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USEWEAR ANALYSIS OF ROBBERG BLADELETS FROM SEHONGHONG SHELTER, LESOTHO*

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ABSTRACT

The late Pleistocene Robberg Industry is the earliest well-defined expression of the southern African Later Stone Age and is typified by the presence of large numbers of bladelet cores and bladelets. Ethnographic and archaeological analogies have previously been used to suggest that these bladelets were employed as inserts in composite weapons or knives. Microwear analysis of Robberg bladelets bearing traces of mastic from recent excavations at Sehonghong rock shelter in the Lesotho highlands shows that they were mounted parallel to their haft and at least sometimes reversed and re-used in their mount. Wear traces indicate that most were used to cut organic materials, particularly hide and soft plant materials. Though a function as components of projectile weapons is not excluded, it is evident that Robberg bladelets had a multiplicity of uses.

INTRODUCTION

The Robberg Industry is the earliest well-defined expression of the southern African Later Stone Age. Initially defined on the basis of excavations from Nelson Bay Cave in the Western Cape Province (Klein 1974; Deacon 1978), it has since been recognised at sites across South Africa, as well as in Lesotho and Swaziland (Deacon 1984a; Mitchell 1988a; 1988b; Wadley 1993).

While microlithic, and featuring a similar range of formally retouched artefacts to those known from middle and later Holocene assemblages, it is quite different from Later Stone Age (LSA) occurrences that postdate 12 000 BP. These differences reside partly in the very low frequency with which formal tools such as scrapers, adzes and backed microliths are present, and partly in the heavy emphasis placed on the manufacture of bladelets from specialised bladelet cores.

Though varying between sites and assemblages, the frequency of such bladelets can reach as much as 25% of all whole flakes (Wadley 1996). These bladelets were most often struck from single platform bladelet cores, but, particularly in those assemblages dominated by quartz, bipolar reduction was also practised (Mitchell 1988b). This technique resulted in the production of many core-reduced pieces, and in quartz-rich Robberg occurrences, what Deacon (1984a) termed small and flat bladelet cores.

Bladelets form the hallmark of Robberg technology. Though found in the hundreds or thousands in Robberg assemblages and clearly deliberately produced, the function of these bladelets has been little researched. Both Deacon (1983) and Parkington (1984) suggested that they might have been used as inserts in stabbing spears comparable to the well attested and highly effective 'death spears' of Aboriginal Australia (Flood 1995). The possibility that Robberg bladelets were used as inserts in projectile points or other multi-component tools, such as the taap-sawknives known from Western Australia (Mulvaney 1969:93), was considered in greater detail by Mitchell (1988a). However, in the absence of information on the uses to which Robberg bladelets were actually put, such discussion, which considered a wider range of archaeological analogies, remained speculative.

THE ROBBERG ASSEMBLAGES FROM SEHONGHONG

Sehonghong (29.46S; 28.47E) is a large sandstone rock shelter situated on a tributary of the Orange (Senqu) River in the eastern highlands of Lesotho (Fig. 1). Originally excavated in 1971 by P. Carter (1978), the site

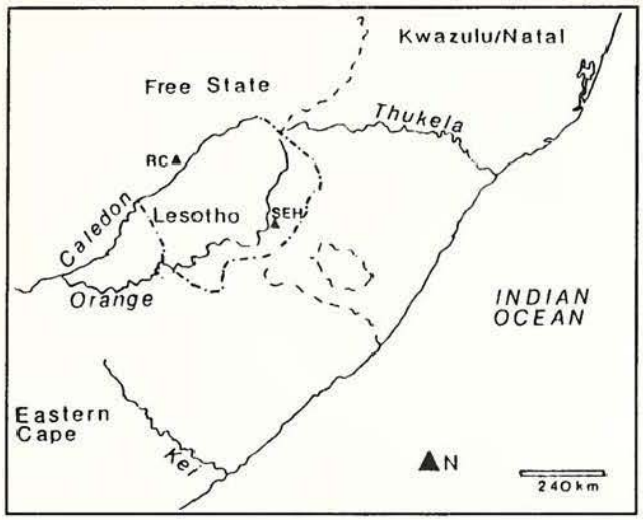

Fig. 1. Location of Sehonghong rock shelter.

