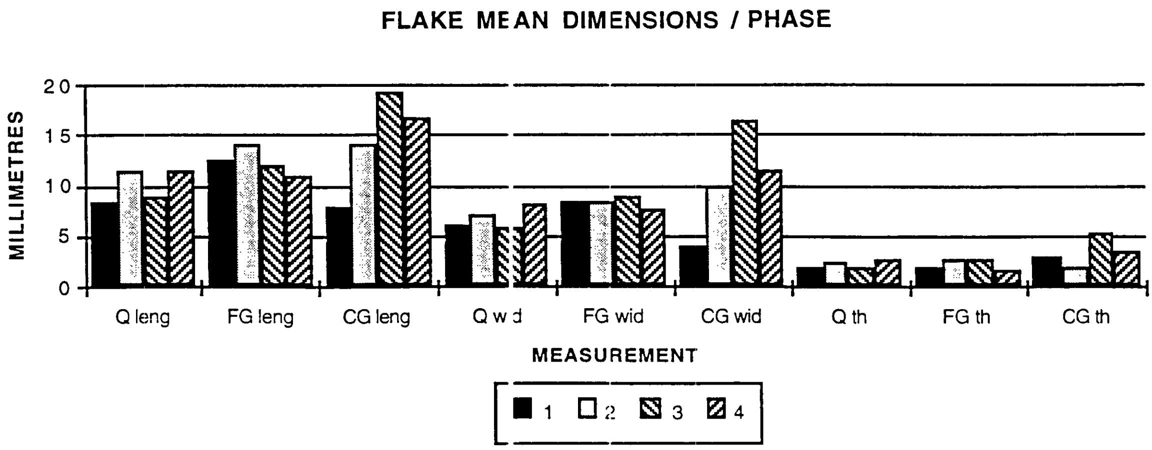
a) the ranges of lengths in quartz and coarse grained (30, 66) and maximum lengths (35, 46).

b) the ranges of widths in quartz, fine grained and coarse grained (26, 23, 28) and maximum widths (28, 25, 32).

c) The ranges of thicknesses in fine grained and coarse grained (11, 13) and the maximum thicknesses in fine grained and coarse grained (12, 14). This probably indicates that the knappers in phase 3 were making a wider range of flake sizes than in the other three phases. This may have been due to a mix of activities that required the utilisation of a wide range of sizes in flakes.

2) In phase 4 (between 7410 BP and 20310 BP), the minimum lengths in quartz, fine grained and coarse grained were larger than in the other three phases. This also occurs in the minimum widths in quartz and coarse grained with fine grained being equal largest.

Some trends become clearer when viewed as a graph (see following graph).



The graph and table show :

1. There is very little consistency across the four phases for each attribute.
2. The most consistent variable across the four phases is the thickness of the quartz flakes from phase 1 through to phase 4 (1.83, 2.42, 2.09, 2.63 mm) and the fine grained widths from phase 1 to phase 4 (8.50, 8.34, 8.78, 7.60 mm).
3. Some other dimensions were reasonably close between phases. These were :
   a) fine grained thicknesses between phases 2 and 3 (2.82 and 2.83 mm).
   b) Quartz mean lengths between phases 2 and 4 (11.69 and 11.63 mm).
4. The only trend seems to be in fine grained lengths where they progressively get longer from phase 4 though to phase 2 (11.00, 11.90, 14.00 mm), but phase 1 falls to 12.5.

These attributes show that there was change through time in the dimensions of the raw materials used. These will be discussed in more detail later in the chapter when all attributes and possible combinations will be considered as evidence of changing human behaviour.

5.10.7 Flaked pieces

Tables denoting means and later the cortex present in each raw material group per analytical phase are next presented.

