CHAPTER FIVE
THE LITHIC ASSEMBLAGES

The lithic assemblages of Tshisiku Shelter, Balerno Main Shelter and Balerno Shelter 2 provide most of the data for this study of hunter-gatherers and interaction since stone tools form the greater part of the assemblages. In order to facilitate comparison with previous studies done in the region, the lithic analysis and density quantification follow Walker’s (1994; 1995a) classification / typology system, with a few additions and refinements (see Appendix A), as well as Deacon’s (1984) typology. The analysis focuses on morphological and technological change, in addition to typological change in the lithic assemblage: a change in technology could reflect a socio-cultural change in the hunter-gatherer population, whilst typological change may reflect changes in activities. Raw material types (see discussion in Appendix A), uses and preferences will also be analysed for any changes through time and space, reflecting changes in activities and identities. Knowledge of raw material sources used by the Shashe-Limpopo hunter-gatherers could contribute significantly towards understanding the impact of contact on hunter-gatherer mobility and lifestyle, but, as yet, the locations of such sources are unknown.

All tables and graphs referred to in this section can be found in the Appendix B.

Tshisiku Shelter
The majority of the Tshisiku Shelter assemblage represents an extensive period of Late Holocene pre-contact occupation; only a small portion of the deposit represents shelter occupation during the last 2000 years. As such, the analysis of this assemblage (in terms of any changes in material density, lithic flaking technology and raw material use through time, especially across the pre-contact / contact divide) is important, in order to provide a base-line for comparison with other shelters such as Balerno Main Shelter, which provide a more comprehensive picture of the interaction period over the last 2000 years. However, the possible ‘lagged’ nature of the deposit may result in difficulties in understanding material density changes through time, as they may be time-averaged, and the exact nature of the hunter-gatherer / farmer contact may be obscured.
The Tshisiku lithic assemblage comprises a total of 26,419 lithics (excluding ‘chips’ – see Table 5.1; Fig. 5.1). As a whole, the lithic assemblage tends to follow a ‘bell’ or ‘battleship’ curve of material distribution (Table 5.2a; Fig. 5.2), where lithic densities increase from the lowest level, Spit 14, to peak in Spit 7, and then generally decrease through time to the Surface level. This pattern is repeated by the ‘Informal’ and ‘Formal’ tool categories, and to a lesser degree, by the ‘Utilised’, broken or miscellaneously ‘Retouched / Backed’, and ‘Other’ categories.

The types of raw materials (see Appendix A) utilised in the total Tshisiku Shelter lithic assemblage include chert, quartz, fine-grained dolerite, agate and fine-grained quartzite (Table 5.3; Fig. 5.3). The assemblage is dominated by chert (36.1%) and quartz (23.1%). The remainder of the assemblage comprises fine-grained dolerite (19.7%), agate (14.3%) and fine-grained quartzite (6.8%).

The overall percentage frequencies of chert in the assemblage contrast with those of agate, quartz and fine-grained dolerite, specifically in the pre-ceramic period: chert percentage frequencies increase when those of agate, quartz and fine-grained dolerite decrease, and vice versa. Utilisation of fine-grained dolerite appears to increase in the pre-ceramic period, with a similar percentage frequency of use exhibited by chert, agate and quartz.

**Knapping debris and Informal tools**

*The Informal tool inventory*

Comprising informal tools (i.e. those tools that show no retouch or obvious utilisation), broken tools and by-products of tool manufacture, the Informal category forms 95.5% (Table 5.2b) of the total assemblage, and thus repeats the pattern of material density distribution described above for the total assemblage (Table 5.2a; Fig. 5.2 & 5.4). Proximal broken flakes are the most numerous of all the lithic types, followed by chunks, flakes and distal broken flakes (Table 5.4). There seems to be a broad correlation between increasing chunk percentage frequencies and decreasing flake percentage frequencies, between Spit 12 and the Surface. About a quarter of the chunks and flakes are cortical in this assemblage.
Few irregular cores occur, as bipolar cores dominate the core types present in the assemblage, forming about 91% of the total core category. Some variation in bipolar cores occurs (see Fig. 5.5 - 5.7) including a few bipolar bladelet and bipolar ‘rice seed’ cores, as well as ‘typical’ bipolar cores (Table 5.4). Percentage frequencies of bipolar cores are high between Spit 6 (in the early pre-ceramic period) and the Surface, peaking in Spit 4 (1220 – 1010 BC) before slightly decreasing again in Spit 3. Percentage frequencies are highest in the contact period, from Spit 3 to Spit 1, with a small drop in percentage frequency in the Surface level, but higher bipolar core percentage frequencies occur in the pre-ceramic period, and the period leading up to contact. There is also a tendency for bipolar core percentage frequencies to increase when those of irregular cores decrease.

To summarise, although some changes in percentage frequency of the different types of Informal lithics do occur through time (Table 5.4), no major trends or changes in technology are evident. Lithic densities, on the other hand, follow a bell-shaped curve of distribution, increasing through time from Spit 14 in the early pre-contact period and upwards, with the greatest amounts of material / activity concentrated in the pre-contact period between Spit 9 and Spit 6. Densities peak in this period (after 4330 – 4220 BC), in Spit 7, before decreasing to Spit 4 in the late pre-ceramic period. In the beginning of the ceramic period, in Spit 3, lithic densities are slightly higher than those in Spit 4, but then continue to decrease through time to the Surface. Little change occurs across the pre-ceramic / ceramic period divide. The peak in activity at Tshisiku Shelter thus occurs far earlier in the history of the occupation of the shelter than in comparison to the other shelters studied in the Shashe-Limpopo so far.

**Raw material used in Informal tools**

As Informal tools form about 95% of the total assemblage, it would follow that the Informal category also has a similar pattern of raw material utilisation to that displayed by the total assemblage. Chert comprises 35.5% of the Informal category, with quartz comprising 23.6%, fine-grained dolerite 20.3%, agate 13.8% and fine-grained quartzite 6.9% (Table 5.5; Fig. 5.8). Overall, in the pre-ceramic period, high percentage frequencies of chert occur after 5660 – 5610 BC (Tables 4.2 & 4.3), around the time of Spit 10 and Spit 9, while very low percentage frequencies occur
Figure 5.6. Tshisiku Shelter: Examples of cores occurring in the assemblage.

(a-c: irregular cores; d: bipolar bladelet core; e, f, h-j: bipolar cores; g, k: split cobble cores).
Figure 5.7. Tshisiku Shelter: Further examples of cores occurring in the assemblage.

(a: bipolar core; b, c: battered pieces; d-g: bipolar ‘rice seed’ cores.)
in Spit 6. Chert percentage frequencies increase slightly through time from early pre-contact Spit 5 to the ceramic period (from Spit 3 to the Surface). Between Spit 13 and Spit 9 in the early pre-ceramic period, chert and quartz percentage frequencies remain fairly similar, but above this point (Spit 8, which dates to 4330 – 4220 BC), when chert percentage frequencies increase, those of quartz decrease and vice versa. Similar percentage frequencies of chert, agate, quartz and fine-grained dolerite are present in Spit 7 and Spit 6, although fine-grained quartzite percentage frequencies are still low. Fine-grained dolerite percentage frequencies seem to increase when those of chert decrease, and vice versa. Higher percentage frequencies of fine-grained quartzite occur in the early pre-contact period between Spit 14 and Spits 10/9, but then decrease to consistently low percentage frequencies across the pre-ceramic / ceramic divide (between Spit 4 and Spit 3), up until the Surface level. Raw material utilisation through time is also illustrated by several of the Informal category lithic types, for example chunks, flakes and cores (Tables 5.6-5.8; Figs. 5.9 – 5.11).