Carter's (1978) initial excavations at Sehonghong identified the presence of a bladelet-rich assemblage associated with a single radiocarbon determination of terminal Pleistocene age (13 000 ± 140 BP (Pta-884); Carter & Vogel 1974). Subsequently this assemblage was identified as a variant of the Robberg Industry of the Eastern and Western Cape (Klein 1974) and bracketed between dates of 13 200 ± 150 and 12 200 ± 250 BP (Carter *et al.* 1988). This picture was largely confirmed by the 1992 excavation, which identified Robberg assemblages in two layers - RF and RBL/CLBRF - dated to 12 180 ± 110 and to 12 410 ± 45 and 12 470 ± 100 BP respectively (Mitchell 1995a).

A small Robberg assemblage recovered from a lens dates to 11 090 ± 230 BP, while an older expression of what has been identified as the same industrial tradition dates to between 20 200 and 19 400 BP (Mitchell 1995a). All the artefacts discussed in this paper come from RF or RBL/CLBRF (Fig. 2).

In the Robberg assemblages at Sehonghong bladelets

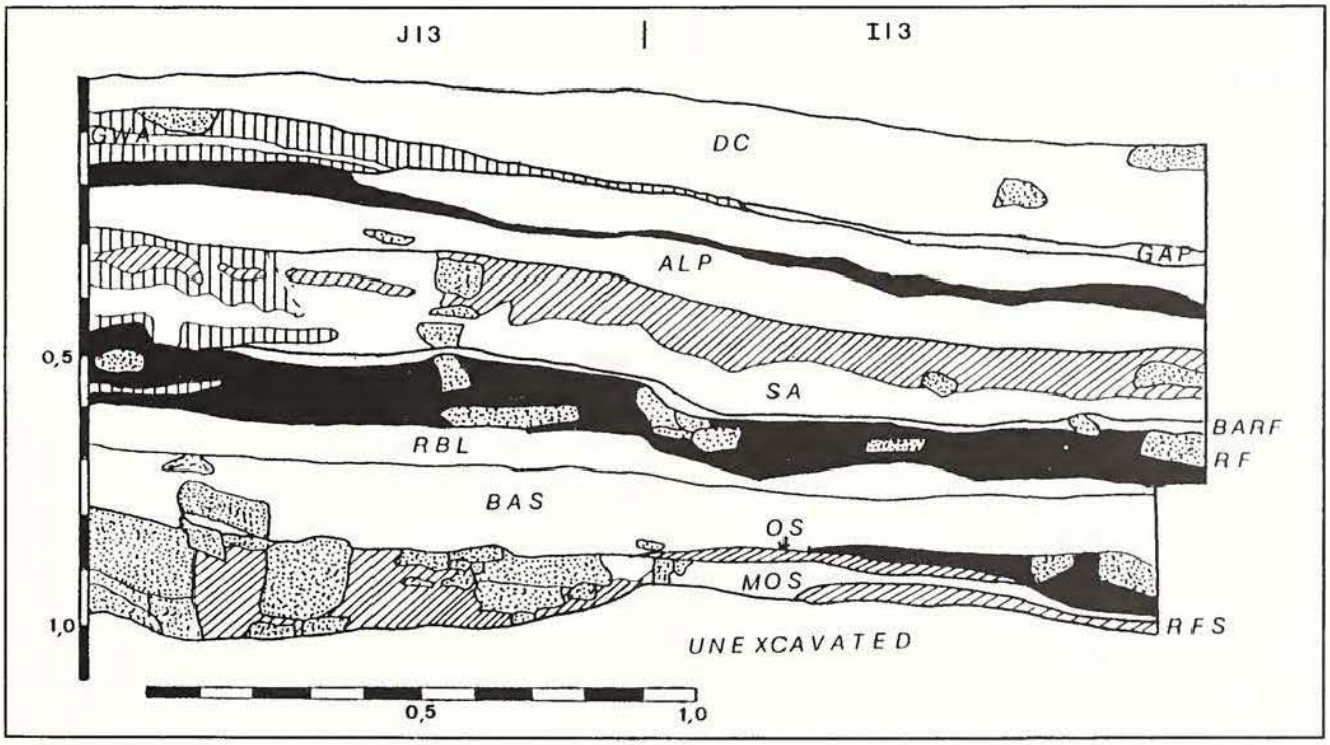

Fig. 2. Sehonghong: partial section of the north wall.

has a long sequence of Middle and Later Stone Age assemblages, possibly extending back as far as the Howieson's Poort at its base (Carter *et al.* 1988).

