

APPENDIX A

DEFINITIONS

Definitions of terms used in the analysis of the lithic assemblages

No single, worldwide system of classifying tools exists. This is largely due to the differences in the questions being asked by researchers, and the different methodologies that are applied during analyses (Toth 1982). Artefacts change their shape, and often their function, through use (Andrefsky 1998), and may therefore not easily fit into a single typological category. This, in addition to the fact that types and typologies can be interpreted in various ways in different places and contexts, has made lithic analysts realise that each assemblage needs to be interpreted within its individual context (Andrefsky 1998). It is thus essential in a study focussing mainly on lithic assemblages – such as this one - to discuss the meanings of some of the new, modified, or less well-known terms used in the lithic analyses, in order to facilitate comparison with other studies. For more complete discussions on the various lithic typologies used in southern African Later Stone Age studies, see Deacon (1984), Walker (1995; 1996) and Orton (1998).

Geological terms used in the lithic analyses

In order to produce stone tools, the raw material that is selected as a core needs to be able to fracture conchoidally, to be elastic but brittle, and should lack flaws, cracks and inclusions (Whittaker 1994). The crystalline structure of the raw material is the most important factor in how easily a material will flake; knappable rocks are thus largely composed of silica (silicon dioxide – SiO₂). The most homogenous materials with amorphous crystalline structures (like glass and obsidian) fracture easily, while cryptocrystalline structures (fine-grained aggregate crystals less than 3µm in diameter (Andrefsky 1998)) are more difficult to fracture. Amorphous materials such as basalt or quartzite, are very hard to work with (Whittaker 1994).

Raw materials used in the Shashe-Limpopo lithic assemblages

Chert

Cryptocrystalline silicates include flint, chert, jasper, chalcedony, and agate. They are difficult to define, as geologists have contradictory definitions for the different kinds of rock (Whittaker 1994; Rapp & Hill 1998). Chalcedony is made up of quartz micro-crystals and differs from chert either because its crystals grow in bundles of radiating fibres instead of forming grains, or because it has smaller inter-crystalline pores and thus is less porous than chert (Whittaker 1994; Rapp & Hill 1998). Chalcedony may be dissolved and deposited into other rocks, such as igneous rocks, and as it has no significant impurities, tends to be light-coloured / whitish and translucent, although it may turn red with heating (Rapp & Hill 1998).

‘Chert’ is often used as a general term for any fine-grained, siliceous rocks produced by chemical, biochemical and biogenic processes, including flint, jasper and chalcedony (Rapp & Hill 1998). Chert itself is defined as a compact cryptocrystalline or microcrystalline (crystals just visible under a microscope) variety of quartz originating from a sedimentary context. Cherts are also varied in colour and composition, with various inclusions, according to the specific formation and contexts of genesis which result in the different colours and textures (Andrefsky 1998; Rapp & Hill 1998). They usually occur as nodules, or as beds that form as secondary deposits in rocks such as limestones, dolomites and chalks (as they are mostly composed of calcium carbonates) (Whittaker 1994; Andrefsky 1998; Rapp & Hill 1998). Nodular chert is precipitated under low pH conditions, where carbonate materials tend to dissolve (Andrefsky 1998). The nodules are often eroded out of the parent bedrock and incorporated into sedimentary deposits such as gravel, or they may become exposed on the surface. A rough, often calcareous, cortex covers most of the nodules, although the chert can also be weathered to produce a patina through water and chemicals permeating into the nodule, and silica and other materials leaching out, leaving a ‘rind’ of a different colour (Whittaker 1994). Bedded cherts are often associated with sedimentary rock strata and with volcanic deposits (Andrefsky 1998).

Agate

Agates are fine-grained crystalline quartzes of various colours, and are also classified as semi-precious stones. Irregular or concentric bands of colour caused by various impurities within the structure of the stone characterise agates, which may also have mossy or dendritic inclusions resembling vegetation (for example moss agate) (Rapp & Hill 1998).

