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The Later Stone Age of Welgevonden Rock Shelter, Waterberg, Limpopo Province, South Africa

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ABSTRACT
Welgevonden Rock Shelter and its surrounds were used intermittently from the Earlier Stone Age to the Later Stone Age and perhaps by Iron Age farmers. We report on Later Stone Age occupations that probably began in the last few thousand years and persisted until at least 270 years ago. The rich lithic assemblage contains a variety of backed tools and small end scrapers made on quartz, chalcedony and siltstone together with a large assemblage of ground stone. Most chalcedony artefacts were probably manufactured elsewhere, whereas quartz and siltstone lithics were made on site. The excavated rock shelter lacks rock art, but two sites with fine-line paintings are nearby. The north-eastern site has multiple painting events and both sites have paintings of metal artefacts made by Iron Age farmers. Recovered farmer artefacts include Eiland ceramic sherds, one Letsibogo sherd, several iron beads and a fragment of a glass bead. People may have worked with rain near the excavated rock shelter on the hillside which bears several rock cisterns that fill with water after rains. Plant identifications made from seeds and charcoal indicate that the savanna vegetation of the area was essentially the same as it is presently. Spatial segregation of domestic and ritual behaviour, of the kind recorded in some ethnographies, is suggested by the proximity of the occupied (unpainted) rock shelter to unoccupied rock art sites.

Keywords: backed tools and scrapers, ostrich eggshell beads, fine-line rock art, Eiland ceramics, ritualised space

1. Introduction

An important objective for excavating the Waterberg archaeological sites is to discover when the plateau was occupied, by whom, and to study potential interactions between groups. Curiously, it seems that Later Stone Age occupation on the Waterberg plateau was restricted to the last 2000 years, a conclusion based on archaeological excavations by van der Ryst (1998, 2006) and Wadley and colleagues (2021, 2022, 2023). The putative demographic movement into a seemingly empty Waterberg about 2000 years ago is unparalleled in southern Africa. Hunter-gatherers and Iron Age farmers may have arrived on the plateau more-or-less simultaneously as part of a symbiotic relationship that lasted for several hundred years. Both Later Stone Age and Middle Stone Age artefacts are abundant at open sites and in rock shelters. Nonetheless, only two Waterberg rock shelter sites on the western edge of the Waterberg, Olieboomspoort and Red Balloon Rock Shelter, have Middle Stone Age dates. Olieboomspoort has a date of 150 000 years ago (Val et al. 2021) while Red Balloon has optically stimulated luminescence (OSL) ages that centre on ~100 000 years ago (Wadley et al. 2021). Even if more recent Middle Stone Age dates become available, the occupation hiatus remains considerable.

Recent excavations of Later Stone Age occupations in Kaingo Sheep Rock Shelter on Kaingo Game Reserve yielded charcoal that was radiocarbon dated to 2060±30 bp (Beta-715455) (2020-1888 bp) (Wadley et al. 2022). These support the Later Stone Age dates (from the last 2000 years) that van der Ryst (1998) obtained on the plateau. An OSL age estimate of 4370±180 years ago from the basal layer of the Kaingo site (Wadley et al. 2022) suggests that a few Later Stone Age incursions may have preceded the 2000-year-old settlement on the plateau. Middle Stone Age lithics underneath the Later Stone Age occupations at Sheep Rock Shelter also support van der Ryst's suggestion of a Holocene hiatus in the Waterberg. It was not possible to get an OSL age estimate of the Sheep Rock Shelter Middle Stone Age occupations because the older sand grains were contaminated with Holocene sand wash (Wadley et al. 2022). Until secure chronology becomes available, we remain uncertain whether the Waterberg plateau really was abandoned for most of the Holocene. We also need more environmental proxies because it is possible that the area was deserted for environmental reasons that are presently unknown. The modern vegetation community surrounding Welgevonden Rock Shelter comprises the Waterberg Mountain Bushveld with about 550 mm of annual rainfall (Mucina & Rutherford 2006). *Burkea africana*, *Sclerocarya birrea*, *Grewia* sp., *Vachellia* sp., *Senegalia* sp., *Combretum* sp. and *Croton gratissimus* are among the common woody species in the area (The Waterberg Tree Group 2024). Before we embark on a palaeoenvironmental project to find out what was happening on the Waterberg landscape in the Holocene, we must first demonstrate that the assumed occupation hiatus exists in a large sample of sites. We can only achieve this by excavating and dating a range of archaeological sites in the area. The excavation of Welgevonden Rock Shelter was undertaken as part of this project.

Welgevonden 186 KQ is the original farm name for land now incorporated into the Kaingo Game Reserve in the western Waterberg (Fig. 1), from which the rock shelter takes its name (its University of the Witwatersrand and Kaingo Research Centre curation code will be 2427BB3). Sites from several periods cluster on or around the low hill where Welgevonden Rock Shelter is located (Fig. 2). The hill has extensive quartzite outcrops that were quarried by Acheulean (Earlier Stone Age) knappers. A few small rock shelters house Middle Stone Age and Later Stone Age stone tools on their sandy floors and three unoccupied sites have rock art (one site with a single faded motif is not discussed here). The hill summit has a commanding view of the surrounding landscape (SOM Fig. 1) and on its eroded surface there are sizeable rock cisterns (Fig. 2, SOM Fig. 2), a shallow pan that is dry for most of the year and sandstone rocks with unusual surfaces for the Waterberg (SOM Fig. 3). The cisterns hold stores of rainwater, and this resource would have been attractive for the area's occupants. In the Earlier Stone Age, *Homo erectus*, a scavenging hominin, may have used the views from the hill for locating predator kills. These early stone workers quarried quartzite blocks and knapped Acheulean large cutting tools and scrapers from giant cores both on the hilltop and on an open stretch of veld to the west of the excavated rock shelter (Fig. 2). Acheulean quartzite cores and flakes litter the gentle, even slope in front of Welgevonden Rock Shelter, but Earlier Stone Age artefacts are not as abundant here as they are on top of the hill near the rock cisterns. Large cutting tools, and fragments thereof, are relatively rare, suggesting that they may have been removed from the quarry site to be used elsewhere. A seasonal stream (Giraffe Stream) about 200 metres west of Welgevonden Rock Shelter (24°05'17.45" S, 27°49'23.43" E), has streambanks with a few Acheulean flakes embedded in ferricrete (*ouklip*). This ferricrete has been cored by Prof. Michiel de Kock of the University of Johannesburg, but the palaeomagnetic results are not yet available. We predict that the site was used somewhere within the range of one million to 780 000 years ago, as was the case at Woodstock Rocks (Wadley et al. 2023).