FLAKED PIECES LENGTH STATISTICS

(all measurements in mm)

QUARTZ				
phase	**1**	**2**	**3**	**4**
Mean	7.89	8.92	8.86	8.75
Range	10	25	18	18
Minimum	05	05	05	05
Maximum	15	30	23	23
Count	09	882	209	36

fine grained				
phase	**1**	**2**	**3**	**4**
Mean	7.36	10.9	8.10	8.69
Range	8	19	17	17
Minimum	05	05	05	05
Maximum	13	24	22	22
Count	11	854	129	26

coarse grained				
phase	**1**	**2**	**3**	**4**
Mean		12.95	14.22	13.20
Range		22	17	11
Minimum		09	05	09
Maximum		31	22	20
Count	0	41	09	05

FLAKED PIECES WIDTH STATISTICS

quartz

phase	1	2	3	4
Mean	4.56	5.62	5.71	5.81
Range	07	01	14	12
Minimum	02	19	01	02
Maximum	09	18	15	14
Count	09	882	209	36

fine grained

phase	1	2	3	4
Mean	4.45	6.84	5.35	5.27
Range	03	19	16	13
Minimum	04	01	02	01
Maximum	07	20	18	14
Count	11	854	129	26

coarse grained

phase	1	2	3	4
Mean		9.23	9.11	7.00
Range		24	15	02
Minimum		03	03	06
Maximum		27	18	08
Count	0	40	09	05

FLAKED PIECES THICKNESS STATISTICS

QUARTZ

phase	1	2	3	4
Mean	2.78	2.21	2.67	2.61
Range	05	11	05	04
Minimum	01	01	01	01
Maximum	06	12	06	05
Count	09	882	209	36

fine grained

phase	1	2	3	4
Mean	2.82	2.94	2.82	2.88
Range	02	16	09	06
Minimum	02	01	01	01
Maximum	04	16	10	07
Count	11	854	129	26

coarse grained

phase	1	2	3	4
Mean		3.28	4.33	3.80
Range		06	03	04
Minimum		01	03	02
Maximum		07	06	06
Count	0	40	09	05

TABLE 5.17

This table shows that there was very little difference between the means of quartz and fine grained lengths, widths and thicknesses of the flaked pieces. It is only in the coarse grained that there were differences. This is best illustrated by the following graph.

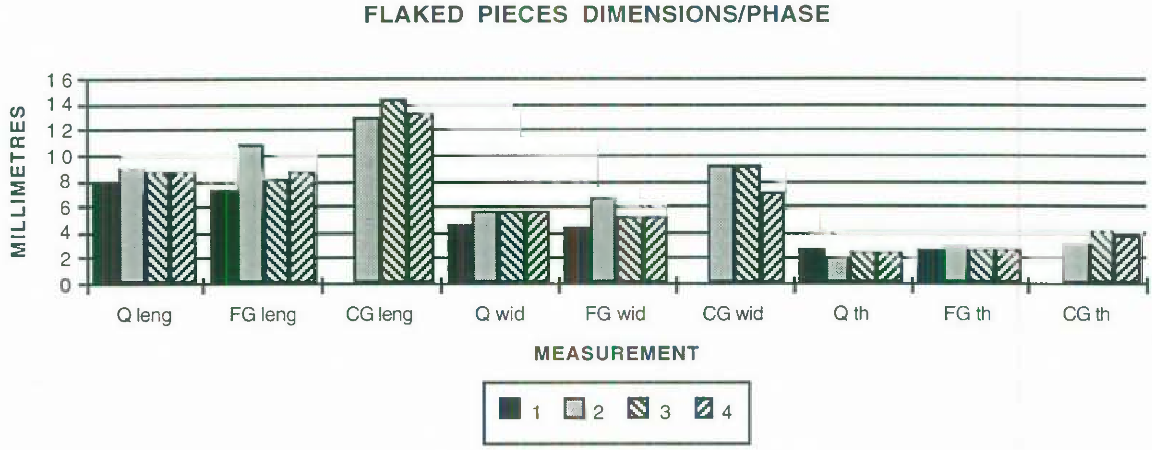


FIGURE 5.15

The only dimension to stand out in this graph was the fine grained length in phase 2 which was over 2 millimetres longer than the other phases in fine grained and also quartz in all phases. As with most other dimension of cores and flakes, the coarse grained dimensions were much larger than in the other two raw material groups. Probably more of value in analysing flaked pieces, was the percentage of cortex present on the flaked pieces. This gave some indication as to where the majority of flaked pieces were being made in the reduction sequence. If this was combined with other attributes, then it could help to pinpoint trends in artefact production.