Raw material trends in chunks include higher chert concentrations in the early pre-ceramic period between Spit 12 and Spit 8 (4330 – 4220 BC (Tables 4.2 &4.3)), and between Spit 5 and Spit 4 (1220 – 1010 BC) (Table 5.6; Fig. 5.9). Very low chert percentage frequencies occur in Spits 7 and 6. Percentage frequencies are again lower in the ceramic period between Spit 3 and the Surface. In contrast, agate percentage frequencies are very low in Spits 14 to 8, and higher from Spit 6 onwards. When fine-grained dolerite percentage frequencies increase, those of chert decrease, and vice versa. Consistently low percentage frequencies of fine-grained quartzite occur through time, although slightly lower percentage frequencies occur from Spit 4 to Spit 2.

In the flake category, chert is less dominant than it is in the chunk category, forming only 33.0% of the flakes, followed by quartz (22.8%) and fine-grained dolerite (21.0%) (Table 5.7; Fig. 5.10). Agate (15.1%) and fine-grained quartzite (8.1%) make up the remainder of the flakes. In flakes, chert percentage frequencies in the early pre-ceramic period are higher in Spits 13 to 8 than in the levels above, with the exception of Spit 1 and Surface in the ceramic period. Chert flakes are low in percentage frequency in Spits 7 and 6. Both agate and quartz percentage frequencies
increase when those of chert decrease, and *vice versa*. Higher percentage frequencies of fine-grained dolerite flakes occur in the early pre-ceramic in Spits 9 and 8 (4330 – 4220 BC), and percentage frequencies are especially high in Spits 3 and 2 in the ceramic period. Fine-grained quartzite percentage frequencies are highest between Spit 14 and Spit 10, and then decrease to fairly low percentage frequencies in the rest of the assemblage.

The raw material used in the core category (Table 5.8; Fig. 5.11) is also dominated by chert and quartz (each forming 38.0% and 37.2% of the total assemblage, respectively). Agate cores make up 20.6% of the core category, with the remainder comprising fine-grained quartzite (2.4%) and fine-grained dolerite (1.8%). When chert core percentage frequencies are high in the pre-contact period between Spits 13 to 8, agate core percentage frequencies are low. Between Spits 7 and 5 in the early pre-contact period, chert and agate core percentage frequencies are similar but then begin to differ again in the levels above Spit 5, where percentage frequencies of chert cores are high and those of agate are low. Thus, although there is some change in emphasis on raw materials utilised through time, no real change occurs across the pre-contact / contact divide.

**Utilised pieces and broken /miscellaneously Retouched / Backed pieces**

**The Utilised and Retouched / Backed piece inventories**

Utilised pieces are those tools that exhibit abraded and damaged surfaces or edges as a result of use. Broken and / or miscellaneously backed or retouched pieces are lithics that have been retouched or backed, but that cannot be identified as a specific retouched / backed tool (for example, as a segment or scraper). No major trends are notable in either of these categories (Tables 5.9 - 5.10; Figs. 5.12 - 5.13), except for the predominance of fine-grained dolerite in tools such as abraded flakes (Fig. 5.14) and chunks in the Utilised category, and the high densities of lithics occurring in the early pre-ceramic in Spits 7 and 6.

**Raw material used in Utilised and Retouched / Backed pieces**

The majority of Utilised tools are comprised of fine-grained dolerite (76.3%), with a few chert (10.5%) and agate (10.5%) examples. Only one fine-grained quartzite tool
Figure 5.14. Tshisiku Shelter: Examples of abraded tools occurring in the assemblage. (a-d: abraded flakes; e: abraded core)
(2.6%) occurs in the assemblage (Table 5.11; Fig. 5.15). No utilised quartz tools were identified. Most utilised tools are concentrated in the period after 4330 – 4220 BC (Spit 8) (Tables 4.2 & 4.3), between Spits 7 and 3, with Spit 6 displaying the most variety of raw materials in the Utilised tools category. No other trends are noticeable.

Chert (63.8%) dominates the broken and miscellaneous Retouched / Backed category, with quartz forming 21.7%, agate 13.0%, and fine-grained dolerite 1.4%, of the raw material used in this category (Table 5.12; Fig. 5.16). No fine-grained quartzite broken or miscellaneous backed / retouched lithics are present in the assemblage.

**Formal tools**

The Formal tool inventory

The Formal tool category (forming only 3.0% of the total assemblage) also follows a mostly bell-shaped or battleship curve pattern of material density distribution (Table 5.13; Fig. 5.17). An increase in formal tool frequencies occurs in the early pre-ceramic period from Spit 14 to Spit 7, where frequencies peak, before decreasing through time to Spit 1. A slight decrease in tool densities occurs in Spit 3, at the beginning of the ceramic period, before material densities continue to decrease to Spit 1. No formal tools were recovered from the Surface level.

A variety of different formal tools (indicating a wide range of activities) are present in the Tshisiku Shelter assemblage, including several types of scrapers, backed pieces, adzes, scraper-adzes, awls, borers, spokeshaves and planes (Figs. 5.18 – 5.20). The most dominant Formal tools are small end scrapers, followed by segments and backed bladelets (Figs. 5.19 – 5.21). Few small side scrapers (in comparison to the proliferation of small end scrapers) occur in the assemblage.

The widest variety of Formal tool types occurs in the early pre-contact period between Spit 10 and Spit 5, with the highest densities of formal tools occurring between Spit 8 (4330 – 4220 BC) and Spit 6. Densities are especially high in Spit 7. Although a slight increase in the percentage frequency of scrapers, segments and
Figure 5.18. Tshisiku Shelter: Examples of various scrapers occurring in the assemblage. (a-g: end scrapers; h, i: side scrapers; j-l: end & side scrapers; m-o: end & 2 sides scrapers; p: end & end scraper; q, r: double-edged scrapers; s, t: backed scrapers; u-w: scraper adzes)
Figure 5.19. Tshisiku Shelter: Examples of selected formally retouched and backed tools. (a, b: adzes; c, d: spokeshaves; e, f: borers; g-i: awls; j-o: segments; p, q: backed flakes; r-w: backed bladelets)
Figure 5.20. Tshisiku Shelter: Example of a hammerstone (a) and a plane (b) from the assemblage.
backed bladelets occurs in the beginning of the ceramic period in Spit 3, no major changes in technology between the pre-contact and contact period are evident.

When comparing the frequency of scrapers to that of formal backed pieces (Fig. 5.21), a bell-shaped curve of distribution is apparent in the formal backed category. Backed pieces are more prolific in the earlier pre-ceramic period (for example Spit 8), with fewer backed pieces occurring in the ceramic period (Spit 3 to Spit 1). The number of scrapers present in the assemblage fluctuates somewhat through time, although it too follows a mostly bell-shaped curve. The number of scrapers contrasts roughly with the number of formal backed tools in the assemblage. High numbers of scrapers are present in the pre-ceramic period in Spit 6, and at the beginning of the ceramic period, in Spit 3.

**Raw material used in Formal tools**

Chert (55.7%) and agate (30.5%) dominate, with quartz making up a further 10.9% of the Formal assemblage. The remainder of the Formal category is made up of fine-grained quartzite (1.7%) and fine-grained dolerite (1.2%). No formal tools occur in the Surface level (Table 5.14; Fig. 5.22). The percentage frequency of chert formal tools is high in the early pre-ceramic between 5660 – 5610 BC and 4330 – 4220 BC (Table 4.2 & 4.3) (Spits 10 to 8) and across the pre-contact / contact period divide from Spits 5 to 2. Agate percentage frequencies tend to increase where those of chert decrease (and vice versa): the highest agate percentage frequencies are found between Spits 14 to 11 (5660 – 5610 BC) and between Spits 7 to 5. This pattern is similar to that displayed by scrapers (Table 5.15; Fig. 5.23) and backed bladelets (Table 5.16; Fig. 5.24).