Welgevonden Rock Shelter formed under a mushroom-shaped boulder that provides cover in a two-to-four-metre-wide corridor around its perimeter (Fig. 2). It may have been used for shade and shelter from the Acheulean until the relatively recent Later Stone Age. No rock paintings are present in Welgevonden Rock Shelter, but two sites with fine-line art, WEL1 and WEL2, are each about 30 m distant (Fig. 2). WEL1 was recorded by the Rock Art Research Institute and is listed on the African Rock Art Database (https://rari.wits.ac.za/) with the site code RSA GOD1. WEL2 is a new site discovered by Wim Biemond in 2023.

Figure 1. Welgevonden Rock Shelter in the Waterberg of Limpopo Province. Other sites mentioned in the text are marked on the map.

2. Methods

Excavation

Excavation was conducted with SAHRA permit #4117. A 2x1 metre trench (squares R2 and R3) was opened near the dripline of the small shelter. We began in September 2023, and two further excavation seasons followed, ending in March 2025 when a sterile sediment layer was reached. Before excavating, geotextile was laid on the floor of the shelter to prevent disturbance to the deposits surrounding the trench. The shelter and the excavation trench were mapped using a Nikon total station. The total station readings also record the x, y, z locations of all items larger than 30 mm, as well as smaller artefacts, bone and plant remains of particular interest.

The excavation followed natural stratigraphy and sediments were named for textures and Munsell chart colours. Where natural layers were deeper than 10 mm, these were divided into plans (*décapage*) such as VDGB 1, VDGB 2 and VDGB 3. Total station bucket points (BP) were given as a z depth measurement for each plan. Each plotted find was bagged individually with its site and layer details and the total station number and bucket point number. Excavated surfaces were photographed at the base of each plan. We also used a Microsoft Surface tablet to photograph exposed surfaces and plotted pieces. A coloured flag was positioned next to each item to make it more visible on the photograph when items were crowded. Sediment was screened through nested 2 mm and 1 mm sieves and the finds were sorted and packed on site. Some were washed and photographed in the laboratory at the Kaingo Research Centre. At the close of excavation, the trench was rehabilitated with geotextile, rocks, and biodegradable hessian sacks filled with sand. Sediment was then raked over the top of the filled trench.

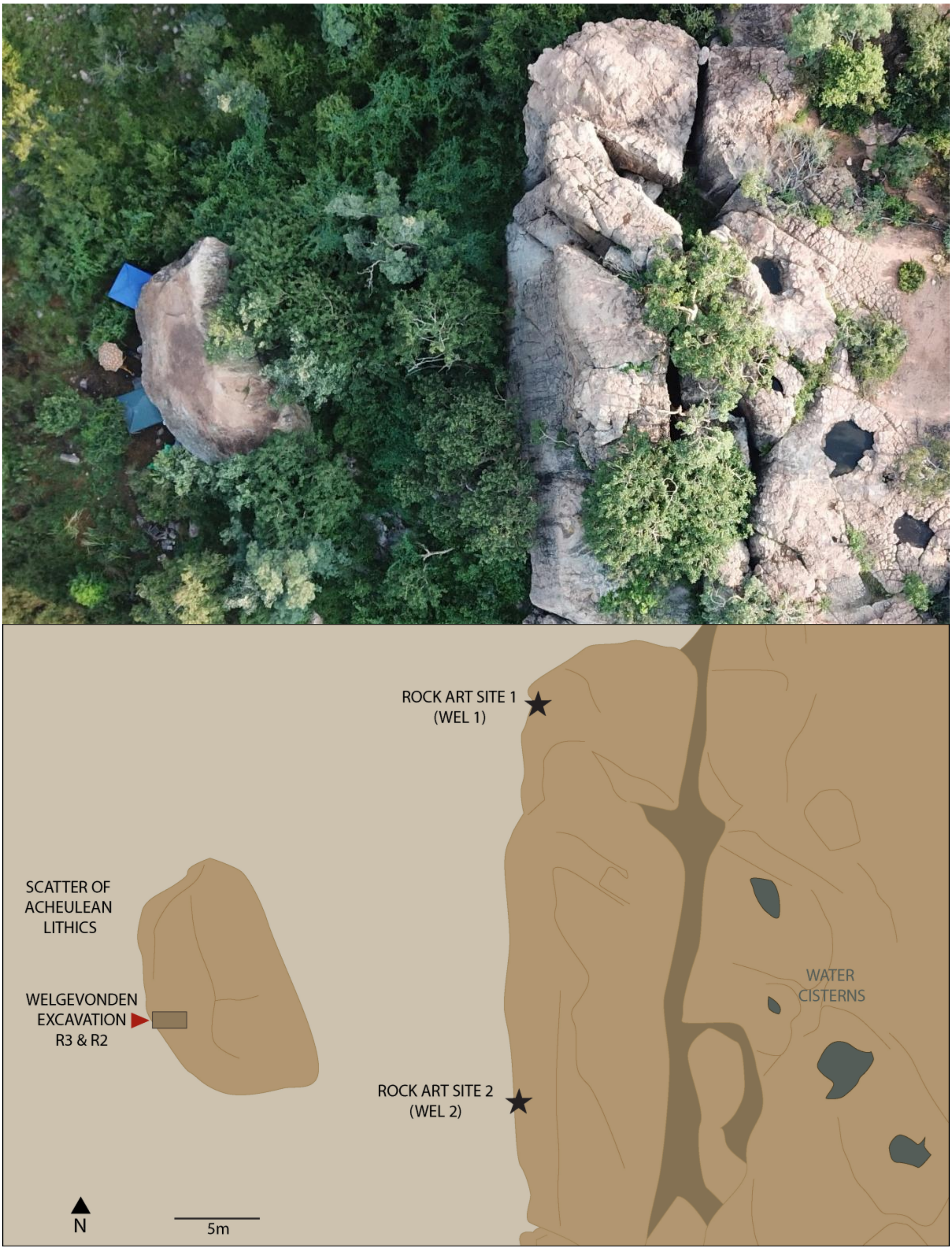

Figure 2. Drone photograph (top) and map (bottom) of the hillside with rock art sites WEL1 and WEL2 and the neighbouring boulder that creates Welgevonden Rock Shelter. Top: Aerial photograph of the boulder with gazebos where excavation and sorting took place. Also featured is the hilltop with several natural rock cisterns filled with rainwater. Bottom: Map of the area shown in the photograph. The excavation trench is labelled R2 and R3. The shelter faces west on to an open, grassy plain with many Acheulean cores and flakes. The position of the rock art sites is shown on the hillside.