Quartz

Quartz is a mineral composed of essentially pure SiO₂, and can be glassy and clear when pure (rock crystal), or it may be coloured by trace elements (for e.g. amethyst). Quartz is extremely hard (Whittaker 1994), and is also the most stable of all minerals on the earth's surface (Rapp & Hill 1998).

Quartzite

Quartzite is a generalised term for recrystallised or cemented sandstones (Andrefsky 1998). In other words, quartzites are metamorphasised sandstones, where quartz grains in sandstones were crystallised by heat and pressure to form a new rock type. Most quartzites occur in cobble form, although some do occur in bedded form. Quartzite is one of the toughest and least amorphous raw materials, and is hard to flake, often producing crude-looking tools. The fracture surfaces are usually rough, with a grainy or 'sugary' texture, and the crystal structures composing the rock can be seen with the naked eye (Whittaker 1994). Quartzites make good hammerstones for flaking other materials such as chert (Whittaker 1994), as well as good grindstones (Manhire 1987). Fine-grained quartzites tend to fracture with more control than larger-grained quartzites, and are therefore more suitable for stone tool production.

Dolerite

Dolerite is a dark, coarse-grained basaltic (igneous) rock that comprises medium-grained crystals that are less than 1-2mm in length / width. It is composed chiefly of dark pyroxenes, with some light feldspar, and labradorite (Rutley 1933; Gerrard 1988; http://www.canadianrockhound.ca/junior/rocks_igneous.html; and also <http://onlinedictionary.datasegment.com/word/Dolerite>).

Flaking techniques used in the lithic assemblages

The core category in my typology has been subdivided into those cores which were worked using bipolar flaking (bipolar cores, bipolar bladelet cores, bipolar 'rice seed' cores, split cobble cores and battered pieces), and those which were worked using other techniques such as freehand percussion (irregular cores and the opposed platform core) (van Doornum 2000). This division was made in order to highlight the flaking technology used by hunter-gatherers in the Shashe-Limpopo region, and allows for an investigation of the possible reasons for choosing this particular technology above others. When flakes are removed from any suitable point on a core, an irregular shape results; this type of core is thus referred to as an irregular core. In contrast, the bipolar flaking technique involves standing a chosen piece of raw material on an anvil and hitting it with a hammerstone, while holding the piece upright (Orton 1998). The piece may also be held horizontally on the anvil (Toth 1982). Flakes may detach from both ends of the core, due to contact with both the hammerstone and the anvil, thus producing two opposing platforms (Toth 1982; Orton 1998).

Bipolar flaking may in fact be under-represented in most classifications of assemblages (van Doornum 2000; Orton 1998), because, as Clarke (1998) discovered during her replication experiments, a high percentage of the cores that she produced through bipolar flaking would typically be classified as irregular, because they lacked the traditional attributes associated with 'bipolar' cores.

The bipolar technique is suited to materials that fracture easily, such as obsidian, quartz and cryptocrystalline silicates. The bipolar technique is also useful for flaking small pieces of raw material (less than 50mm in dimension), as the core can be placed on an anvil, and held with only two fingers, then struck with a fair amount of force with a hammerstone. Such small cores would be difficult to flake using the hard hammer percussion technique (Toth 1982). Holocene hunter-gatherers in the Koobi Fora region favoured the bipolar technique, according to Toth (1982), producing numerous cryptocrystalline and quartz bipolar cores. Small nodules, thick flakes and angular pieces of raw material were used to produce flakes suitable for microliths.

Bipolar flaking can be recognised by the distinctive crushing found on either one or both ends of the core. The core often ends in a point, with a fairly broad platform at the opposite end, or a ‘rugby ball’ shape may be produced (Clarke 1998). Often, a kind of ‘double bipolar’ core results, with crushing on two sets of opposing ends (Fig 5.5). In other words, the core was first flaked in a bipolar fashion in one dimension, and then turned ninety degrees, and flaked in a bipolar fashion in another dimension. Such cores have not been separated out from the general ‘bipolar cores’ category in the typology in this project.