58.2% of scrapers are made of chert, with agate comprising 33.3%. Only 6.0% of scrapers are quartz, with 1.8% being fine-grained quartzite, and 0.7% fine-grained dolerite (Table 5.15; Fig. 5.23). When chert scraper percentage frequencies are high, those of agate tend to be low, except for Spits 7 and 6 in the early pre-contact period where similar percentage frequencies of both chert and agate occur. Quartz scrapers are generally concentrated in both the early and late pre-contact period between Spit 9 and Spit 3, with the highest percentage frequency present in Spit 7. Only three fine-grained dolerite scrapers are present in the assemblage, and these are found in
Spits 9, 7 and 3. The fine-grained quartzite scrapers in the assemblage occur in Spits 11, 6 and 3.

57.7% of formal backed pieces are made on chert, followed by 22.7% on agate, and 19.0% on quartz (Table 5.16; Figure 5.24). Fine-grained dolerite and fine-grained quartzite each form 0.3% of the backed tool category. The distribution of percentage frequencies of backed chert pieces is similar to that of scrapers, and no clear patterns in the distribution of backed agate pieces is discernable between Spit 11 (5660 – 5610 BC) (Tables 4.2 & 4.3) and Spit 1, as percentage frequencies fluctuate through time. The percentage frequency of backed quartz pieces is high in Spit 11, but low in Spit 7. Quartz percentage frequencies fluctuate between the pre-ceramic and the ceramic period. Only one backed fine-grained dolerite tool and one fine-grained quartzite occur in the formal assemblage, and these are found in the early pre-ceramic in Spit 7.

Segments tend to be made on chert (65.9%), with a few agate (22.5%) and quartz (10.1%) examples. Only one fine-grained dolerite (0.8%) and one fine-grained quartzite example (0.8%) occur in the assemblage (Table 5.17; Fig. 5.25).

‘Other’ lithic artefacts

The ‘Other’ lithic inventory

Forming 1.0% of the total lithic assemblage (Tables 5.2b & 5.18; Fig. 5.26), ‘Other’ lithic types include unused pebbles and nodules of raw material, coarse-grained dolerite chunks with no discernable use or purpose, and small fragments of rock crystal. Also included in this category are groundstone artefacts such as anvils / grindstones, hammerstones, and nutting / rubbing stones (Fig. 5.20), fragments of which are found in the pre-contact period in Spits 7, 6, 4 and in the contact period in Spit 3. A few complete hammerstones are found in Spits 11 (5660 – 5610 BC (Tables 4.2 & 4.3)) and 6, with several nutting / rubbing stones occurring in Spits 10, 6 and 1. In summary, although the majority of groundstone work recovered occurs in the pre-ceramic period, no other major patterns in material density distribution are noticeable in this category, either in the pre-ceramic or the ceramic period, or across the divide between the pre-ceramic and ceramic period.
**Balerno Main Shelter**

The Balerno Main Shelter lithic assemblage (comprising 34,881 lithics, excluding ‘chips’ (Table 5.19; Fig. 5.27)) is a typical Later Stone Age microlithic assemblage (Table 5.20a; Fig. 5.28). It is characterised by the use of colourful, fine-grained cryptocrystalline silicates, as well as coarser-grained quartzite and dolerite, in the production of stone tools, predominantly using the bipolar technique (Appendix A). Small scrapers dominate the formal tool category, with backed tools (for example, segments) forming a smaller percentage of the formal tools than is the case at Tshisiku Shelter. Analysis of the assemblage involved looking for changes in lithic frequencies, flaking technique and raw material preference through time, across the boundaries represented by the different stratigraphic levels and their corresponding dates. The lithics (and all other artefacts) recovered from each square (O13, P13, P14 and P15) were analysed separately, according to the stratigraphic spits in which they were excavated, and then combined to provide a larger sample size for analysis.

94.1% of the total assemblage is made up of the ‘Informal’ tool category (Table 5.20b). ‘Formal’ tools comprise 3.7% of the entire assemblage, with the balance being made up by ‘Other’ lithics (1.5%), ‘broken / miscellaneously Retouched / Backed’ pieces (0.5%), and ‘Utilised’ pieces (0.2%). The overall pattern in the assemblage includes a general increase in the density of material from the pre-contact basal level DBG 75+, to the contact period BRA levels, where artefact frequencies are high. Frequencies then decrease rapidly in the upper levels: BOD (AD 1640 – 1650), Rocky Corner, Damp Black Dung, Consolidated Surface and Surface (AD 1660 – 1680; AD 1760 – 1800) (Tables 4.5 & 4.6). This pattern is reflected in the Informal and Formal tool categories.

Several different raw material types were used in the production of the Balerno Main Shelter lithic assemblage (see Appendix A), including chert, which dominates the assemblage (comprising 49.2% of the total), followed by quartz (16.3%), fine-grained dolerite (15.4%), agate (14.3%) and fine-grained quartzite (4.8%) (Table 5.21; Fig. 5.29).
The basal, pre-ceramic spits, DBG 70-75 (dating to between 340-320 BC; 210 – 100 BC) (Tables 4.5 & 4.6) and DBG 75 +, have fairly low percentage frequencies of chert, with higher percentage frequencies of agate and quartz (Table 5.21; Fig. 5.29). Between DBG 65-70 and BRA, chert dominates, although variation in percentage frequency does occur within this time period. Chert percentage frequencies are high in most levels above BOD. Quartz, agate and fine-grained dolerite display similar percentage frequencies throughout these levels, and indeed, throughout the entire assemblage, although fine-grained dolerite tends to have slightly higher percentage frequencies than those of agate, while agate percentages are in turn slightly higher than those of quartz (Table 5.21; Fig. 29). There is also a tendency for quartz and agate percentage frequencies to decrease when chert percentage frequencies increase, and vice versa. This trend is especially marked in the lower levels, where percentage frequencies of fine-grained dolerite, quartz and agate are higher than those in the overlying DBG and BRA levels. Of interest is the slightly higher percentage frequency of fine-grained dolerite that occurs in the lower pre-ceramic DBG levels, as well as in DBD and DC. Fine-grained quartzite percentage frequencies are fairly constant throughout the assemblage, with a small peak in percentage frequencies in Consolidated Surface.

From this brief examination of the raw material trends for the total assemblage, it is apparent that while some change occurs across the pre-ceramic / ceramic period divide (around the time of DBG 60-65) in terms of raw material utilisation, no major shift is evident. During the later second millennium contact occupation of the shelter -DBD / BOD (AD 1640-1650) to Surface (AD 1660 – 1680; AD 1760 - 1800) (Tables 4.5 & 4.6) - change is only apparent in the drop in lithic numbers. Within the contact period occupation of the shelter (predominantly the BRA levels, between about AD 670 – 770 and AD 910 - 1020), raw material use remains consistent, with no major changes in use occurring.