FLAKED PIECES CORTEX NUMBERS

phase	1	2	3	4	
quartz	3 (9)	154 (656)	60 (205)	11(36)	
fine grained		1 (11)	69 (1052)	4 (129)	2 (27)
coarse grained		0 (0)	8 (41)	1 (10)	1(5)

(FP totals in brackets)

FLAKED PIECES CORTEX PERCENTAGES

phase	1	2	3	4	
quartz	33.33	23.48	29.27	30.55	
fine grained		10.11	06.56	3.10	7.41
coarse grained		0	19.51	10.00	20.00

TABLE 5.18

Table 5.18 shows that the fine grained percentages of flaked pieces with cortex were very small in comparison to the quartz. The only observable trend in the table seems to be in the quartz where the percentages decrease from the oldest phase (4) through to phase 2 but rise again in phase 1. This could reflect more controlled knapping of quartz in phase 3 as fewer flaked pieces were being made in the initial reduction. It could also reflect a change in the stone technology as the percentages of complete flakes in quartz falls from phase 2 to phase 1 (34.92% to 21.74%). There is a rise in the percentage of fine grained flaked pieces with cortex from phase 2 to phase 1 (6.56 to 10.11%) which may suggest that that fine grained was not being reduced as much in phase 1 as phase 2. A dramatic fall in the complete flake percentage in fine grained also accompanies this from phases 2 and phase 1 (47.07% to 10.26%).

5.11 SELECTED ATTRIBUTES AND THEIR COMBINATIONS

In an effort to draw together attribute percentages so that combinations of attributes could be selected that could point to inferences of human behaviour, a table of what I considered the most important percentages was constructed. Following that, a table outlining aspects of human behaviour and the attributes of artefacts that were associated with them is also presented. This table shows the importance of quartz in relation to the fine grained portion of the assemblage. This table is similar in profile and follows the model of human behaviour presented in Chapter 3. The tables are presented on pages 123-125.

5.12 TECHNOLOGICAL SUMMARIES

The following sums up the comparison between the results from the Crazyman Shelter and the predictive model.

5.12.1 Phase 4 (20000 BP - 8000 BP) (CMS - 20310 to 7410 BP)

1.This is the oldest phase of the site and is represented by only 282 artefacts over a 12900 year period and by a very slow rate of sediment deposition.

2. The majority of the artefacts recovered from this phase were cores (135), of which 106 still retained cortex. This suggests that only minimal reduction of artefacts was occurring in this period. There was a much higher percentage of quartz and the coarse grained cores that still had cortex present than the fine grained cores (quartz 85 %, coarse grained 73%, fine grained 48%).

3. This phase has the highest percentage of artefacts made on coarse grained (8%) and the second lowest in quartz (62%). This suggests that local stone was mainly used for knapping during this period.

4. The large percentage of transverse breaks in the flakes (65% in fine grained and 31% in quartz) suggests that most artefacts must have lain on the surface without being covered up for many years and were trampled and broken.

Dodson and Wright (1989:182-192) have stated that in the period 25,000 BP to 10000 BP, the vegetation at nearby Ulungra Springs (about 40 km to the south of the Crazyman Shelter)

CMS SELECTED ATTRIBUTES PERCENTAGES

TABLE 5.19

QUARTZ

unit	flakes %	flakes complete %	flakes trans %	flakes long. %	flakes with cort. %	flaked pieces %
1	31.72	21.74	30.44	47.83	28.26	6.21
2	12.91	34.92	50.27	38.62	17.81	49.8
3	27.45	26.27	37.88	50.31	24.95	11.68
4	20.11	25.71	42.86	37.14	40	20.69

unit	cores %	cores with cor. %	cores no c. & rot. %	cores cort. & not rot. %	MIcro-Debitage %	total no. in assemblage
1	21.38	48.28	51.61	12.9	40.69	145
2	28.85	65.9	25.97	31.3	10.31	1464
3	43.15	77.89	20.39	44.03	16.38	1789
4	55.75	84.85	10.31	67.01	2.87	174

****

FG

FG unit	flakes %	flakes complete %	flakes trans %	flakes long. %	flakes with cort. %	flaked pieces %
1	39.8	10.26	53.97	53.85	5.09	11.22
2	13.56	47.07	45.86	21.65	16.2	55.96
3	39.2	12.39	57.27	35.61	4.27	21.61
4	23.53	25	70	10	0	31.76

unit	cores %	cores with cor. %	cores no c. & rot. %	cores cort. & not rot. %	MIcro-Debitage %	total no. in assemblage
1	13.49	5.88	88.24	5.88	30.61	98
2	14.35	34.05	55.37	10.75	16.03	2146
3	18.52	37.29	67.18	12.21	14.91	597
4	27.06	47.83	34.78	21.74	14.12	85