Historical sources show that the site was still used by local hunter-gatherers in the late nineteenth century (Vinnicombe 1976). Sehonghong was re-excavated in 1992 as the initial stage of a project that aims to reassess existing models of hunter-gatherer land use and palaeoenvironmental change in the Lesotho highlands (Mitchell 1993). While analysis of the faunal and botanical samples from this excavation is still in progress, details of the cultural-stratigraphic sequence have already been reported (Mitchell 1994; 1995a; 1996a; 1996b).

were almost invariably struck in opalines (also known as crypto-crystalline silicas or CCS), which are locally available as nodules in river gravels and as veins exposed at the surface of the lavas that overlie the sandstone in which rock shelters such as Sehonghong have formed. Bladelets account for 40.5% of all whole flakes larger than 10 mm in RF and 48.9% of such flakes in RBL/CLBRF.

The large numbers of proximal, mesial and distal bladelet sections indicate that these figures probably underestimate the scale on which bladelets were produced. The large numbers of bladelets found suggests that, though generally unmodified, it is these artefacts,

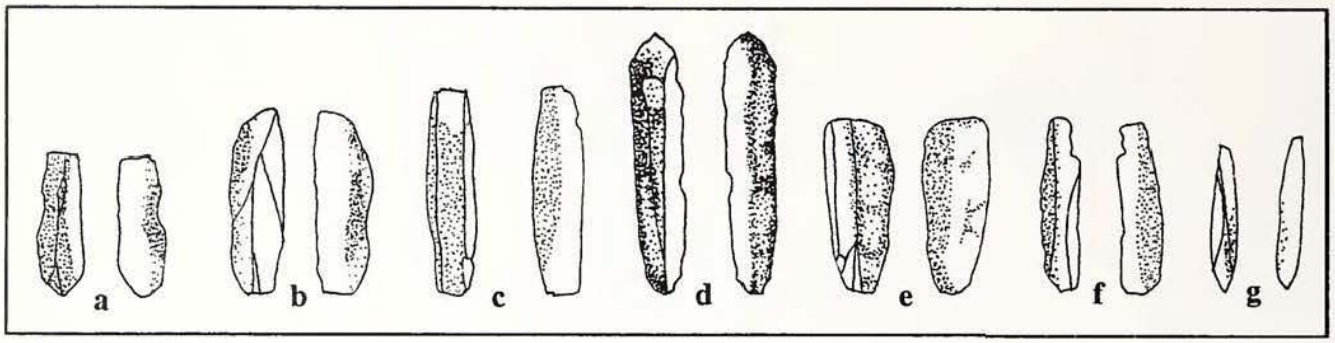

Fig. 3. Bladelets from Sehonghong examined for wear traces. Stippling denotes mastic.

rather than the rare retouched tools, that are the most 'formal' component of the Robberg stone working tradition. This view is strengthened if we consider the care and degree of standardisation applied to their manufacture.

High-backed bladelet cores, generally with single platforms, are the dominant core-type used to produce Robberg bladelets at Sehonghong. The higher frequency of such cores in RF, as opposed to bladelets removed in a plane different from that of the platform in RBL/CLBRF, suggests some chronological variation within the Robberg tradition. The very small bulbs of percussion and striking platforms on the bladelets suggest that a punch technique was used to produce them, although the bipolar technique can produce similar bladelets (see Barnham 1987).

The bladelets are quite standardised in size, particularly in width, compared to the relatively few bladelets found in other Later Stone Age assemblages at Sehonghong: for RF and RBL/CLBRF mean lengths and widths are 18.8 $\pm$ 6.4 and 17.5 $\pm$ 5.2 and 6.5 $\pm$ 2.3 and 6.2 $\pm$ 1.8 mm respectively. Utilised bladelets are slightly longer. Relatively few of the bladelets found at Sehonghong or in other Robberg assemblages show macroscopically visible evidence of utilisation or retouch. The overwhelming majority of those that do exhibit what Deacon (1984a) terms simple edge-damage (as opposed to steep utilisation or notching), take the form of light 'nibbling' along one, or sometimes both, lateral edges. This, and the acute edge angles on utilised bladelets from the 1971 excavation (Carter *et al.* 1988), suggest a primary use in cutting and/or slicing activities. Such utilisation is most common on the ventral surfaces of the RF and RBL/CLBRF bladelets and has also been noted at Rose Cottage Cave where Wadley (1991:128) comments that "many of the bladelets have extensive utilisation and occasionally shallow retouch on both cutting edges of the ventral surface".