Since ages for Waterberg occupations are of primary concern, we hoped to collect charcoal from layers with large, undisturbed samples. Regrettably, only one such charcoal sample was found (in square R2 VDGB 3) and it was submitted to Beta Analytic, Miami, USA. Other small, scattered charcoal pieces were unsuitable for dating. At the end of the excavation, three sediment cores were removed from the north wall of square R3 for optically stimulated luminescence (OSL) dating and they were sent to the Royal Holloway University of London. Unfortunately, sand grains are contaminated and cannot yield ages (Simon Armitage pers. comm. December 2025). Rainwater flowing through the shelter may have mixed the grains. Calcium carbonate residues on the hearth stones from square R3, in a feature called 'Ghost Hearth', may have potential for Uranium/Thorium dating, and a sample was sent to the U-series dating lab, University of Cape Town in October 2024; we do not yet know whether the samples are sufficiently uncontaminated for the dating process. The feature was named 'Ghost Hearth' because it does not have a classical hearth profile with white ash underlain by black ash and charcoal nodules. Instead, the surface of the hearth was marked with fire-pocked spall, and remnants of white ash in the form of calcium carbonate now adhere to rocks that may once have been hearth stones.

Charcoal
One thousand small charcoal fragments were recovered from the sieves and 101 of these were large enough to be sectioned. Transverse (TS), tangential longitudinal (TLS) and radial longitudinal (RLS) sections of charcoal were made. The charcoal was analysed initially using a Dinolite and later a light microscope (Olympus BX 51) that was fitted with reflective light and magnified up to 500 times.

Lithic analysis
Lithics were gently washed in cold water, then separated by rock or mineral types. Flaked lithics were initially divided into large typological groups: core, flake (whole or broken), blade, tool (retouched piece), and debitage. Chips were divided into those measuring 10 to 20 mm and those less than 10 mm. Where possible, the rock or mineral types of the <10 mm chips were recorded, but when it was not possible to identify rock types, chips were designated 'quartz' or 'other' raw materials. Cores were classified by platform position (for example, adjacent or opposite platform), platform number (for example, single platform), or manufacturing type, such as bipolar cores, blade cores, and those with radial flaking. Within the flake category, trimming flakes, preparation flakes and rejuvenation flakes were combined because it is impossible to separate them accurately (McNabb 2009). Formal tools were classified into various classes such as scraper, then further subdivided into types, such as end or side scraper. All whole flakes, retouched tools, cores and whole grindstones were measured (length, breadth and thickness) in mm with digital callipers with the blades covered in plastic-wrap to prevent scratching. The breadth of grooves on grooved stones was also measured with digital callipers.

Ostrich eggshell and worked bone
Some, but not all these small pieces were piece plotted. The diameters of whole eggshell beads and their apertures were measured using a Dinolite. The worked bone fragments were classified as flakes, spatulas and broken shafts, presumably from bone points or linkshafts.

Faunal remains
The excavated bone fragments are morphologically unidentifiable, but it is sometimes possible to get animal identifications from them if enough collagen remains for ZooMS analysis. Ten bone samples were exported to the ZooMS NEaar Laboratory BioArCh, York University, UK, with SAHRA export permit #4741.

Rock art
The imagery in both WEL1 and WEL2 was photographed and the detailed digital photographs were later enhanced using Dstretch, which is a plug-in for Image J (Harman 2006). This image enhancement assists the identification of faint or deteriorated paintings. A complete inventory was made of all the identifiable images at both sites, noting image types, colour, and frequency. Badly preserved images were recorded, but they are not tabulated here.

3. Results

Excavation

The site stratigraphy, while present, was indistinct and there were many sandstone and quartzite rocks in each layer. The sandstone spalls were almost certainly derived from weathering of the boulder that creates the shelter. The roof canopy of the rock shelter is retreating, and this produces cracks that cause sandstone blocks to fall to the ground. The continuous erosion of the sandstone roof suggests that its overhang was formerly more extensive than at present and that the rock shelter is now smaller than it was in the past. The migration of the dripline (the area washed by rainwater falling from the 'eaves' of the roof) demonstrates this process because the dripline found in the northwest corner of the trench disappeared as we dug deeper (SOM Fig. 4).

Unfortunately, falling blocks of sandstone and animal burrows have altered the sediments. Some Middle Stone Age (and even Earlier Stone Age) artefacts are present in the Later Stone Age layers and, apart from the natural disturbance of sediments, it seems likely that the shelter occupants collected and recycled items such as Earlier Stone Age quartzite cores and flakes; the mixing of artefacts from different ages occurred this way. Notwithstanding some intermingling of lithics from the various ages, there appears to be broad integrity to the sediments. We suggest this partly because of restricted vertical occurrences of certain artefact classes. Ceramic sherds were found only in layers Surface and VDGB; they were not found in deeper layers. Ostrich eggshell beads and bead manufacturing debris were found from Surface until the base of Big Rock VDGB, though one bead was found in the Ghost Hearth. Below layers Big Rock VDG and Ghost Hearth 2-7 almost all lithics fit within the expected range of Middle Stone Age assemblages and Later Stone Age tools were rare. The Middle Stone Age lithic assemblages, and their contexts (layers below Big Rock VDG), will be reported in a separate publication.