****

CG

unit	flakes %	flakes complete %	flakes trans %	flakes long. %	flakes with cort. %	flaked pieces %
1	20	0	50	50	50	0
2	18.83	40	46.67	22.67	26.67	40.2
3	19.74	37.93	24.14	41.38	30	5.92
4	13.04	100	0	0	66.67	21.74

unit	cores %	cores with cor. %	cores no c. & rot. %	cores cort. & not rot. %	MIcro-Debitage %	total no. in assemblage
1	70	71.43	0	14.29	5	10
2	39.21	82.15	7.5	20	1.96	102
3	68.42	68.27	3.85	28.85	2.63	152
4	65.22	73.33	6.67	33.33	0	23

****

CMS BEHAVIOURAL INFERENCES ATTRIBUTES RESULTS
TABLE 5.20

BEHAVIOURAL INFERENCE	*ATTRIBUTE*	*PHASE*	*PRESENT IN QUARTZ*	*PRESENT IN FG*	*missed if only FG analysed*
PREFERENCE FOR	**HIGH %**		phases 1,3 and 4	phase 2	**YES**
RAW MATERIAL	**LOW %**		phase 2	phase 1, 3, and 4	**YES**
PREFERENCE FOR	**HIGH % OF CG**	3 & 4	N/A	N/A	**YES**
RAW MATERIAL (CG)	**LOW % OF CG**	1 & 2	N/A	N/A	**YES**
REDUCTION OF RAW MATERIAL	**LOW % MICRODEBITAGE**	2, 3 & 4	16.38 %, 10.31 %,2.87 %	16.03%, 14.91%, 14.912%	**NO**
	HIGH % MICRODEBITAGE	1	40.69%	30.61%	**NO**
REDUCTION OF RAW MATERIAL	**HIGH % CORES**	3 & 4	43.15%, 55.75%	18.52%, 27.06%	**YES**
	LOW % CORES	1 & 2	21.38%, 28.85%	13.49%, 14.35%	**YES**
REDUCTION OF RAW MATERIAL	**HIGH % FLAKES**	1, 3 & 4	31.72%, 27.45%, 20.11%	39.80%, 39.20%, 23.53%	**NO**
	LOW % FLAKES	1	12.91%,	13.96%,	**NO**
RATIONING OF RAW MATERIAL	**HIGH % NON ROTATED**	2, 3 & 4	31.72%, 44.03%,67.01%	10.75%,12.21%, 21.74%	**YES**
	CORES WITH CORTEX	1	12.90%	5.88%	**NO**
RATIONING OF RAW MATERIAL	**% OF CORES**	3 & 4	77.89%, 84.85 %	37.29%, 47.83%	**YES**
	WITH CORTEX	1 & 2	48.48, 65.97%)	5.88%, 34.05%	**YES**
RATIONING OF RAW MATERIAL	**% OF FLAKES**	1 & 3 & 4	28.26%, 24.95%, 40%	5.09%, 4.27& 0%	**YES**
	WITH CORTEX	2	17.81%	16.2%)	**NO**

CMS BEHAVIOURAL INFERENCES ATTRIBUTES RESULTS
TABLE 5.20

BEHAVIOURAL INFERENCE	*ATTRIBUTE*	*UNIT*	*PRESENT IN QUARTZ*	*PRESENT IN FG*	*missed if only FG analysed*
REDUCTION STRATEGY	**PERCENT OF**	1 & 2	6.21%, 49.76%	11.22%, 55.99%	**NO**
	FLAKED PIECES	3 & 4	11.69%, 20.69%	22.63%, 31.76%	**TO SOME EXTENT**
REDUCTION STRATEGY	**INCREASING MEAN**	4 > 3 > 2	YES	YES	**NO**
	CORE LENGTH	1	DECREASE FROM UNIT 2	DECREASE FROM UNIT 2	**NO**
REDUCTION STRATEGY	**PERCENT OF**	1 & 3	21.74%, 26.27%	10.26%, 12.39%	**YES**
	COMPLETE FLAKES	2	34.92%	47.07%	**NO**
		4	25.71%	25%	**NO**
DEGREE OF TRAMPLING	**% OF TRANSVERSE**	1	30.94%	58.97%	**YES**
	FLAKE BREAGAGE	2	50.27%	45.86%	**NO**
		3	37.88%	57.27%	**YES**
		4	42.86%	10%	**YES**
KNAPPING SKILLS	**LOW/HIGH**	1	47.85%	58.97%	**NO**
	% OF LONGITUDINAL	2	38.62%	45.86%	**NO**
	FLAKE BREAGAGE	3	50.31%	57.27%	**NO**
	(LOW = HIGH SKILLS)	4	37.14%	70%	**YES**
LACK OF EXPERIENCE IN KNAPPING DIFFICULT MATERIAL	**BIPOLAR KNAPPING**	ALL UNITS	NO	VERY SMALL PERCENT	**NO**
STRESS IN POPULATION (JESKE'S CONTENTION)	**BIPOLAR KNAPPING**	ALL UNITS	NO	VERY SMALL PERCENT	**NO**