**Knapping debris and Informal tools**

**The Informal tool inventory**

Including debitage, informal tools and broken tools, this category forms the majority of the assemblage (Tables 5.20a & 5.22; Fig. 5.30). In general, lithic frequencies
increase in the pre-contact phase from DBG 75+ to DBG 60-65, then decrease briefly in the beginning of the first millennium contact period in spit DBG 55-60, before increasing from BRA 55-60 (AD 670 – 770) to BRA. Lithic densities in LB and BOD are low, with even lower densities of material occurring between BOD (AD 1640 – 1650) and the Surface (AD 1660 – 1680; AD 1760 – 1800) (Tables 4.5 & 4.6), in the later second millennium.

Flakes and chunks are the most dominant informal tool types, while the most common type of cores in the Balerno Main Shelter assemblage are those produced by bipolar flaking (including ‘traditional’ bipolar cores, bipolar bladelet cores, bipolar ‘rice seed’ cores, and split cobble cores) (Figs. 5.31 & 5.32). As at Tshisiku Shelter, about a quarter of the flakes and chunks are cortical, and bipolar cores form about 96% of the total core category. In general, bipolar core percentage frequencies are low in the pre-contact period in DBG 70-75 (340 – 320 BC; 210 – 100 BC) (Tables 4.5 & 4.6) and DBG 65-70, but increase through time to DBG 60-65. During the ceramic period (between DBG 60-65 and BOD), percentage frequencies remain fairly consistent. No bipolar cores are found in DBD, Rocky Corner and DC.

The general pattern displayed by the Informal component of the lithic assemblage shows lower percentage frequencies of lithics occurring in the basal late pre-ceramic levels (DBG 75+ to DBG 65-70), which increase through time to DBG 60-65 (Table 5.22; Fig. 5.30). Higher percentage frequencies occur in the ceramic period between DBG 60-65 and BRA, with peaks in percentage frequency in the upper BRA levels. Very low percentage frequencies of Informal tool materials occur in the later second millennium period between BOD and the Surface. Within the first millennium AD and early second millennium AD (i.e. the BRA levels) there seems to be an increase in Informal tool frequencies in BRA 50-55, a slight decrease in BRA 40-45 (AD 910 – 920; AD 950 – 1020) (Tables 4.5 & 4.6), followed by an increase in BRA (probably due to the inclusion of P13 BRA 45-50 with P13 BRA). While there is some change across the pre-ceramic / ceramic divide (in the region of DBG 60-65), no major shift is evident, unlike the distinct change between BRA and BOD (that is, between the first and the late second millennium occupation of the shelter).
Figure 5.31. Balerno Main Shelter: Examples of selected cores occurring in the assemblage. (a-c: irregular cores; d: opposed platform core; e-g: split cobble cores)
Figure 5.32. Balerno Main Shelter: Examples of bipolar cores occurring in the assemblage. (a-e: bipolar cores; f-i: bipolar bladelet cores; j-m: bipolar 'rice seed' cores; n-r: battered pieces)
**Raw material used in Informal tools**

Changes in frequencies and percentage frequencies of raw material usage through time in the Informal tool category are shown in Table 5.23 and Figure 5.33. These changes follow the same trends as those seen in the total assemblage (see Table 5.21 and Figure 5.28; and described above). These patterns of raw material distribution described above for the total assemblage and for the Informal category as a whole, are repeated in several of the Informal category lithic types, for example: chunks, flakes and cores (Tables 5.24-5.26; Figs. 5.34 - 5.36).

General trends for chunk and flake raw material (Tables 5.24 & 5.25; Figs. 5.34 & 5.35 respectively) include chert dominating in the upper (later second millennium) and middle (first millennium / early second millennium) levels of the assemblage, with quartz and agate being favoured in the lower pre-ceramic levels. Agate, quartz and fine-grained dolerite exhibit roughly similar values throughout the assemblage. Chert tends to increase in frequency when agate and quartz frequencies decrease, and *vice versa*. This dichotomy is especially noticeable between the upper contact and lower pre-contact levels. There is slightly more emphasis on fine-grained quartzite in the lower levels.

Of interest in Square O13 is a discrete cache of tabular chert chunks (some of which could be refitted), which was found in the DBG 55-60 level. It appears as if the chert had been quarried and brought back to the site to be used at a later date.

As with chunks and flakes, chert remains the most dominant raw material in the core category, forming 54.1% of the core category (Table 5.26; Fig. 5.36). Quartz core frequencies are very high (29.4%), with agate core frequencies significantly lower (13.6%). Frequencies of fine-grained dolerite and fine-grained quartzite cores are very low (1.6% and 1.4%, respectively).

In the pre-contact levels, chert percentage frequencies are low while those of agate and quartz are high; the opposite is true for both the first and second millennia AD. Few fine-grained dolerite and fine-grained quartzite cores are present. As with the chunk and flake categories, no major changes in raw material use across the pre-ceramic / ceramic period boundary occur.
Utilised pieces and broken / miscellaneously Retouched / Backed pieces

The Utilised and Retouched / Backed piece inventories

As illustrated in Table 5.27 and Figure 5.37, higher frequencies of utilised pieces occur in the pre-ceramic period between DBG 70-75 (340-320 BC; 210 – 100 BC) (Tables 4.5 & 4.6) and DBG 60-65. Percentage frequencies decrease in the first millennium from DBG 60-65 to BRA 55-60 (AD 670 – 770) and LB. Percentage frequencies are again high in BRA 50-55 and BRA in the early second millennium contact period, but decrease in the late second millennium in BOD. No Utilised pieces were found between BOD (AD 1640 – 1650) and the Surface (AD 1660 – 1680; AD 1760 – 1800) (Tables 4.5 & 4.6).

The main kinds of utilised tools include utilised flakes (Fig. 5.43), occurring mainly between DBG 70-75 (340 – 320 BC; 210 – 100 BC) and BRA 55-60 (AD 670 – 770). Frequencies of abraded chunks are especially high in upper BRA levels of the ceramic period (Table 5.27).

Broken or miscellaneously retouched / backed tools are concentrated between DBG 70-75 and DBG 60-65 in the pre-contact period, and between BRA 50-55 and BRA in the first millennium / early second millennium AD contact period (Table 5.28; Fig. 5.38). A few examples occur in BOD, but none are found in the remaining upper levels.

Raw material used in Utilised pieces and Broken / Retouched pieces

Almost no utilised tools are found in the upper levels of the assemblage (Surface to BOD), with a few scattered examples occurring throughout the rest of the assemblage. Fine-grained dolerite dominates, comprising 33.3% of the utilised tools, followed closely by chert (29.2%) and agate (27.1%) (Table 5.29; Fig. 5.39). The high percentage frequency of fine-grained dolerite utilisation is probably due to the coarse-grained nature of the raw material, which is useful as an abrading material. In general, fine-grained dolerite and fine-grained quartzite percentage frequencies are high when chert and agate percentage frequencies are low, and vice versa.
Most broken and miscellaneous retouched / backed pieces are made of chert and agate, with a few examples of quartz, fine-grained dolerite and fine-grained quartzite (Table 5.30; Fig. 5.40). These pieces are common from DBG 70-75 (340 – 320 BC; 210 – 100BC) to BOD (AD 1640 – 1650), but do not occur in the upper contact levels (BOD to Surface), in the second millennium. When chert percentage frequencies are high, those of agate tend to be low and vice versa.

**Formal tools**

*The Formal tool inventory*

Formal tool frequencies increase in the pre-ceramic period from DBG 75+ to DBG 60-65, decreasing briefly in the ceramic period in DBG 55-60, before increasing again in BRA 50-55. Lower percentage frequencies of formal tools occur in BRA 45-50 (AD 910 – 920; AD 950 – 1010) (Tables 4.5 & 4.6), but continue to increase again in BRA. Percentage frequencies are also high in BOD (AD 1640 – 1650) (Table 5.31; Fig. 5.41). As with Informal, Utilised and Retouched / Backed pieces, extremely low densities of lithics occur in the upper / late second millennium levels of the deposit (i.e. all those levels above BOD).