We recognise three Later Stone Age stratigraphic members and their associated layers are listed in Table 1 and illustrated in Figure 3 and SOM Figure 4. The uppermost stratigraphic member is dated 270±30 bp (Beta-715454) (1626-1681 cal AD) based on a charcoal sample from layer VDGB 3 in square R2. The 'Ghost Hearth' in square R3 first made its appearance as a layer of small fire-popped rock spalls. Its spatial and vertical extent was thereafter recognisable by the thick layers of calcium carbonate on hearth stones and the associated lithics. Raman Spectroscopy and portable Fourier Transform Infrared Spectroscopy (FTIR) were used to identify the calcium carbonate residues on hearth stones and in surrounding soil samples. Hearth stones with this coating have been sent to UCT for assessment and possible Uranium/Thorium dating. Coated stones occur directly below the ones we first excavated, right to the base of the excavation. If our interpretation of the calcium carbonate as ash is correct, then the hearth extends to the base of the excavation, suggesting that this was repeatedly a hearth area from the Middle Stone Age to the Later Stone Age. The stratigraphy within the hearth shows its repeated use through time and this implies that the strata are not badly disturbed even though recent sand grains are mixed with the older ones, precluding the possibility of OSL dating.

Charcoal identifications

About 1000 charcoal fragments, all of which were too small for piece plotting and dating, were retrieved from the sieved Welgevonden sediments. Of these, 101 charcoal samples were suitable for analysis. Amongst the selected samples, 26 charcoal types were recognised. It was not possible to identify all the types from the assemblage, but the wood anatomy of 12 identified species is presented in SOM Table 1. The assemblage contains mostly *Senegalia/Vachellia* species (thornbush [formerly called *Acacia*]) from six different types. Apart from these, there are *Combretum* sp. (bushwillow), two *Ficus* sp. (fig), *Kirkia* sp. (seringa), *Rhoicissus revoilii (*wild grape) and *Pterocarpus* cf. *rotundifolius* (round-leaved bloodwood). *Senegalia* and *Vachellia* species could not be distinguished because of a lack of anatomical detail in each charcoal fragment and the many similarities in the wood microstructures of the various species. SOM Table 1 shows that the specimens include a combination of solitary vessels with either short, radial multiple or clustered vessels. In the samples studied here, these vessels had a diameter of between 50 and 100 microns and varying vessel frequency. One of the most diagnostic features is axial parenchyma on the Transverse Section (TS). This varied from being vasicentric to confluent. All the rays on the Tangential Longitudinal Section (TLS) were 1-3 cells-wide and their Radial Longitudinal Sections (RLS) revealed a homocellular procumbent arrangement (Fig. 4).

The bushwillow (*Combretum* sp.) could be identified with certainty, but not to species level. The anatomical description of the wood, as viewed in the archaeological fragment, includes small (≤50 μm), sparse vessels and vasicentric parenchyma cells on the TS, uniseriate rays on the TLS that are heterocellular on the RLS, that is, having mixed procumbent, square and upright cells in one ray. This tree also has phloem included in the secondary xylem growth of the plant as well as prismatic crystals chambered inside ray cells (SOM Table 1). Fig trees (*Ficus* sp.) were identified through their characteristic solitary and paired vessels that dotted the TS surface along with irregularly/wavy banded parenchyma. Noted along with them were the 1-3 cell-wide rays on the TLS that have body procumbent rays with one line of square marginal cells on the RLS (Fig. 5).

Table 1. Welgevonden Rock Shelter names of strata, bucket points (BP) and litres of sediment in the uppermost Later Stone Age layers. The volume of sediment is listed in **litres** because the excavation buckets are marked in litres. The Later Stone Age sequence is divided into three members (alternating grey and white cells): Surface & VDGB, Big Rock VDGB plans 1-7, Big Rock VDG & Ghost Hearth plans 2-7 (VDGB=Very Dark Greyish Brown; VDG=Very Dark Grey). BP R2=the bucket points (the z depth readings) for layers in Square R2. BP R3=the bucket points for layers in Square R3.

Layer	Plan	BP R2	BP R3	Litres R2	Litres R3	Litres total
Surface	1	13	14	31.5	17	48.5
Surface	2	19	25	30	28	58
VDGB	1	39	48	15	7	22
VDGB	2	75	58	42.5	17	59.5
VDGB	3	100	84	40	22	62
VDGB	4	132	149	27.5	39	66.5
VDGB	5	238	189	22	28	50
VDGB	6	-	293	-	34.5	34.5
VDGB	7	-	450	-	18	18
VDGB	8	-	554	-	17	17
Big Rock VDGB	1	364	708	32	8	40
Big Rock VDGB	2	509	868	17	17	34
Big Rock VDGB	3	620	1011	12	17	29
Big Rock VDGB	4	778	1162	15	12	27
Big Rock VDGB	5	904	1214	7.5	3	10.5
Big Rock VDGB	6	1042	1274	18	3.5	21.5
Big Rock VDGB	7	1182	-	19	-	19
Big Rock VDG	1	1231	1381	6	4.5	10.5
Big Rock VDG	2	1286	1464	3	4.5	7.5
Big Rock VDG	3	1398	1536	4	3	7
Big Rock VDG	4	1483	1690	4	7	11
Big Rock VDG	5	-	1802	-	6	6
Big Rock VDG	6	-	1941	-	8	8
Big Rock Ghost Hearth	2	-	1536	-	3	3
Big Rock Ghost Hearth	3	-	1605	-	2	2
Big Rock Ghost Hearth	4	-	1727	-	2	2
Big Rock Ghost Hearth	5	-	1845	-	2	2
Big Rock Ghost Hearth	6	-	1875	-	2	2
Big Rock Ghost Hearth	6B	-	1887	-	0.5	0.5
Big Rock Ghost Hearth	7	-	1957	-	2	2

Seringa (*Kirkia* sp.) wood has solitary and short radial multiple vessel arrangements, small and sparse vessels, and vasicentric parenchyma that formed very narrow bands across the TS. The rays were 1-2(-3) cells wide and less than 1 mm high on the TLS; they were homocellular procumbent when viewed on the RLS. The wild grape (*Rhoicissus revoilii*) was identified with certainty and its anatomy included small solitary vessels on the TS, as well as wide rays that are 4-10 cells wide on the TLS. The rays had a characteristic mixed composition of procumbent, square and upright cells when viewed on the RLS section. Lastly, *Pterocarpus* cf. *rotundifolius* (round-leaved bloodwood) was identified through its characteristic features that include medium-sized vessels that are solitary and exhibit a ring-porous structure on the TS. They were noted on the TLS together with uniseriate rays on the RLS that were made of homocellular procumbent cells (Fig. 6).