was different from that growing at present. The landscape in that period was dominated by Chenopods (similar to the saltbushes now found growing between the Western and Far Western plains in NSW) with Eucalypt forests only present towards the coast. Heath plants such as *Hibbertia, Bossiaea, Lomandra/Xanthorrhoea* and *Gonocarpus* were also prominent at that time. the Crazyman Shelter faces the west and without tree cover in the Pleistocene period, it would have had little appeal as a base for any permanent activities. It is doubtful if there was any permanent water available in this area in this period.

CONCLUSION FOR PHASE 4

According to the deposition record (one mm per 100 years and 2.22 stone artefacts/excavated kilogram), this area was not used to any great extent by the Aboriginal inhabitants in this period. There were no sterile breaks in the deposit so it appears that there was no great quantity of deposit flowing or blowing into the site. This suggests that the Crazyman Shelter was not a very important site in the period 20310 to 7410 BP.

As there are no other shelter sites in the Coonabarabran region of this age, the stone artefact analysis of the Crazyman Shelter is important in quantifying the important of quartz in this period in Coonabarabran Warrumbungle region. The findings from the Crazyman Shelter suggest that stone when knapped, was in general, not economically reduced, pointing to little pressures being exerted on stone resources as far as the quartz and coarse grained were concerned. Fine grained although reduced more, was not utilised as much as in later periods. This may have been caused by lack of knowledge of the sources of the material in this area or that later use of it was increased by some trade from outside the area. This could suggest that the implements used at this time by the Aborigines were such that the quartz and coarse grained material were sufficient to fulfil most needs.

In general, these results were in agreement with the predictive model. Evidence from the swamp sites around this area of the Northwest suggests they and not the Crazyman Shelter, were the focal points of Aboriginal activity in the Late Pleistocene/Early Holocene (Lime Springs - see Gorecki et al. 1984, Trinkey - see Wright 1986, Cuddy Springs - see Furby, Fullagar, Dodson and Prosser 1991). Wright (1986:1-9) has stated that the swamps at Trinkey and Lime Springs displayed much evidence of Aboriginal activity from as long ago as 26000 BP, but this activity all but ceased at about 6000 BP as the springs feeding these swamps dried up. These sites were about 80 km to the east of the Crazyman Shelter.

5.12.2 Phase 3 (8000 BP - 5000 BP) (CMS - 7410 BP to 5090 BP)

This phase covers a 2300 year period and signals the beginning of an upsurge in site use (indicated by a great increase in deposition of artefacts per excavated kilogram (3.4 artefacts) and the highest rate sediment deposition in any phase (32 mm/100 years) (see figure 5.1). In this phase there were a number of percentage trends beginning in phase 4 and continuing through this phase to phase 2. These were :

a) increasing percentages of "rotated cores without cortex" in quartz, fine grained and coarse grained (late stage reduction).

b) increasing percentages of complete flakes in quartz and coarse grained.

c) increasing percentages of flakes with transverse breaks in fine grained and coarse grained.

d) increasing density of artefacts per excavated kilogram.

e) increasing mean core lengths and widths in quartz, fine grained and coarse grained.

f) decreasing percentages of flakes with cortex in quartz and coarse grained.

g) decreasing percentages of cores with cortex in quartz, fine grained and coarse grained.

h) decreasing percentages of "non rotated cores with cortex" in quartz and fine grained (early stage reduction).

i) decreasing percentages of cores in quartz and fine grained.

j) decreasing percentages of artefacts made on coarse grained material.