Small end scrapers are by far the most common scraper type. Side, as well as end-and-side, scrapers are the next most common types (Table 5.31; Fig. 5.42). Percentage frequencies of end scrapers increase from DBG 75+ to a peak in BRA 50-55. Between BRA 45-50 (AD 910 – 920; AD 950 – 1020) and BOD (AD 1640 – 1650), percentage frequencies of small end scrapers are similar. Very few end scrapers occur in GB Ash, Consolidated Surface and Surface, and none occur in Rocky Corner and DC. Other scraper types (including end & 2 sides, end & end, side & side, all-round, double-edged) (Table 5.31; Fig. 5.42) are concentrated in the mainly ceramic levels between DBG 70-75 and BRA, although none occur in LB. Where percentage frequencies of small end scrapers are low, segment percentage frequencies are high, and vice versa (Table 5.31). Percentage frequencies of backed bladelets (Fig. 5.43) display the same trend – increasing when that of small end scrapers decrease, and vice versa (see Fig. 5.44). Segment percentage frequencies are especially high in LB, and low in BRA 50-55. Hardly any backed pieces are to be found in the second millennium upper contact levels of the assemblage (Surface
Figure 5.42. Balerno Main Shelter: Selected examples of scrapers and adzes.
(a-f: end scrapers; g, h: side scrapers; i, j: end & side scrapers; k, l: end & 2 sides scrapers; m, n: side & side scrapers; o, p: double-edged scrapers; q-s: backed scrapers; t-v: scraper adzes; w, x: adzes)
Figure 5.43. Balerno Main Shelter: Selected examples of utilised and formally retouched / backed tools. (a-b: spokeshaves; c: retouched bladelet; d-f: borers; g, h: awls; i: tanged point; j-m: segments; n, o: backed flake; p-s: backed bladelets; t: obliquely backed bladelet; u, v: utilised flakes; w: utilised bladelet)
Figure 5.45. Balerno Main Shelter: Examples of planes occurring in the assemblage. (a, b: planes)
to BOD), but many occur in the first millennium contact period (BRA 65-70 to BRA) (Table 5.31).

Other tools occurring in the Balerno Main Shelter formal assemblage include awls, borers, scraper-adzes, adzes, spokeshaves, planes, a tanged point, and a retouched Middle Stone Age tool (Table 5.31; Figs. 5.43 & 5.45). Almost no formal tools occur in most of the upper levels of the assemblage, although a fair number of formal tools are present in BOD (AD 1640 – 1650). The greatest numbers of formal tools are concentrated in the ceramic / contact period, that is, in the upper BRA levels and in DBG 60-65. The widest variety of tools occurs mainly within the BRA levels, while DBG 75+, and LB show the least variety in tool types. The general pattern in the Formal tool category is similar to that of the other categories in that the basal pre-ceramic DBG levels have lower percentage frequencies, which increase through time in the ceramic period levels. Percentage frequencies then drop off to almost nothing in the late second millennium farmer period between BOD (AD 1640 – 1650) and the Surface (AD 1660 – 1680; AD 1760 – 1800) (Tables 4.5 & 4.6).

*Raw material used in Formal tools*

The Formal tool assemblage (including scrapers, which are most dominant; segments; backed bladelets; and scraper-adzes) comprises mainly chert (64.5%), some agate (30.5%), and very little quartz (3.2%), fine-grained dolerite (1.1%) and fine-grained quartzite (0.8%) (Table 5.32; Fig. 5.46).

In general, agate is favoured in scrapers in the lower pre-ceramic levels of the assemblage, and decreases in percentage frequency through time to the Surface level. In contrast, chert dominates in the ceramic levels from DBG 55-60 to the Surface (Table 5.33; Fig. 5.47), with lower percentage frequencies of chert scrapers occurring in the pre-ceramic period. However, only a few chert / agate scrapers occur above BOD in the late second millennium AD.

Formal backed tools (including segments (Table 5.34; Fig 5.48), backed blades / bladelets, broken backed blades / bladelets, and backed flakes) are the second largest group of formal tools after scrapers. Raw material percentage frequencies are almost exactly divided between chert (46.7%) and agate (42.4%) (Table 5.35; Fig. 5.49).
However, chert dominates by a few percent, with quartz (9.8%), and a very few fine-grained dolerite and fine-grained quartzite examples making up the remainder of the formal backed pieces. The few backed quartz pieces present in the assemblage are concentrated between DBG 65-70 and BRA, with the highest percentage frequency of backed tools occurring in BRA 55-60 (AD 670 - 770), LB and DBG 70-75 (340 – 320 BC; 210 – 100 BC) (Tables 4.5 & 4.6).

The main trends in raw material that can be observed in the Formal category of the Balerno Main Shelter assemblage include the dominance of chert in both the scraper and the backed tool categories, followed by agate. The small numbers of formal quartz tools that do occur are concentrated between DBG 65-70 and BRA, as are the few fine-grained dolerite and fine-grained quartzite tools. Thus, although some change does occur in raw material use across the pre-ceramic / ceramic period divide, it is not a major change. Raw material use between the first and second millennium of the contact period is also very similar.

‘Other’ lithic artefacts

The ‘Other’ lithic inventory

The distribution of ‘Other’ lithic artefacts (including pebbles, nodules, grindstones, (broken) hammerstones, and nutting / rubbing stones) is illustrated in Table 5.36 and Figure 5.50. Overall, material densities are concentrated in the ceramic levels between BRA 50-55 and BRA, and also in DBG 60-65. Fragments of coarse-grained dolerite are present, though their function is unknown. High frequencies of tiny rock crystal occur in the BRA levels and in DBG 65-70, with none occurring in the two lowest levels of DBG. Tiny mica flakes are also present in most levels in the assemblage. The frequency of these mica flakes and the tiny rock crystals is not high, and they may occur naturally at the shelter.

A complete upper grindstone was found in DBG 60-65, with several broken grindstone fragments occurring in BRA, BRA 55-60 (AD 670 – 770) and DBG 60-65. An ochre-smeared hammerstone was found in DBG 60-65. Fragments of broken hammerstones were found in BRA and in DBG 65-70, with broken nutting / rubbing stones occurring in BRA, BRA 50-55, DBG 55-60 and DBG 70-75 (340 –
320 BC; 210 – 100 BC). Finally, a grooved stone was found in BRA 55-60 (AD 670 – 770) (Fig. 5.51).

Thus, in general, almost no ‘Other’ artefacts occur in the late second millennium AD between BOD (AD 1640 – 1650) and the Surface (AD 1660 – 1680; AD 1760 – 1800). Grindstones, hammerstones and nutting / rubbing stones are primarily concentrated in the first millennium AD / early second millennium contact period between DBG 60-65 and BRA, with a few occurring below, in the late pre-contact levels of DBG 70-75 and DBG 65-70.
Figure 5.51. Balerno Main Shelter: Grooved stone and upper grindstone / hammerstone found in the assemblage.

(a: grooved stone; b: upper grindstone / hammerstone)
**Balerno Shelter 2**

The Balerno Shelter 2 lithic assemblage comprises a total of 4190 lithics, excluding chips. The majority of this small assemblage is concentrated in the GB layer, specifically the ceramic period GB 5-10 and the GB 0-5 spit levels (Table 5.37a; Fig. 5.52). Very low numbers of lithics are present in the late pre-contact OB layer. Raw materials used in the Balerno Shelter 2 assemblage include chert (46.6%), quartz (24.5%), fine-grained quartzite (13.8%), fine-grained dolerite (9.7%) and agate (5.4%). Far less agate was utilised at Balerno Shelter 2 than at other sites in the Shashe-Limpopo (Table 5.38; Fig. 5.53).