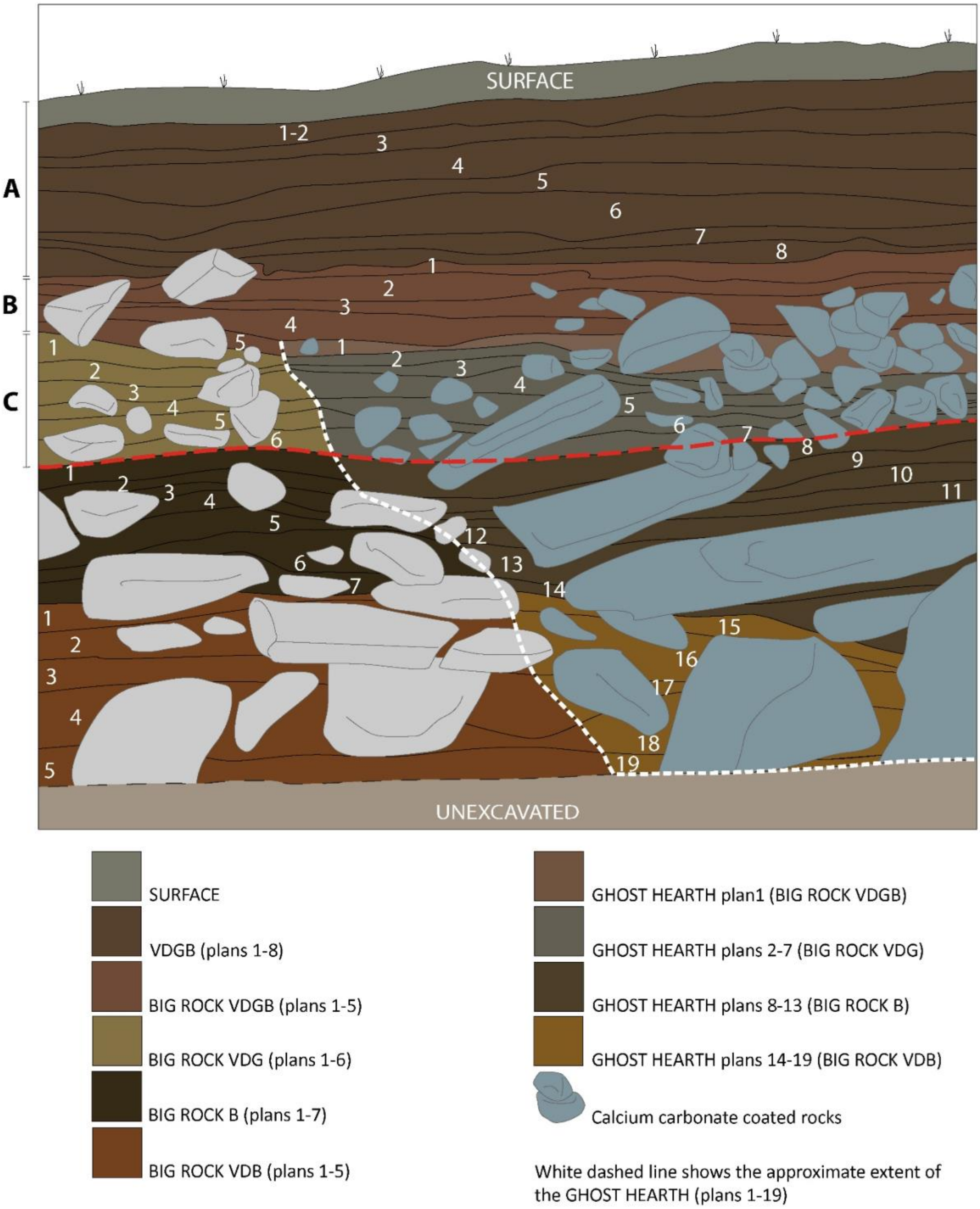

Figure 3. Stratigraphy of the Welgevonden Rock Shelter north wall in square R3 (100 cm wide). The three Later Stone Age members (a-c) described and discussed in this paper are illustrated in the upper half of this stratigraphic drawing above the red dashed line: Surface & VDGB plans 1-8 (a); Big Rock VDGB plans 1-5 and Ghost Hearth plan 1 (b); Big Rock VDG plans 1-6 & Ghost Hearth plans 2-7 (c). This figure shows the position of a hearth that was used repeatedly through time (it is present on the right of the white dashed line). The 'Ghost Hearth' was excavated in layers, each of which is named and numbered in the key. This feature has not preserved the black and white layering commonly associated with hearths, but the fallen hearth stones and artefacts incorporated in the designated hearth area are coated with calcium carbonate (coloured blue-grey above), presumably from hearth ash.