At Sehonghong, only eleven of the more than 5000 bladelets from RF and RBL/CLBRF can be described as formally retouched; the majority of these are backed, either parallel to the unretouched edge or to a point, though ventral retouch and distal truncation are both represented by single examples.

During excavation a group of 44 artefacts from RF and RBL/CLBRF, all made in opalines and all but five of them bladelets, were observed to be partly covered by a thin, glossy black film. This has been identified as mastic based on its colour, a location that avoids edges with macroscopically visible utilisation and the restricted range of artefacts on which it occurs. The physio-chemical characterisation remains has yet to be attempted. Fourteen of these bladelets (Fig. 3) were submitted for microwear analysis.

THE MICROWEAR ANALYSIS

Procedures

Prior to cleaning the bladelets, the black substance on the implements (SEH 12, 17, 27, 30 and 42) was examined by touching it with a hot needle. In all the cases the substance melted. Similar results were obtained from testing the 'mastic' used for hafting two other implements from archaeological contexts (Binneman 1983, 1994). This suggests that the black substance on the bladelets is of a similar organic composition.

The analysis proceeded along the lines established in earlier studies (Keeley 1980; Binneman 1982, 1984). The bladelets were soaked several times (30 minutes on average) during the examination, first in a 10% HCl solution and then in a 10% solution of KOH. They were then examined under an incident-light microscope using magnifications of between 50 and 400. The wear traces on the Sehonghong bladelets were compared with those in an experimental reference collection.

Results

Of the fourteen artefacts examined one (SEH 19) was not suitable for further analysis because of the presence of shiny mineral inclusions. Six (SEH 9, 14, 23, 28, 35 and 39) show wear traces that are not sufficiently well-developed for any conclusions to be reached as to their function, although three of these (SEH 9, 23 and 28) may have been used in contact with some kind of soft material. We therefore concentrate on the results obtained from the remaining seven bladelets.

SEH 12 (from I13-065, RF) (Fig. 3a)

A bladelet with straight laterals, a tiny bulb of percussion and striking platform and snapped at the distal

Fig. 4. Small patches of bone polish next to a flake scar on bladelet SEH 12 I13-065, RF. 200X.

Fig. 5. Hide polish on bladelet SEH 17 M13-087, RF. 200X.

end. Mastic was present on two-thirds of the left lateral of the dorsal aspect and along the right lateral of the ventral aspect. The bladelet was hafted along the thin, sharp, low-edge angle and the stronger, higher edge angle was used to perform the activity.

Interlocking microflaking occurred along the right dorsal and left ventral laterals, suggesting that the bladelet was used on a 'hard' material. A few half-moon 'breakages' were present along the mastic-coated edges, but no micropolish or other usewear traces occurred here. Micropolish was weakly developed except near the distal end of the left ventral lateral and on the bulb of percussion. Small patches of bone polish (Fig. 4) occurred on the side-edges of the flake scars. 'Bright streaks' run parallel to the edge. The bladelet was used to saw/cut, and probably also to whittle, bone. However, because meat polish forms very slowly, it is possible that it may have been used to cut meat from bone, *i.e.* in butchery activities.

SEH 17 (from M13-087, RF) (Fig. 3b)

A bladelet with a small bulb of percussion and striking platform; straight right lateral and a left lateral edge which curve towards the right at the distal end. The bladelet was hafted along the thin, sharp, low edge-angle and the stronger, higher edge angle was used to perform the activity. The bulb has been removed. Mastic was present along the left lateral of the dorsal aspect and the right lateral of the ventral aspect. Microflaking is mainly visible on the opposite two laterals. Interlocking flaking were present on both aspects near the distal end and a second set of smaller 'crushing' flakes lined the immediate cutting edge. These wear patterns suggest cutting/sawing activities. A few half-moon 'breakages' were spaced along the dorsal left and ventral right laterals. Some were 'fresh' and appeared to be post-depositional. Others display traces of mastic and probably occurred during manufacture and/or hafting. No wear traces occur along these laterals and appeared not to have been used. A well-developed 'fine' micropolish was oriented parallel to the edge on both the right dorsal and left ventral aspects (Fig. 5). The cutting edges and the edges of the flake scars were rounded. Short and longer shallow U-shaped striae run parallel to these edges and long bright 'streaks' are also visible. These were probably caused by sand grains and/or small fragments of the bladelet caught between the tool and the material during contact. Near the proximal end of the left ventral lateral a few 'bright spots' run away from the immediate edge at approximately 45^0. These resemble experimental wear produced by rubbing stone on stone. It is thus possible that the bladelet came into contact with stone when it was used, or that it was rubbed against another stone artefact when being carried around. The rounded edges and 'fine' micropolish suggest that this bladelet was used to cut soft material, most probably hide.