Percentage frequencies of chert fluctuate in the pre-contact period in the OB spit levels, but generally tend to decrease from OB 15-20 to OB 5-10 (Table 5.38; Fig. 5.53). Between OB 0-5 and GB 5-10, chert percentage frequencies are fairly similar, increasing only slightly in GB 0-5 and the Surface level. Agate percentage frequencies also fluctuate in the OB / pre-ceramic period, but then increase through time from GB 10-15 to the Surface. A high percentage frequency of agate occurs in OB 5-10. Percentage frequencies of quartz are high in the OB spit levels (in contrast to lower chert percentage frequencies). In the GB levels, quartz percentage frequencies remain consistent through time (as do chert percentage frequencies). No fine-grained dolerite occurs in the pre-contact OB levels, except for a tiny amount in OB 0-5. Percentage frequencies of fine-grained dolerite increase from OB 0-5 to peak in GB 5-10, and then decrease in GB 0-5 and the Surface. Fine-grained quartzite percentage frequencies fluctuate in the OB spit levels, with the highest percentage frequencies occurring in spit OB 5-10. Percentage frequencies then decrease through time from OB 5-10 through the contact period to the Surface.

**Knapping debris and Informal tools**

*The Informal tool inventory*

Knapping debris, broken tools and informal tools form 95.3% of the total assemblage (Table 5.37b). Lithic frequencies increase from very low amounts in the pre-contact OB levels (OB 30-35 to OB 0-5) to peak in the contact period in GB 0-5. Densities are again lower in the Surface level (Table 5.39; Fig. 5.54).
The most common lithic types in the Informal category are chunks, flakes and broken flakes, of which 10-20% are cortical (Table 5.39). Both irregular and bipolar cores (Fig. 5.55) are more common in the GB spit levels than in the OB levels, with bipolar cores dominating the cores types (forming about 86% of the total core types). Percentage frequencies of irregular cores decrease through time from GB 10-15 to GB 5-10 in the contact period, before increasing again to the Surface. Bipolar core percentage frequencies increase through time in general, from the lower levels to the Surface (with the exception of GB 10-15, where percentage frequencies are quite low).

Although no major changes in typology occur through time, more noticeable trends are visible in lithic frequencies: the major changes in frequency occur across the pre-ceramic and ceramic period divide. Lithic frequencies increase from the pre-ceramic period to peak in the ceramic period, in GB 0-5, before decreasing again in the Surface.

**Raw material used in Informal tools**

The pattern of raw material percentage frequency distribution through time in the Informal tool category is similar to that described for the total assemblage (Table 5.40; Fig. 5.56). A similar pattern is also reflected in several of the Informal tool types, such as chunks, flakes and cores (Tables 5.41-5.43; Figs. 5.57-5.59).

Chert (56.9%) forms a large percentage of the total chunks present in the assemblage, followed by quartz (22.1%). Fine-grained quartzite (9.9%), fine-grained dolerite (6.3%), and agate (4.8%) form a much smaller portion of the total raw material (Table 5.41; Fig. 5.57). Chert chunk percentage frequencies are high in the pre-contact OB levels, although they decrease briefly in OB 5-10. Percentage frequencies of chert are generally constant in the GB levels, peaking again in the Surface. Agate chunks are uncommon in the pre-contact OB levels, and decrease in percentage frequency from GB 15-20 to GB 5-10. From GB 5-10 in the ceramic period to GB 0-5 and the Surface, percentage frequencies increase again. Quartz chunks are also scattered in the OB levels, with percentage frequencies generally increasing through time from the lower levels to peak in GB 5-10, before continuing to decrease to the Surface, in a similar pattern to that displayed by chert. Fine-
Figure 5.55. Balerno Shelter 2: Examples of cores occurring in the assemblage. 
(a-e: irregular cores; d, e: bipolar cores; f, h: bipolar bladelet cores; g, i: battered pieces)
grained dolerite and fine-grained quartzite are also concentrated in the GB spit levels. Fine-grained dolerite chunk percentage frequencies increase in the pre-contact period from GB 15-20 to peak in GB 5-10 in the contact period, then decrease through time to the Surface. Fine-grained quartzite chunk percentage frequencies decrease from GB 15-20 to GB 5-10, increasing briefly in GB 0-5 before decreasing in the Surface.

Few chert flakes occur in the OB spit levels, with percentage frequencies decreasing from OB 10-15 to GB 15-20 in the pre-ceramic period, before increasing to peak in the ceramic period in GB 0-5 (Table 5.42; Fig. 5.58). No agate flakes were recovered from the OB levels. Agate flake percentage frequencies increase through time from GB 5-10 to the Surface. Quartz flake percentage frequencies fluctuate in the OB spit levels, but decrease through time from OB 0-5 to the Surface. With the exception of OB 0-5, no fine-grained dolerite flakes occur in the OB levels. In the GB spit levels, fine-grained dolerite flake percentage frequencies increase to peak in GB 5-10 in the contact period before decreasing to GB 0-5, although higher percentage frequencies are present in the Surface level. Scattered examples of fine-grained quartzite flakes occur in the pre-ceramic OB levels. Percentage frequencies decrease from high numbers in GB 15-20 to the Surface.

Cores are predominantly chert (47.7%) or quartz (42.7%), with only a few agate, fine-grained quartzite and fine-grained dolerite examples (Table 5.43; Fig. 5.59). Most cores occur in the GB levels, with very low frequencies of chert, quartz, and agate cores occurring in the OB spit levels. Chert core percentage frequencies fluctuate in the GB levels, while those of agate decrease from GB 15-20 to GB 5-10 before increasing through time to the Surface. In contrast, the percentage frequency of quartz cores increases through time to peak in the ceramic period in GB 5-10, and then decreases through time to the Surface. The percentage frequency of quartz cores also tends to decrease when the percentage frequency of chert cores increases and vice versa (Table 5.43; Fig. 5.59). The only fine-grained dolerite core occurs in the Surface layer, while the percentage frequency of fine-grained quartzite cores is similar to that of agate cores: percentage frequencies decrease from GB 10-15 in the pre-ceramic to GB 5-10 in the ceramic period, before increasing through time to the Surface.
Utilised pieces and broken / miscellaneousely Retouched / Backed pieces

The Utilised and Retouched / Backed piece inventories

Utilised pieces make up only 0.1% of the total Balerno Shelter 2 assemblage: only a few utilised flakes occur in the ceramic period, in spits GB 5-10 and GB 0-5 (Table 5.44; Figs. 5.60 & 5.61).

Hardly any broken or miscellaneousely retouched / backed pieces occur in the assemblage (0.4%). Few examples are found in the pre-contact OB levels (Table 5.45; Fig. 5.62). The majority of these retouched / backed pieces are found in the GB spit levels, and are concentrated in GB 0-5. Densities increase in the pre-ceramic period from GB 10-15 to peak in the contact period in GB 0-5, before decreasing through time to the Surface.

Raw material used in Utilised and Retouched / Backed pieces

Only one fine-grained utilised flake is present in the assemblage; the remaining utilised flakes are all chert (Table 5.46; Fig. 5.63). With the exception of one agate piece, all broken / miscellaneousely retouched / backed pieces are chert (Table 5.47; Fig. 5.64).