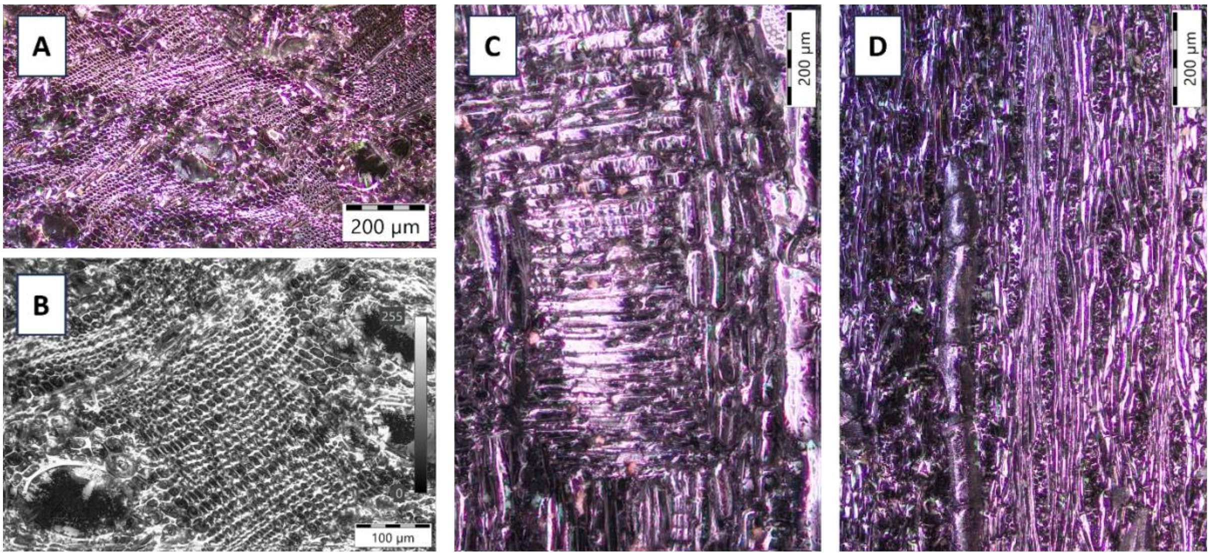

Figure 4. The wood anatomy of *Senegalia/Vachellia* sp. 2 showing the solitary vessels with aliform to confluent parenchyma (a), thin-thick fibres and possible crystals in parenchyma cells (b), homocellular procumbent ray cells on the RLS (c) and rays that are 1-2(-3) cells wide, simple perforation plates, vessel element length on the TLS (d).

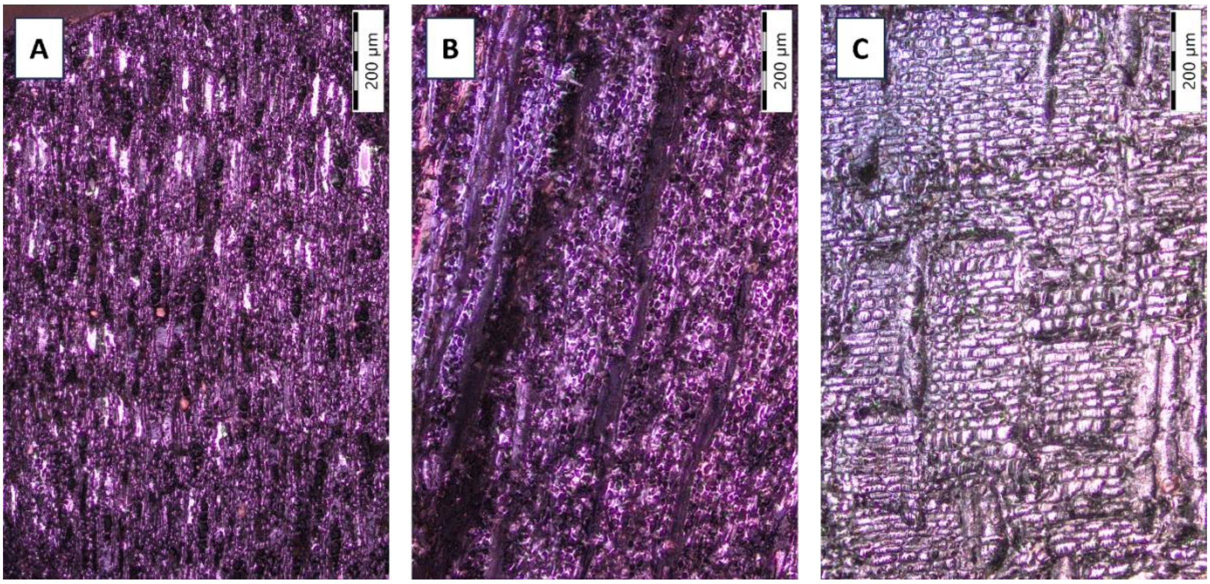

Figure 5. The wood anatomy of *Ficus* sp. 1 showing the wood porosity, short radial multiple vessel arrangement, banded parenchyma (a), 1-3 cells wide rays on the TLS (b), and mixed procumbent, square and upright cells on the RLS (c).

Seed identification

Preservation of fruit, seed and nut remains ('seeds') is poor in all layers except for the surface, which is slightly protected by the huge boulder that forms the site. The surface deposit is soft and very sandy (10 litres of deposit resulted in one litre of sieved material), and rich in fresh seeds and other organic matter including many rootlets. Surface seeds were uncarbonised and limited to a few taxa, dominated by *Grewia* sp. (raisin bushes). The other taxa in the assemblage were *Ziziphus mucronata* (buffalo-thorn), *Bridelia mollis* (velvet sweetberry), *Mimusops zeyheri* (common red-milkwood), two species of *Vitex* (finger-leaf), *Hexalobus monopetala* (Shakama plum), *Sclerocarya birrea* (marula), *Commiphora* sp. (corkwood), *Lannea* sp. (false-marula), cf. *Canthium* (turkey berry), cf. *Kirkia* sp. (white seringa) and a single endocarp of the exotic *Melia azedarach* (seringa). All these taxa grow close to the site or within flying distance for seed-eating birds and other potential natural agents of seed distribution. Preservation decreased rapidly below the surface and many decomposing seeds were present in VDGB (Fig. 3). Within VDGB, the degree of decomposition increased and below this layer no decomposing seeds were observed and only a few carbonised seeds were present. The assemblage included only taxa that are currently present in the vegetation and accordingly did not indicate any vegetation change. Even though many edible fruits were present in the assemblage, the difficulties of distinguishing people rather than other entry routes as the agents of seed deposition mean that no definitive interpretations can be made about people's use of seeds at the site. For these reasons, no detailed quantification of the seeds was undertaken.