A further clarification needs to be made with respect to bipolar cores: in many cases, I feel that bladelet cores in the assemblage are a form of bipolar core, produced using the bipolar technique. Through replication experiments in bipolar technology, Clark (1998) found that both flakes and bladelets can be produced with a certain amount of regularity from bipolar cores, and that the bladelet cores that she produced were unintentional. I believe that it is therefore difficult to recognise specific intention (Perlès 1992) to create bladelets from these cores, and have therefore been cautious in assigning cores to a bladelet core category.

Bipolar technology in the Shashe-Limpopo region

The stone tools forming an assemblage may represent any point in the lifespan of a tool, from unmodified raw material to a tool that has been modified and used to the point where it is no longer useful. Tools collected by archaeologists become static, frozen in their last stage or final form; taken out of a dynamic process (Andrefsky 1998). This process (termed the *chaîne opératoire*) is the sequence followed from the procurement of raw material to the discarding of the stone tool, and is influenced by factors including culture, raw material accessibility, tool production and use (Perlès 1992; Andrefsky 1998). The notion of the *chaîne opératoire* informs the creation of various categories for the bipolar cores analysed in this study (Fig. 5.5).

Split Cobbles

The distinction between split cobble and split cobble core is slight. A split cobble is simply a nodule that has been halved, and there is therefore only one facet present,