Formal tools

The Formal tool inventory

The Formal tool category of the Balerno Shelter 2 assemblage forms 2.4% of the total assemblage. Very few formal tools occur in the pre-ceramic OB layer (in fact, none are present between OB 30-35 and OB 15-20) (Table 5.48; Fig. 5.65). Lithic frequencies increase from spit GB 15-20 to peak in the ceramic period in GB 0-5, before decreasing sharply in the Surface level.

Only a few types of formal tool are present in the Balerno Shelter 2 assemblage, in contrast to the wide variety found at both Tshisiku Shelter and Balerno Main Shelter. Tool types that do occur include a variety of scraper types, as well as a few segments, adzes and scraper-adzes (Table 5.48; Fig. 5.66). Only one backed flake (GB 5-10), one spokeshave (GB 0-5) and two planes (GB 5-10 and GB 0-5) are
Figure 5.61. Examples of utilised flakes occurring in the assemblage.

(a-d: utilised flakes)
Figure 5.66. Balerno Shelter 2: Examples of selected Formal stone tools.
(a-g: end scrapers; h-j: end & side scrapers; k: side & side scraper; l: end & end scraper; m: all round scraper; n-p: scraper-adzes; q, r: adzes; s: spokeshave; t: awl; u-x: segments)
Figure 5.67. Balerno Shelter 2: Examples of planes occurring in the assemblage.

(a-b: planes)
present in the assemblage (Figs. 5.66 & 5.67). Small end scrapers are the most
dominant formal tool type, while backed pieces are almost non-existent in this
assemblage (in contrast to high numbers recovered at Tshisiku Shelter).

Almost all the formal tools are found exclusively in the GB levels. With the
exception of one end scraper in spit OB 10-15, one end scraper in spit OB 5-10, and
one segment in OB 5-10, no formal tools occur in the pre-ceramic OB spit levels.

**Raw material used in Formal tools**

81.0% of all formal tools are chert, with only a few agate pieces (11.4%). The
remainder of the formal tool assemblage consists of quartz (2.9%), fine-grained
quartzite (2.9%) and fine-grained dolerite (1.9%). The only formal tools present in
the OB spit levels are made of chert and agate (Table 5.49; Fig. 5.68).

The percentage frequency of chert in formal tools increases from the pre-ceramic
period in GB 15-20 to GB 0-5 in the contact period, and the Surface, where the
highest percentage frequencies of chert occur. In contrast, agate percentage
frequencies decrease from GB 15-20 to GB 0-5, and increase again briefly in the
Surface level. The only formal quartz, fine-grained dolerite, and fine-grained
quartzite tools in the assemblage are found in GB 5-10 and GB 0-5. The greatest
variety of raw material utilisation therefore occurs in the ceramic period in GB 5-10
and GB 0-5.

A similar pattern is reflected in the raw material of the scraper category. 81.5% of
scrapers are chert, and 12.3% are agate. The remainder comprise fine-grained
quartzite (3.7%) and quartz (2.5%). No fine-grained dolerite scrapers occur in this
assemblage (Table 5.50; Fig. 5.69). Only chert scrapers occur in the OB spit levels.
For the most part, chert scrapers are concentrated between GB 10-15 in the pre-
ceramic period and the Surface. Percentage frequencies of chert scrapers increase
from GB 10-15 to peak in GB 0-5 in the ceramic period. After this time, percentage
frequencies decrease in the Surface level. Agate scraper percentage frequencies
decrease from GB 10-15 to GB 0-5, in contrast to the pattern displayed by chert
scrapers. In other words, when the percentage frequency of chert scrapers increases,
the percentage frequency of agate scrapers decreases and *vice versa*. Quartz and
fine-grained quartzite scrapers only occur in the ceramic period, in spits GB 5-10 and GB 0-5.

The majority of segments are made on chert (57.1%) or agate (28.6%) (Table 5.51; Fig. 5.70). No fine-grained dolerite or fine-grained quartzite segments are present in the Balerno Shelter 2 assemblage. Chert segments occur in spits GB 5-10 and GB 0-5, while agate segments only occur in the pre-ceramic period between OB 5-10 and GB 15-20. The only quartz segment in the assemblage occurs in the contact period in GB 0-5.

‘Other’ lithics

**The ‘Other’ lithic inventory**

Forming 2.1% of the total assemblage (Table 5.37b), the ‘Other’ lithics category includes unused pebbles and nodules of raw material, coarse-grained dolerite chunks, quartz crystals, and a few fragments of a grindstone and also a nutting / rubbing stone (Table 5.52). A polished sandstone piece was also recovered from GB 5-10 in the contact period. No ‘Other’ lithics are present in the pre-ceramic period in the OB spit levels. Frequencies of Other lithics increase from GB 15-20 to in GB 0-5, where they peak, before decreasing again to the Surface (Table 5.52; Fig. 5.71).

**Inter-site artefact comparison: trends in the Shashe-Limpopo lithic assemblages**

There is continuity in the stone tool manufacturing tradition at all of the excavated shelters in the Shashe-Limpopo, with only gradual changes occurring through time, although different periods of use are emphasised at each shelter. At Tshisiku Shelter, lithic densities tend to increase through time in the pre-ceramic period, to peak in Spit 7, before decreasing to the beginning of the ceramic period, between Spit 4 and Spit 3. After a brief increase, lithic densities continue to decrease through time to the Surface level. The greatest period of activity represented in the Tshisiku Shelter lithic assemblage thus falls between about 5660 to 4220 BC. Lithic densities at Balerno Main Shelter increase from the lower pre-ceramic DBG (340 – 320 BC; 210 – 100 BC) levels to the ceramic period BRA levels in the first millennium / early second millennium AD (i.e. from about 340 BC to about AD
1300), where the highest densities occur, in general. Lower percentage frequencies occur in BOD (AD 1640 – 1650), and very low percentage frequencies occur in the upper levels of the assemblage (from above BOD to the Surface) in the late second millennium AD (AD 1640 – AD 1800). Artefact densities are very low in the early pre-ceramic at Balerno Shelter 2, but increase through time to peak strongly early in the first millennium AD contact period (in GB 0-5).

The lithic assemblages of the three sites are dominated by chert, followed by quartz, although fine-grained dolerite is also favoured at some sites (Walker (1994) has noted similar raw material use in Botswanan hunter-gatherer sites). Each site has a slightly different raw material emphasis, no doubt due to the raw materials available nearby, the activities taking place at the site, and the time during which occupation took place. Chert is emphasised at Balerno Main Shelter and Balerno Shelter 2 (as well as Balerno Shelter 3), while fine-grained dolerite is important at Tshisiku Shelter (and Little Muck Shelter), where woodworking or other activities requiring coarse-grained material may have occurred. Fine-grained quartzite is also utilised more in the Balerno Main Shelter and Tshisiku Shelter pre-ceramic period than at other sites, while agate is poorly represented (with the exception of formal tool categories) at all sites studied in the Shashe-Limpopo so far. An inverse relationship exists between chert, and agate and quartz: when chert percentage frequencies increase those of agate and quartz decrease, and vice versa. Although chert is the most favoured raw material in the pre-contact period, greater emphasis is placed on the use of quartz and agate at this time than in the later contact period. At Tshisiku Shelter, an inverse relationship also exists between chert and fine-grained dolerite.