SEH 27 (from K12-067, RBL/CLBRF) (Fig. 3c)

A bladelet with a small bulb of percussion and striking platform and straight laterals. Mastic covered virtually the complete dorsal aspect and most of the right lateral of the ventral aspect. Interlocking flaking were present along the right ventral lateral, the larger flakes were lined with a second row of 'crushing' along the immediate edge. Small flakes were spaced along both the right dorsal lateral and left ventral lateral. Micropolish was well-developed along the immediate edges of all four laterals (Fig. 6). The well-developed polish present on those laterals covered by the mastic indicates that they have been used and that the bladelet was therefore turned in its mount. Polish was best developed around and between the flake scars and appeared to 'flow' parallel to the working edge. This is most probably due to prolonged 'cutting' actions. Striations were generally absent, with only a few, short, fine striae parallel to the edge. The micropolish resembled that produced experimentally by working soft plant materials such as reed and sedge. This bladelet was used to cut and whittle soft vegetal material.

SEH 30 (from J12-067, RBL/CLBRF) (Fig. 3d)

A bladelet with a small bulb of percussion and striking platform and straight laterals. Mastic covered

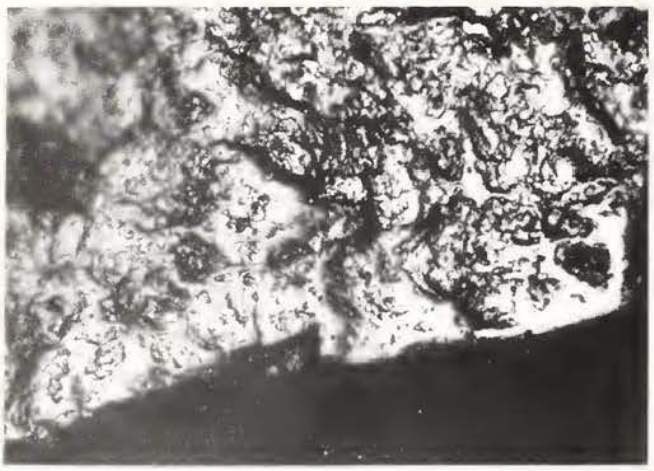

Fig. 6. Vegetal polish along the mastic coated lateral on bladelet SEH 27 K12-067, RBL/CLBRF. 200X.

large areas of the right lateral of the dorsal aspect and the entire left lateral of the ventral aspect. The bladelet was hafted along the thin, sharp low-edge angle and the stronger, higher edge angle used. Microflaking were present along the immediate edge of the right lateral on the ventral aspect; all were sharp and crisp with little 'crushing' of the edge.

Micropolish was well-developed along the immediate edges of the left dorsal lateral and right ventral lateral. It was best developed around the flake scars toward the distal end (Fig. 7). On both aspects it appeared to 'flow' from the proximal to the distal end, most probably due to prolonged 'sawing' actions. Micropolish was absent from the mastic-coated areas. Striations were generally absent.

The polish resembles that obtained experimentally from working soft plant materials, such as wood, reed and sedge. The extensive macrowear on the right ventral aspect must have occurred from pressure applied from the dorsal aspect and thus suggests that the bladelet was also used in 'whittling' activities.

SEH 42 (from L13-106, RBL/CLBRF) (Fig. 3e)

A bladelet with the bulb removed by flaking. Mastic was present along the right lateral of the dorsal aspect and the entire left lateral of the ventral aspect. The bladelet was hafted along the thin, sharp low-edge angle, and the stronger, higher edge angle used to perform the activity.