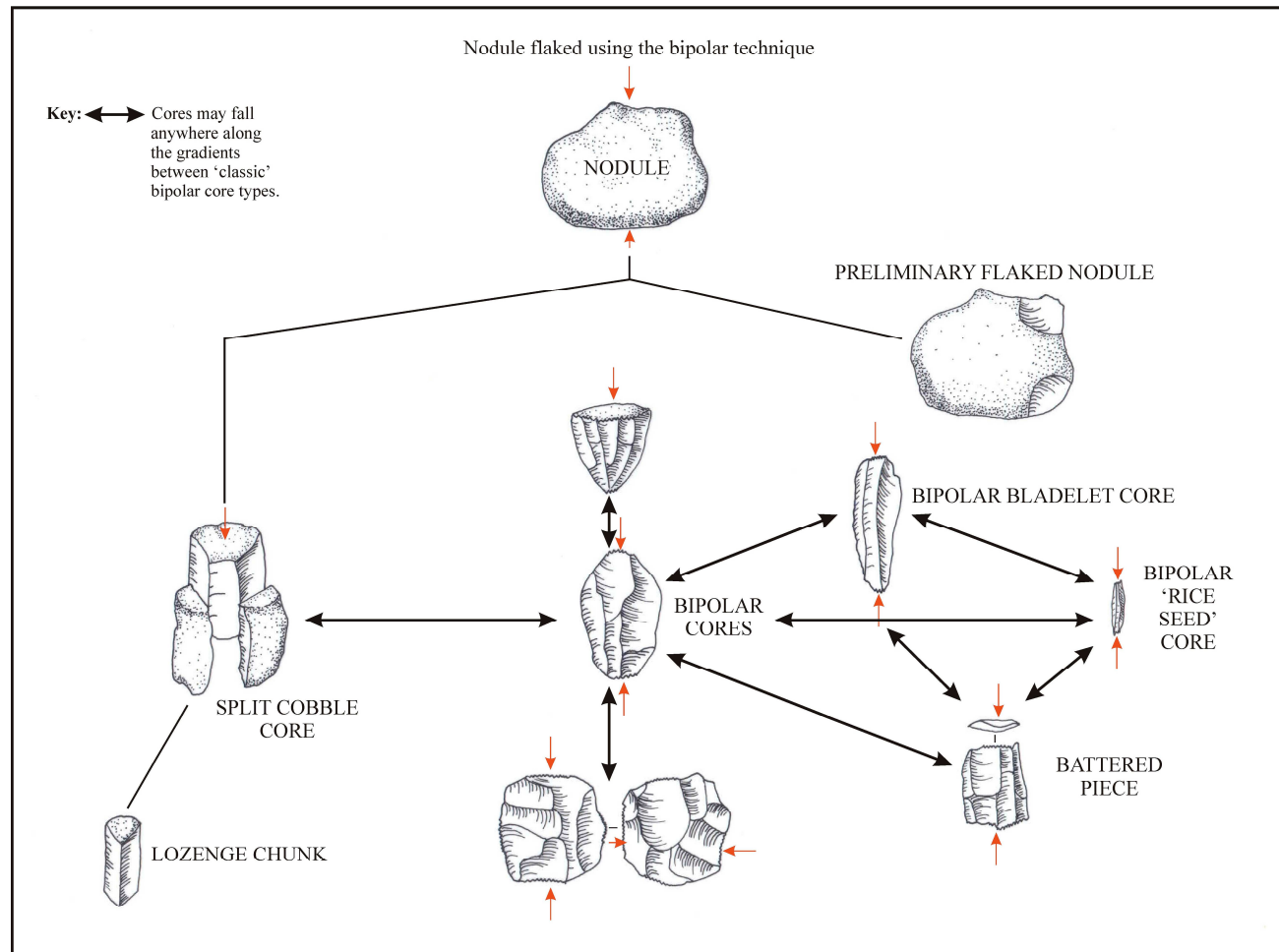


Figure 5.5. Stages of bipolar reduction (schematic).

the remainder of the nodule being covered by cortex (Barham 1987). The intention to use the nodule for bipolar flaking is clearly there, but for some reason, the knapper did not develop the split cobble further. Technically, the split cobble is a chunk, but I feel that if I were to include split cobbles with chunks, I would be obscuring the intent of the knapper.

Lozenge Chunks

Technically, as with the split cobble category above, these are cortical chunks. They are characterised by two facets and an outer cortex rind, looking somewhat like a segment of an orange. This category has been created because, again, these have been produced using the bipolar technique, and stand out from other ‘regular’ chunks (also see Hall 2000).

Preliminary Flaked Cores

Strictly speaking, these pieces are not cores as Deacon (1984) defines them, with three or more distinct flake removals. However, they are also not just chunks - instead, they are nodules which have been intentionally flaked with the purpose of exploring whether or not it would be worthwhile to continue knapping. In some of the larger nodules this is a function of the raw material type, which is a chert encrusted with a calcrete layer which obscures the quality of the raw material, and which therefore has to be removed. In other cases, nodules were simply abandoned for some unknown reason, after a few exploratory removals.

Split Cobble Cores

The bipolar technique that Barham (1987) investigated in his replication experiments involved holding a pebble with its long axis in a vertical position on a stone anvil. The pebble is then struck with a hammerstone. If the pebble splits into two or more segment-shaped pieces, it is called a split cobble core. Barham (1987:47) further describes these cores as “triangular or pie-shaped in cross-section, with cortex covering the smooth rounded portion of the core”. Bladelets are often removed from these cores, but, as noted above, it is uncertain whether or not the bipolar technique in a particular assemblage was primarily used for the production of flakes or bladelets (Clarke 1998).

Bipolar ‘rice seed’ cores

This is a bipolar core that has been reduced to the shape of a rice-seed (Manhire 1987). They are long and narrow in shape, and on average, smaller than 15mm in length, and 5mm or less in width. Bipolar ‘rice seed’ cores occur mostly on quartz (Manhire 1987), but chert examples also occur in the Shashe-Limpopo region.