This phase had a number of important features. These were :

1. This phase had the fastest buildup of deposit in the site with an average of 29 mm per 100 years. Artefact density over the 2320 years covering this phase was over a third higher than that of phase 4 (phase 3 = 3.51, phase 4 = 2.24 artefacts per kilogram of excavated deposit).

2. This phase has the highest percentage of artefacts made from quartz in any phase (quartz =70%, fine grained=24%, coarse grained=6%), but the lowest percentage of artefacts made from fine grained material.

3. Although the percentages of flakes per raw material assemblage were the second highest for all three raw material groups in this phase, fine grained had the highest percentage (39%) in the three raw material groups. The percentage of longitudinal breaks in quartz and coarse grained flakes was also at their highest in this phase. This suggests that although more quartz was used, knapping skills were not keeping pace with the use (possibly more people knapping, so a greater range of skills).

4. Microdebitage percentages were higher in the quartz and coarse grained in this phase than in the previous phase suggesting more reduction of this material (this suggests more economic reduction of these raw materials). Percentage of flaked pieces (the other item of debitage) were at their lowest in all three raw material groups in this phase (this suggests that the raw material was not being reduced to the fullest extent). (Results from phase 2 suggests that highest percentages of flaked pieces occurs when the raw material is reduced to the fullest extent).

5. Because the highest percentage of flaked pieces occurred in phase 2, it suggests that a different type of reduction strategy may have been occurring in that phase from that practised in phases 3 and 4. Phase 3 has high percentages of cores in the class "non rotated with cortex" (early stage of reduction) and also a percentage of quartz and fine grained flakes between those in phases 1 and 2 (the lowest percentage occurs in coarse grained).
6. The percentage of coarse grained artefacts diminishes from phase 4 through to phase 2, suggesting that because of its inferior knapping qualities (personal experience), its use diminished as the popularity of the local quartz increased (this may have been associated with an increase in the ability to work out strategies to successfully reduce the quartz). One method described by Witter (1992:43) as the fracture line acceleration method, used the fracture lines as a starting point for tapping the hammerstone against, causing the pebble to break down this line or lines thus producing a useful platform(s) to work from. Another method is the bipolar method but there was no evidence of this method being used in this phase at the Crazyman Shelter.
7. The core reduction charts for this phase show the largest spread of core sizes for the three raw material groups in any phase. This could imply that either the technology to reduce the cores to the sizes found in phase 2 and 1 was not present or that rationing of all raw material was not occurring to any great extent.

CONCLUSION FOR PHASE 3

The Crazyman Shelter at this stage of its history as an Aboriginal shelter became much more important than in the previous phase. If we gauge the build up of deposit in the shelter as being affected by occupational pressures (see Hughes and Lampert 1982) then the massive buildup of deposit over this period suggests that this site was used extensively and reduction of stone on site was increasing. There were no breaks in the archaeological material in the deposit, which suggests that there were no massive inflow of material carried in by wind or rain at any time (see Appendix 1). Why the site became more popular in this period is not clear, but it could have been a combination of factors including one of water supply. Wright (1986) found a change in the spring activity at Trinkey and Lime Springs with springs drying up at about 6000 BP (both the Trinkey-Lime Springs and the Crazyman Shelter are located near or on the Pilliga Sandstone Formation). Spring activity in Warrumbungle may have been similarly affected, making sites with adjoining creeks more popular (Deringulla creek is about 80 metres to the west of the Crazyman Shelter and Jack Halls Creek that at present has permanent waterholes, is only 2 km to the north).

The time period of 8000 to 5000 BP in Australia (this covers the time period of this analytical phase) is described by Linacre and Hobbs (1977 :192) as generally warmer and wetter than the present climate regime. It appears that the climate was still cold 10,000 years ago and gradually became warmer between 10,000 and 8000 years ago (Linacre and Hobbs 1977:192). The diminishing water resources at Lime Springs and Trinkey may have been responsible for shelters such as the Crazyman Shelter to be gaining importance because the climate became warmer and wetter. The return of the eucalypt woodland to this area would have enhanced this site as it would have been protected from the prevailing western orientated weather conditions that now prevail and in all probability occurred then.