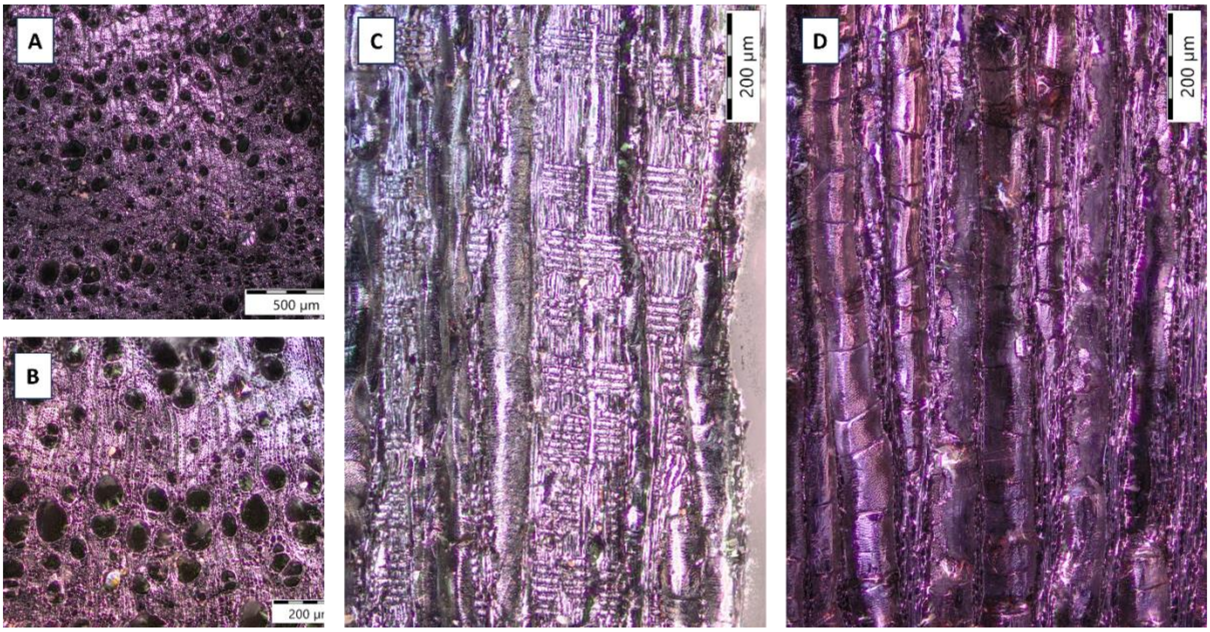

Figure 6. The wood anatomy of *Pterocarpus* cf. *rotundifolius*. The following is shown: wood porosity (a), wood ring-porous structure, solitary vessel arrangement, lightly banded parenchyma and vessel frequency; vessel diameter (b), vessels with tyloses inside, vasicentric parenchyma; homocellular procumbent ray cells on the RLS section (c); and uniseriate rays, simple perforation plates and vessel element length on the TLS (d).

Ceramics

Some ceramic sherds were recovered from the excavation and others were gathered from the surface in and around the rock shelter. Most of the decorated and undecorated rim sherds belong to the Eiland facies, but one Letsibogo facies sherd was found on the surface (Table 2, Fig. 7). The surface collection comprises 13 vessels of which 11 are decorated. The excavation produced 173 sherds and 12 of these are decorated. The entire assemblage from the excavation, together with the surface collection, comprises 22 jars, six constricted jars and two bowls. Among the decorated sherds, 16 jars, five constricted jars and one bowl could be identified as Eiland facies vessels. A Tswana-speaking potter made the Letsibogo facies bowl that is burnished inside with red ochre.

Table 2. Ceramics recovered from the surface collection and the Welgevonden Rock Shelter excavation.

Ceramics	Jars	Constricted jars	Bowls	Indeterminate	Total
Decorated sherds					
Eiland surface collection	8	2	0	0	10
Eiland excavation	8	3	1	0	12
Letsibogo surface collection	0	0	1	0	1
Undecorated sherds					
Surface collection	2	0	0	0	2
Excavation	4	1	0	156	161
Total	**22**	**6**	**2**	**156**	**186**