Battered Pieces

I have also condensed *pièces esquillées*, *outil écaillés* and core reduced pieces into an exhausted core / battered piece category (van Doornum 2000). Morphologically similar artefacts showing evidence of bipolar flaking have been described from both Middle and Later Stone Age assemblages and variously classified as *pièces esquillées*, *outil écaillés* and core reduced pieces (Barham 1987). Distinctions between these types are usually based on differences in edge morphology and assumed function (Deacon 1984, Barham 1987, Orton 1998). Barham believes that the general similarity between these three types of artefact suggests a common technological origin, and as such, there is no real distinction between them. As his replication experiments show, *pièces esquillées*, *outil écaillés* and core reduced pieces are all products of bipolar flaking, and, although they may differ in function, they appear to represent various stages / forms of exhausted bipolar cores (Barham 1987). Barham also found that the edge of the core in contact with the anvil becomes curved and chisel-like during flaking / core reduction. The core may then be abandoned, or reversed and worked as before. Once the core has become too small to be safely held and struck, the process ends. The resulting exhausted core has crushed chisel-like edges that may be curved, depending on the stage at which the core was abandoned during the process of reduction (Barham 1987). It is possible that some of these pieces were intentionally produced for specific purposes, such as being used as wedges for splitting bone or wood (Mazel & Parkington, and Binneman in Walker 1995a), or as a chisel and used to remove bark (Walker 1995a).

Other lithic artefacts

Opposed platform core

Cores of this type have been flaked using a form of free-hand percussion, first from one platform, and then the other, once the core has been turned 180 degrees.

Utilised pieces

Utilised tools include flakes, blade(let)s, chunks and cores. Different kinds of utilisation may be distinguished, including uneven / ‘nibbled’ edges, with small removals on the ventral surface of the piece often resulting from use (L. Wadley, *pers. comm* 2003). Another form of utilisation damage is abrasion, where a smoothed / polished edge or surface is produced through use.

Miscellaneously retouched pieces

Although these pieces have been retouched, the retouch is not formal. In other words, small sections of the tool have been retouched in a random fashion, unlike the regular fashion in which a scraper is retouched, for example.

Formal tools

Chert and agate tend to be favoured in formal tool production in the Shashe-Limpopo region. In general, the division by size of scrapers and scraper-adzes into small, medium and large is defined as follows: small = 0-20mm; medium = 20-30mm and large = 30+mm.

Backed scraper

A backed scraper is an end or side scraper that has been backed or blunted on the margin opposite the scraper retouch.

Double-edged scraper

These scrapers look like “slugs” in that they have two opposing arcs of retouch that join at a point.

Scraper-adzes

A scraper-adze is generally made on an end scraper, with one or both of the lateral edges steeply flaked with adze-retouch.

Backed bladelets

Typically, these are pieces that are twice as long as they are wide, with backing along one of the straight, longitudinal margins.

Obliquely backed bladelets

Bladelets that have had their distal ends snapped off, and which have then been backed along this oblique edge.

Backed flakes

These are flakes that have been backed along one edge; i.e. backed pieces which are too short or fat to be called backed bladelets. My definition differs from that of Walker (1994; 1995a), who classifies backed flakes as quadrants. Walker (1995a) notes that Deacon (1984) would probably break down his 'quadrant' category into backed points, segments or backed bladelets, depending on dimensions and shape.

Planes

Walker (1995a) describes these tools as large pieces with a flat surface (often the ventral surface of a thick flake) that have a lot of step flaking along part of the circumference away from the platform. Deacon (1982) refers to these tools as heavy edge-flaked pieces, which are made on large split cobbles that have a flat base from which flakes have been struck around the perimeter. Often these tools are remnants of grindstones / anvils which have broken, and which have then been flaked. Most have been made on quite coarse-grained material, such as dolerite or quartzite (Deacon 1982; Walker 1995a). In the Shashe-Limpopo region, for example, planes tend to be made almost exclusively on large, thick flakes of dolerite. Walker suggests that planes may have been heavy-duty, scraping tools, possibly used for removing bark.

Tanged point

A small triangular flake with retouch on its point, which has had flakes removed from its butt / platform in order to facilitate hafting.