Microflaking was mainly present on the left lateral of

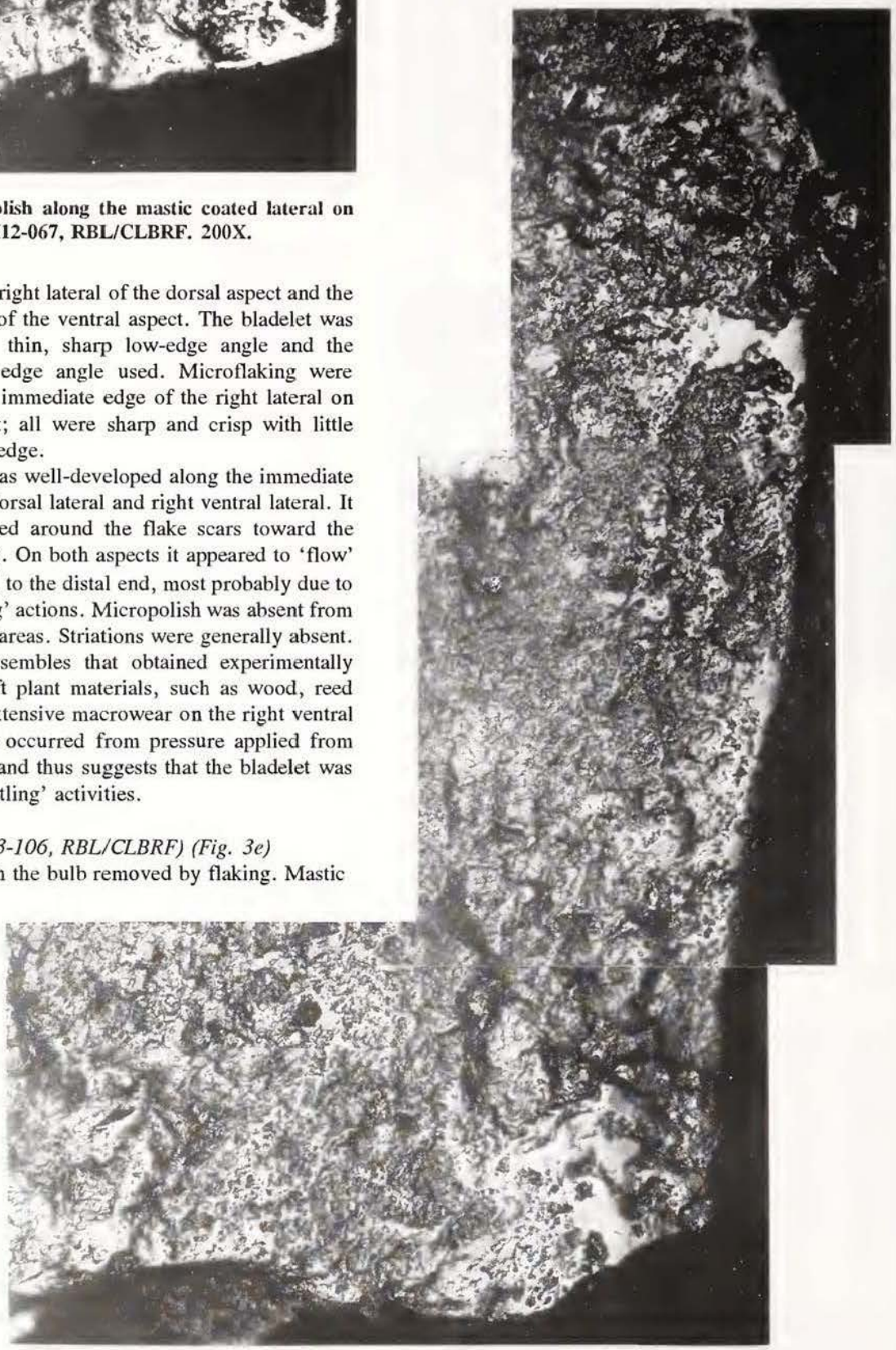

Fig. 7. Well-developed vegetal polish along the edge of a flake scar on bladelet SEH 30 J12-067, RBL/CLBRF.