As a result of the more favoured conditions as described by Linacre and Hobbs, the population in the Warrumbungles area may have started to expand and this could be supported to a certain extent by increased knapping and reduction of material as the quartz flakes had less cortex present and the mean flake length of quartz flakes was much smaller than in phase 4 (phase 3 = 9.00 mm, phase 4 = 11.63 mm). If this time period at the Crazyman Shelter is taken in context with the phases 4 and 2, then it seems that this period was a transition time when the Crazyman Shelter changed from being a site that was visited on rare occasions (maybe once in a 500 years period, as may have been the case in phase 4) to one of more intense occupation and more intensive reduction of stone in phase 2.

5.12.3 Phase 2 (5000 BP - 1000 BP) (CMS - 5090 BP - 1380 BP)
This phase is the most informative one in the Crazyman Shelter, as there is good preservation of plant and animal material besides the stone artefacts, and it has an absence of Post-contact disturbance. It had the second highest discard of artefacts per spit (6.42), and according to Table 5.6, the second highest rate of sedimentation buildup (16 mm/100 years). This phase had many changes from the previous two phases. Probably the most important as far as stone technology was concerned, was the introduction of backed artefacts. From the knowledge that there was a change in technology to produce backed artefacts, it is suggested, that this technology could have also triggered the following changes in the attributes of the artefacts which were present in this phase :

1. The lowest percentage of artefacts made on quartz and coarse grained (Q=40%, coarse grained=3%) but the highest percentage of artefacts made on fine grained material (fine grained=58%).
2. The lowest percentages of cores in coarse grained and the second lowest percentage of cores in quartz and fine grained (quartz=29%, fine grained=14%, coarse grained=39%).
3. The second lowest percentage of cores with cortex present in quartz and fine grained but the highest percentage for coarse grained cores.
4. The lowest percentages of flakes in quartz and fine grained.
5. The highest percentage of complete flakes in quartz and fine grained.

7. The highest percentage of flakes with transverse breaks. These percentages were reasonably even across the three raw material groups (quartz=50%, fine grained=47.%, coarse grained=47%) and suggest much trampling was occurring in the site in this time period.
8. The lowest percentage of flakes with cortex in quartz and coarse grained (so more reduction is indicated) but fine grained had the highest percentage in any phase (16%).
9. The highest mean core lengths and widths in the three raw material groups.
10. The highest mean flake lengths in quartz and fine grained.
11. The lowest percentage of quartz flaked pieces with cortex (24%), but the highest percentage of fine grained and coarse grained flaked pieces with cortex (fine grained, however, was always low - max.=10%)
12. The highest percentage of flaked pieces per assemblage in all three raw material groups. (This percentage was over twice as high as those in any other phase in quartz (50%), while the fine grained at 56% was 22% higher than in any other phase, while coarse grained at 40%, was 18% higher than in any other phase).

The core reduction charts in this phase show that the range of sizes of discarded quartz and fine grained cores were approximately the same. This may have some connection with the production of Backed blades which only occurred in this phase.

CONCLUSION TO PHASE 2

The results from the Crazyman Shelter generally support this phase of the model. This phase has the second highest density of artefacts per kilogram of excavated material (6.42 artefacts/excavated kilogram) but not the greatest rate of deposit (13 mm/100 years). With the largest percentage of debitage in any phase, it suggests that the inhabitants were reducing stone to a greater extent than those between 7410 BP and 5090 BP. The highest percentage of fine grained artefacts and the lowest percentage of quartz and coarse grained artefacts occurred in this period, so it appears that the fine grained material was highly favoured as a knapping material between 5090 and contact time. The reduction of quartz was greater in this phase than at any other time which suggests increased pressures on local stone resources.

5.12.4 PHASE 1 (1380 BP - 200 BP) (CMS - 1380 BP to SURFACE)

This phase belongs to the period described by Witter (1986b:5-7) as the Post Microblade period (there was an absence of backed artefacts). According to Gaynor (1987: 197) there was a decline in artefact density from the previous 1000 years at Kawambarai cave. but this phase at the Crazyman Shelter did not match that at Kawambarai cave, as the density of artefacts/excavated kilogram actually increased in this phase from the previous period to the highest in any phase (7.44). This was 1 artefact/excavated kilogram greater than the previous phase and over 5 artefacts/ excavated kilogram greater than the oldest phase (4). The rate of deposit of 3 mm per 100 years (see figure 8) was the second lowest of the phases but three times higher than phase 4 (which was the lowest of the phases [1 mm per 100 years]).