The bipolar technique of tool production is favoured at all the sites, as is evident in the high percentage frequencies of the various stages of bipolar core reduction, including split cobbles, lozenge chunks, split cobbble cores, bipolar cores, bipolar bladelet cores, bipolar ‘rice seed’ cores and battered pieces. Bipolar cores are the most common cores occurring at all the sites, and throughout the occupation of the shelters. The nodular nature of much of the raw material (chert, quartz, agate) encourages bipolar reduction (Barham 1987; also see Appendix A discussion). Bedded chert (such as the cache found at Balerno Main Shelter) would have had to
be quarried. This may have taken a larger amount of time than simply collecting chert (and quartz and agate) nodules from riverbeds if the quarry was located at some distance from the shelters, unless the source of the nodules was also not located in the near vicinity. Sources of raw material still need to be identified in the region, however, before further comments can be made on the exact nature of raw material acquisition in the region.

Bedded material (such as chert, fine-grained dolerite and fine-grained quartzite) also differs from nodular material in that it is flaked in a different manner – that is, by freehand percussion - which is less expedient than the bipolar technique and does not utilise the material as fully. It is possible, however, that, once a core had been reduced to a point where it was too small to be flaked using freehand percussion, that reduction continued using the bipolar technique, thereby decreasing the number of irregular cores occurring in the assemblage.

As mentioned above, the use of nodular versus bedded raw material has implications for raw material acquisition strategies (for example, quarrying material from fixed locations versus collecting nodules from riverbeds). These strategies may be influenced by social factors such as decreased access to raw material sources due to increasing farmer presence, or cultural preference for certain techniques and materials, and it is therefore important that sources of raw material in the region are located. Bipolar flaking of a previously ‘irregular’ core could also have implications in terms of raw material access and expediency in tool production. Bedded raw material use may have been maximised in this way. It appears that the increase in the use of bipolar technology at some sites took place before farmers settled in the region - i.e. before and during the Happy Rest (AD 350 - AD 600) period (for example at Balerno Shelters 2 and 3, and even Balerno Main Shelter). This indicates that factors other than restriction of access by farmer presence on the landscape influenced the choice of raw material and flaking technology during the contact period.

Bipolar core frequencies increase through time at Balerno Shelter 2 (and Balerno Shelter 3), peaking in the Bambata / Happy Rest period (AD 350 – AD 600). The percentage frequency of bipolar cores at Balerno Main Shelter increases in the pre-
contact period (from between 340 - 320 BC or 210 – 100 BC onwards). During the first millennium / early second millennium AD (up until about AD 1300), bipolar core frequencies remain fairly constant before decreasing abruptly in the late second millennium BOD period (AD 1640 – AD 1650). At Tshisiku Shelter, apart from a slight increase in Spit 3, bipolar core percentage frequencies decrease through time from where they peak in the pre-contact period, in Spit 7.

The nature of the raw material is also important in that it has a direct impact on how it was flaked and what core types and tools resulted. Fine-grained dolerite and fine-grained quartzite have different uses in comparison to chert, quartz and agate, and thus fewer cores occur in these raw materials (van Doornum 2000). Many abraded artefacts at Tshisiku Shelter and Balerno Shelter 3, for example, were recycled from fine-grained dolerite anvils and upper and lower grindstones that were subsequently flaked into cores and planes. Recycling of fine-grained dolerite and fine-grained quartzite artefacts indicates they were valued and were curated. There may have been a specific functional intent for these raw materials: for example the abrasion of particles from the raw material may have aided in woodworking and hide-processing activities (Webley 1990; van Doornum 2000). On the other hand, formal tools at all five shelters tended to be made on chert and agate. Few formal quartz tools occur, but this may be due to the difficulty in identifying retouch due to the nature of the raw material. Hardly any fine-grained dolerite and fine-grained quartzite formal tools occur.

There seems to be intense activity, and a very tight focus in the activities taking place at Little Muck Shelter (if the deposit is not lagged), in contrast to a wider spectrum of activities taking place less intensively over time at Tshisiku Shelter. Since the majority of the tools (and the widest variety) are concentrated in the pre-ceramic period at Tshisiku Shelter, in the Bambata / Happy Rest period at Balerno Shelters 2 and 3, and throughout the entire ceramic period at Balerno Main Shelter, this focus in activity at Little Muck Shelter might indeed be a function of contact with farmers in the ceramic period, as Hall and Smith (2000) suggest.

It is interesting to note that formal tools form about 7.9% (an unusually high percentage) of the Little Muck Shelter assemblage, but only 3.7% at Balerno Main
Shelter, 3.0% at Tshisiku Shelter, 2.1% at Balerno Shelter 2 and 1.7% at Balerno Shelter 3. However, Balerno Main Shelter and Tshisiku Shelter have a greater variety of formal tool types than Balerno Shelter 2 or Balerno Shelter 3 (no data regarding the variety of formal tool types present at Little Muck Shelter was available for comparative purposes). The greatest frequency of retouched tools at Little Muck Shelter occurs during the Zhizo period, while at Balerno Shelters 2 and 3, the greatest frequency of retouched tools occurs in the Bambata / Happy Rest period (AD 350 – 600). In contrast, at Balerno Main Shelter, the widest range of formal tools and greatest numbers of tools occurs throughout the first millennium / early second millennium AD (Zhizo – Mapungubwe) period (AD 900 – 1300), with a slightly greater variety and density occurring in the upper BRA levels (see Chapter 7 for further discussion). After this period, densities and varieties decrease steeply through time in the late second millennium in layers BOD and above (AD 1640 – AD 1800).

Scrapers dominate the formal tool assemblages, as they do in neighbouring Botswana (for example Tuli Lodge, just across the border (Walker 1994)). The majority of these scrapers were recovered from the levels representing the first millennium / early second millennium AD ceramic period occupation (between the Happy Rest and Mapungubwe periods) at Little Muck Shelter and the Balerno shelters. At Tshisiku Shelter, the majority of the scrapers originate from the lengthy pre-ceramic period occupation. More backed tools (possibly used as knives (Wadley & Binneman 1995; Walker 1995)) occur at Balerno Main Shelter and Tshisiku Shelter than at Balerno Shelter 2 and Balerno Shelter 3, where only a few segments are present. Backed pieces are concentrated in the pre-ceramic period at both Tshisiku Shelter and Little Muck Shelter, with a high percentage frequency at Balerno Main Shelter. There are, however, fewer backed bladelets at Balerno Main Shelter and Little Muck Shelter than at Tshisiku Shelter. At Balerno Shelters 2 and 3, the few segments that are present are concentrated in the contact period. No backed bladelets occur at either of these shelters, indicating that different tasks were being performed here, in contrast to the other shelters. High frequencies of backed pieces are concentrated in the pre-ceramic period between Spit 9 and Spit 6 at Tshisiku Shelter, while greater frequencies of scrapers are present in Spit 7 and Spit 6. A small increase in scraper numbers does occur at the beginning of the ceramic
period, in Spit 3, but this is very slight. The same pattern of higher numbers of backed pieces (backed bladelets / segments) versus lower numbers of end scrapers through time, and *vice versa*, is also true for the Balerno Main Shelter formal tool assemblage. Frequencies of backed pieces also decline relative to increases in scraper frequencies in Botswana in the ceramic period (Walker 1994). Few backed pieces occur at Balerno Shelter 2. Although the variety of formal tool types at Balerno Shelter 2 is limited, those few categories, which do occur, are most common in the early ceramic period.

Thus, on a regional level, chert dominates the raw material used to produce tools using the bipolar technique. Although similar patterns of raw material use and stone tool production occur at all three shelters, as well as through time, changes in lithic frequencies do occur. Therefore, no ‘one’ pattern emerges in the lithic assemblages. These findings will be tested in the non-lithic assemblage analyses.