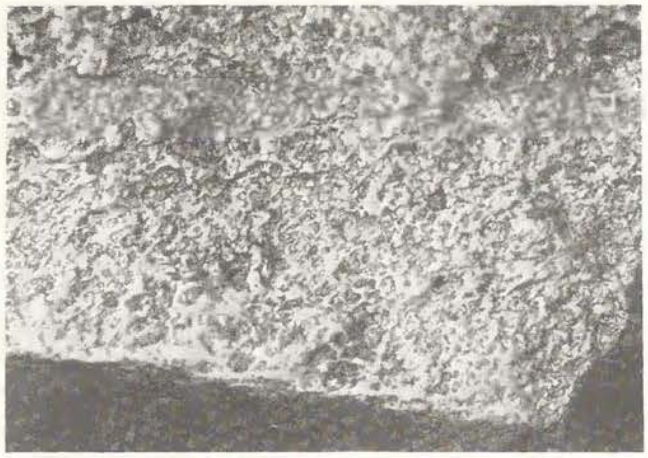

Fig. 8. Hide polish on bladelet SEH 42 L13-106, RBL/CLBRF.

Fig. 9. 'Stone polish' on bladelet SEH 41 K13-097, RBL/CLBRF).

the dorsal aspect and on the right lateral of the ventral aspect. Interlocking flakes concentrated near the proximal and distal ends of the ventral right lateral. There was no micropolish or other usewear traces present on the mastic coated side, although a few 'bright spots' and 'streaks' did occur. A well-developed 'fine' micropolish oriented parallel to the working edge was present on both aspects; dorsal left and ventral right (Fig. 8). Short and long, shallow U-shaped striae run parallel to the edge and minute striae were also present at varying angles. The usewear traces suggest that the bladelet was used to cut soft material, probably hide.

SEH 43 (from L13-106, RBL/CLBRF) (Fig. 3f)

A bladelet with straight laterals, small bulb of percussion and striking platform with mastic present along the entire left dorsal and right ventral laterals. Both laterals displayed interlocking flaking and 'crushing' along the immediate edges; these were concentrated toward the centre and the distal ends. A few flakes were also present along the left ventral lateral. The artefact's micro-surface was very shiny, though it is not clear what the reason for this is. Usewear polish was best developed toward the distal and proximal ends of all the laterals. Minute striae and 'streaks' run parallel and at high angles to the cutting edges. The wear traces indicate that this bladelet was turned in its mount and used on both sides, perhaps on different materials. It seems as if it was mainly used on hide, but perhaps also for a brief period on soft vegetal material. Cutting was the general activity in which the implement was employed.

SEH 41 (from K13-097, RBL/CLBRF) (Fig. 3g)

A small, narrow bladelet with straight laterals, tiny bulb of percussion and striking platform. A small patch of mastic was present near the proximal end of the right dorsal lateral, with a few specks present along the left ventral lateral. The bladelet was hafted along the thin, sharp low-edge angle and the stronger, higher edge angle was the one used to perform the activity. A few small flakes occurred near the distal end of the left dorsal lateral and the proximal end of the right ventral lateral. Two large 'breakages' were present near the distal ends of the right dorsal and the left ventral laterals and a few tiny 'breakages' were spaced along both laterals.

The right ventral lateral displayed abundant patches of 'bright spots' and 'streaks'. A concentration of 'bright streaks' and both deep and shallow V- and U-shaped striae that run parallel and at low angles to the cutting edge occurred near the distal end, indicating that the bladelet made contact with other stone and/or sand particles (Fig 9). Apart from a few tiny patches, there was no well-developed micropolish along the immediate edge to identify any organic material. It is therefore possible that this artefact was used briefly as a cutting/sawing implement on a soft material, such as meat, which usually takes a long time to produce a micropolish. Similar 'stone wear' would have been produced if the meat, or other soft material, had been cut on a stone slab.

Alternatively, it is possible that it could have formed part of a projectile, the 'stone wear' suggesting that it made contact with soil. In either case, the location of the mastic indicates that the bladelet was mounted parallel or at a very low angle to its haft. A large patch of micro-polish on the ridge of a flake scar near the proximal end of the left dorsal lateral is similar to that produced experimentally when working wood and does not resemble 'stone polish'. If it is wood polish, however, it is not clear how it originated, or why it is located where it is.

Summary

All the bladelets, except where the bulbs were removed, displayed tiny bulbs of percussions and striking platforms. Seven of the 14 bladelets selected for study have well-developed microwear. In all cases this results from the artefacts having been used in cutting and/or whittling activities, with the bladelets hafted along their thin, sharp low edge angle and the activities performed using the stronger, higher angled edge. Bladelets were hafted parallel to their mount, rather than as projecting barbs. Two of the bladelets were used to work hide, two to work soft vegetal materials, such as wood, reed or

sedge, and one on both kinds of materials. A further bladelet was used to work bone and/or possibly in butchering animals, while SEH 41 may either have been employed as a component of a projectile weapon or in cutting soft material. Three of the remaining seven bladelets on which micropolish was not so well-developed may have been used to work soft materials, such as hide and meat or those of plant origin.