This phase had :

1. The highest percentage of flakes per phase in all three raw material groups (quartz - 32%, fine grained - 40%, coarse grained - 20%).
2. The lowest percentage of complete flakes per phase in all three raw material groups (quartz - 22%, fine grained - 106%, coarse grained - 0%).
3. A lower percentage of flakes with transverse breaks per phase in quartz and coarse grained but a higher percentage than the previous phase in fine grained (quartz - 30%, fine grained - 59%, coarse grained - 50%).
4. The highest percentage of flakes with longitudinal breaks per phase in fine grained and coarse grained and the second highest in quartz (quartz - 48%, fine grained - 54%, coarse grained - 50%).
5. The lowest percentage of flaked pieces per phase in all three raw material groups (quartz - 6%, fine grained - 11%, coarse grained -0%).
6. The lowest percentage of cores per phase in quartz and fine grained (quartz - 21%, fine grained - 13%) but the highest in coarse grained (70%).
7. The lowest percentage of cores with cortex per phase in quartz and fine grained (quartz - 48%, fine grained - 6%), indicating increasing pressures on these raw materials or alternatively cores were being removed from the site for use elsewhere (this would seem unlikely for quartz as it is readily available throughout the region).
8. The highest percentage of rotated cores without cortex per phase in quartz and fine grained (quartz - 52% (At least twice as high as any other phase, fine grained - 88%). This would also support the supposition that there were greater pressures on the quartz and fine grained stone resources than in other phases.
9. The highest percentage of microdebitage per phase in all three raw material groups (quartz - 41%, fine grained - 31%, coarse grained - 5%).
10. The range of sizes of discarded cores of the three raw material groups, as depicted in the reduction charts, is about the same. This would imply greater pressures on all raw materials that in other phases.

CONCLUSION TO PHASE 1

This phase generally fits the predictive model in Chapter Two. This phase displays many inferences of increased pressures on stone resources (for example, lowest percentage of cores/phase and cores without cortex/phase in quartz and fine grained, lowest percentage of complete flakes/phase, lowest mean length of quartz and coarse grained flakes/phase (both local raw material sources), the lowest mean flaked pieces lengths and widths in quartz and fine grained/phase (this implies that stone was reduced more than in other phases). Other indications such as raw material percentages suggest that the fine grained was not favoured as much as the local resources (quartz and coarse grained). This may have been due to restricted access or less movement around the landscape. The fine grained present, however, still showed signs of being highly prized as it was still very heavily reduced with the greatest percentage of microdebitage present in any phase together with the largest percentage of rotated cores in any phase.

5.13 CHAPTER CONCLUSIONS

This chapter has highlighted the importance of quartz as a knapping medium in the Coonabarabran/Warrumbungle Region throughout the 20,000 year of Aboriginal occupation. The use of the complete assemblage (in this case including the quartz and the coarse grained material) for an analysis instead of only the fine grained portion has revealed insights into human behaviour which would have been missed if only the fine grained portion had been analysed. This outcome was not consistent however, between phases, and in some cases the fine grained portion would have revealed certain trends and behavioural inferences that were also present in the quartz and coarse grained portions of the assemblage. On occasions, however, these inferences would have been if only the fine grained had been analysed.

Finally this chapter has shown that it was possible to find perceived changes in stone technology in sections of the Crazyman Shelter by using a combination of percentages of artefact categories and attribute classes. These were reasonably simple sets of attributes, but the analysis did use all the raw materials in the site (quartz, fine grained and coarse grained), and all the flaked artefacts recovered from the excavation to come to these conclusions (not just flakes and/or cores as carried out by some researchers). From the results obtained from this chapter, it was possible to suggest likely uses of the site at four distinct periods over the 20310 year years of occupation. As this site is the oldest securely dated shelter site in Northwest New South Wales, these results are important in supplementing results from those other types of sites such as from springs, swamps, lakes and open sites in this area. These comparisons and results will be discussed in a wider context in Chapter Seven.

Chapter Six will examine a sample of five sites in order to examine the quartz technology in more detail in phase 1. This phase (Post Microblade) at the Crazyman Shelter, is characterised by the heaviest pressures on stone resources in the sequence at the Crazyman Shelter. Coupled to this is the lowest percentages of fine grained in the sequence and a relatively high percentage of quartz artefacts.