DISCUSSION

It has always seemed likely, given their small size, that Robberg bladelets must have been hafted for them to have been used. The Sehonghong examples are unique because they are the first to have been discovered that still retain traces of mastic. Examination of its distribution on the full sample of 39 mastic-stained bladelets from Sehonghong, in conjunction with the microwear results reported here, indicate that they were hafted parallel to their handles or shafts (see Phillipson 1976). Though it is not possible to be certain of this on presently available evidence, their small size suggests that several bladelets were probably hafted in sequence to produce a longer cutting edge in a manner similar to that of the Australian taap-sawknife (Mulvaney 1969). Binneman (1982:266) has previously suggested that at least some backed bladelets from the Holocene levels at Boomplaas Cave in the Western Cape Province may have mounted and used in this way.

The complete absence of bone hafts from late Pleistocene assemblages, even where, as at Sehonghong, faunal remains and worked bone are well preserved, indicates that wooden hafts must have been used (Mitchell 1988a). Deacon (1976:59) has reported the presence of such slotted wooden handles in mid-Holocene contexts at Melkhoutboom in the Eastern Cape Province. Although only one lateral edge was used on most of the bladelets examined in this study, one bladelet (SEH 43) had been turned in its mount and used on two different materials.

The wide range of materials on which the Sehonghong bladelets were used (soft plant materials, hide, bone and possibly meat) is paralleled by results recently obtained in an analysis of Robberg bladelets from the approximately contemporary site of Rose Cottage Cave in the eastern Free State (Binneman 1997 in press). There too Robberg bladelets seem to have been principally employed in cutting hide and soft plant materials, some of which it may be possible to identify more specifically from ongoing residue analyses (Williamson 1996).

Given the scarcity of other deliberately designed artefacts in Robberg assemblages a comparable variety of functions for Robberg bladelets could have been anticipated, although most previous authors have selectively emphasised their possible role in hunting weaponry. Microwear analysis of Robberg bladelets from Rose Cottage and Sehonghong thus dovetails with recent critiques of the pre-eminent role previously accorded large ungulates in Robberg subsistence strategies (Mitchell 1988; Deacon 1995) and of the very idea of a single hunting-dominated lifeway in late Pleistocene southern Africa (Mitchell 1996c).

Sehonghong is one of the few late Pleistocene sites at which plant remains are preserved. Preliminary analysis of samples taken from the 1992 excavation indicates, somewhat surprisingly, that geophytic plant foods are absent in the late Robberg layers, at least in the small area excavated (G. Hall, pers. comm.). However, grasses are relatively common and were probably introduced as bedding material. It is possible that at least some of the plant use wear noted on the bladelets discussed here results from cutting and collecting this material.

Only one of the Sehonghong bladelets (SEH 2) has usewear consistent with the possibility that it formed part of a projectile weapon. While it remains possible that at least some of the many bladelets found in Robberg assemblages were used as components of hunting weapons, it is not supported by the small samples examined from Sehonghong and Rose Cottage Cave. Larger samples still need to be examined to confirm this observation.

Only a fraction of the bladelets from the late Robberg levels at Sehonghong, 23 of the 39 (59%) mastic-stained bladelets, were classified as utilised on the basis of macroscopically visible edge damage. SEH 12, which from a typological standpoint was considered to be unmodified, was shown by microwear analysis to have been used to work bone and/or to butcher meat. There is nothing new in the realisation that typological analyses grossly underestimate the number of artefacts that, far from being 'waste' or 'debitage', were in fact employed in a variety of tasks (cf. Phillipson & Phillipson 1970; Binneman 1982), but it is important to stress this point when considering the Robberg.

The implication is that many of these artefacts were used in a manner that was insufficiently prolonged or intensive to affect their gross morphology. That only one of the bladelets examined in this study appears to have been remounted and used in more than one activity supports the idea that many, perhaps most, Robberg bladelets were employed as relatively short-lived, single task tools, rather than being recycled and curated over the longer term. The modern analogy lies perhaps more with disposable razor blades than with pocket knives.

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