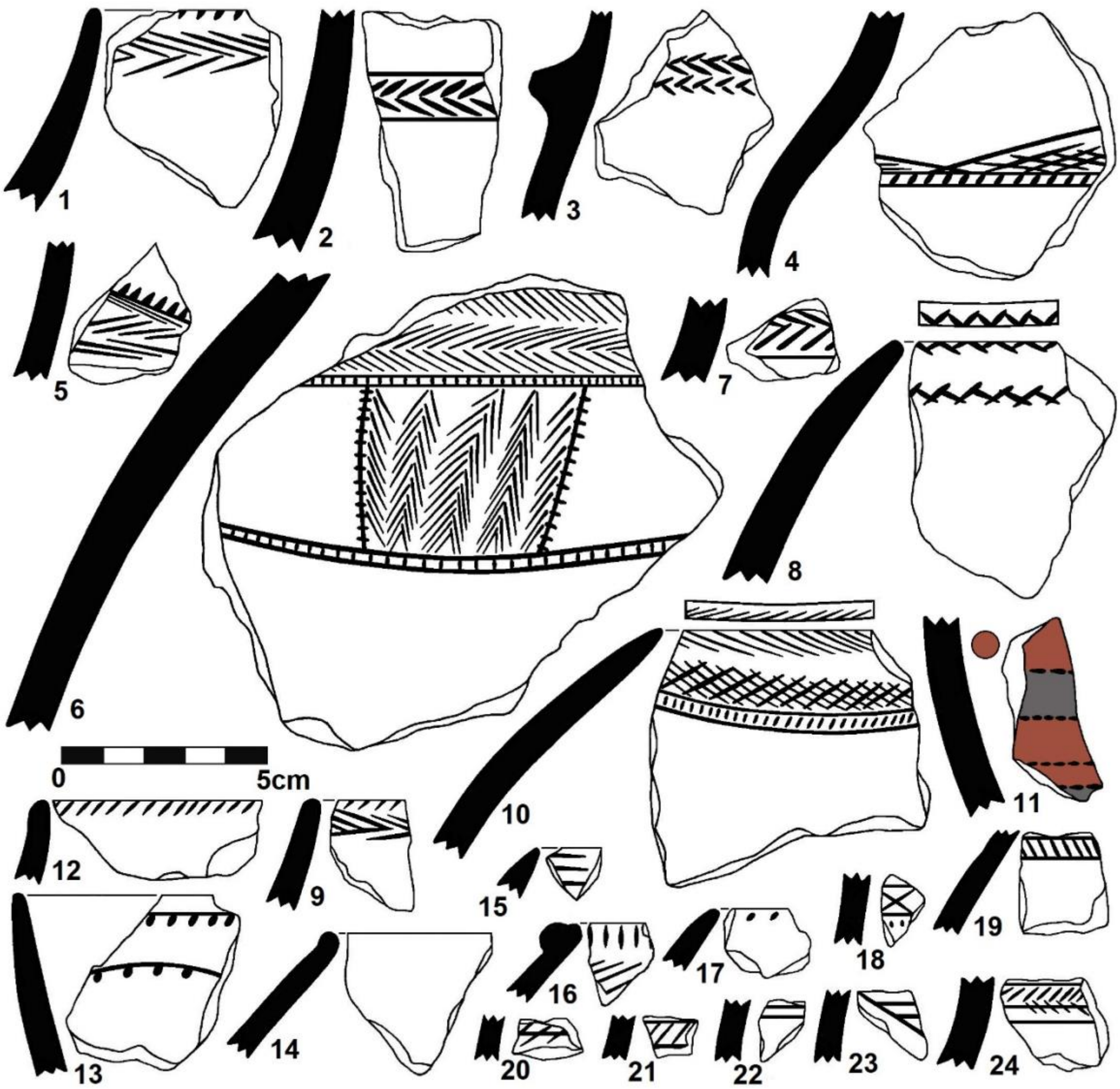

Figure 7. Decorated ceramics and diagnostic rim sherds retrieved during the surface collection (sherds 1-11) and Welgevonden Rock Shelter excavation (sherds 12-24). They represent the Eiland facies (1-10, 12-24) and Letsibogo facies (11) (red dot=red ochre colour inside).

Lithic analysis

Welgevonden is densely packed with lithics. Scrapers are the most common tool type. Backed tools mostly comprise segments and backed bladelets and they are most common in the members Surface & VDGB and Big Rock VDGB (Tables 3 & 4, Fig. 8). Backed tools are scarce in the basal member, Big Rock VDG & Ghost Hearth 2-7 and, instead, there are many tools that are potentially from the Middle Stone Age. These include denticulates, notches and bifacially worked tools or points. End scrapers are the most common scraper type in the youngest members (Figs 9 & 10), but, like backed tools, they are not well-represented in the oldest member, Big Rock VDG & Ghost Hearth 2-7, where a range of scraper forms appear. The distribution of scraper lengths displays a bimodal curve (SOM Fig. 5) that is likely to be the result of a few Middle Stone Age lithics incorporated in the Later Stone Age sediments.

Nonetheless, most scraper lengths fall within the range of 10 to 20 mm (SOM Fig. 5) while most scraper thicknesses are between 3 and 7 mm (SOM Fig. 6). Quartz was commonly used for scraper manufacture in the uppermost member, where chalcedony was also favoured. Siltstone was preferred in the two older members and here quartz and chalcedony were used almost equally.

Table 3. Frequencies of the combined lithic classes in the three Welgevonden Rock Shelter Later Stone Age members.

Typology	Big Rock VDG and Ghost Hearth 2-7	Big Rock VDGB	Surface and VDGB	Total
Core	86	161	98	345
Flake >2 cm	98	323	307	728
Chip 1-2 cm	1634	1909	473	4016
Chip <1 cm	1883	2631	2072	6586
Grooved stone	7	3	23	33
Ground stone fragment	10	21	13	44
Bored stone	1	3	3	7
Scraper	42	103	53	197
Broken scraper	4	12	5	21
Backed tool	3	31	35	69
Other formal tool	33	70	65	168
Broken tool	7	20	14	41
Ground ochre	4	8	1	13

Table 4. Frequencies and percentages of formal tools (excluding scrapers and ground stonework) in the three Welgevonden Rock Shelter Later Stone Age members.

Stratigraphic member	Borer/awl		Notch		Denticulate		Backed		Point/ bifacial		LCT/ESA fragments		Miscellaneous		Other		Other-broken	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Big Rock VDG & Ghost H2-7	4	11.1	2	5.6	4	11.1	3	8.3	3	8.3	5	13.9	7	19.4	1	2.8	7	19.4
Big Rock VDGB	16	16.4	2	2.0	4	3.6	31	30.9	4	3.6	7	7.3	11	10.9	6	5.5	20	20.0
Surface & VDGB	12	12.0	7	6.5	5	5.4	35	34.8	7	6.5	5	5.4	10	9.8	5	5.4	14	14.1
Total	**32**	**39.5**	**11**	**14.1**	**13**	**20.1**	**69**	**74.0**	**14**	**18.4**	**17**	**26.6**	**28**	**40.1**	**12**	**13.7**	**41**	**53.4**

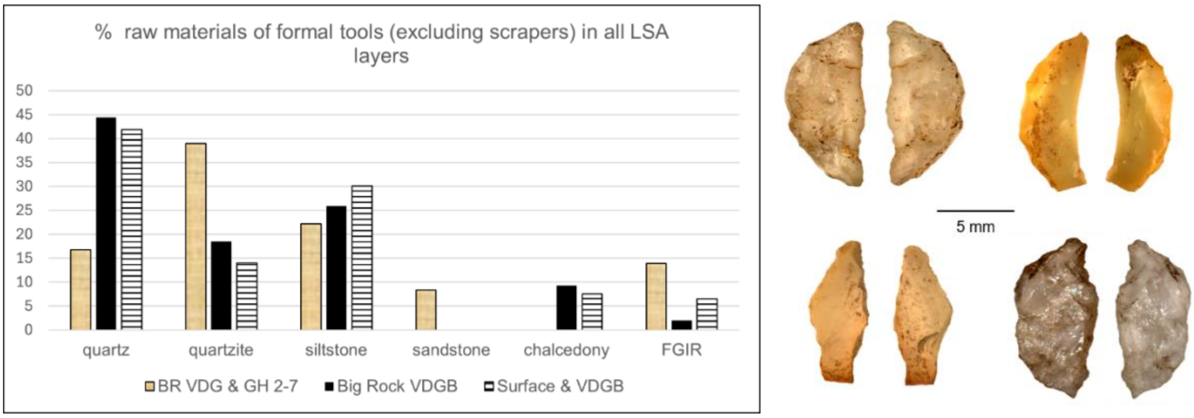

Figure 8. Percentage frequencies of formal tool classes in all three Later Stone Age members of Welgevonden Rock Shelter, excluding scrapers and ground stonework. A selection of backed tools is shown on the right (1 & 3=quartz, 2 & 4=chalcedony).

Figure 9. Welgevonden Rock Shelter Later Stone Age end scrapers (1, 2, 4 & 5=chalcedony, 3, 6-8=siltstone).

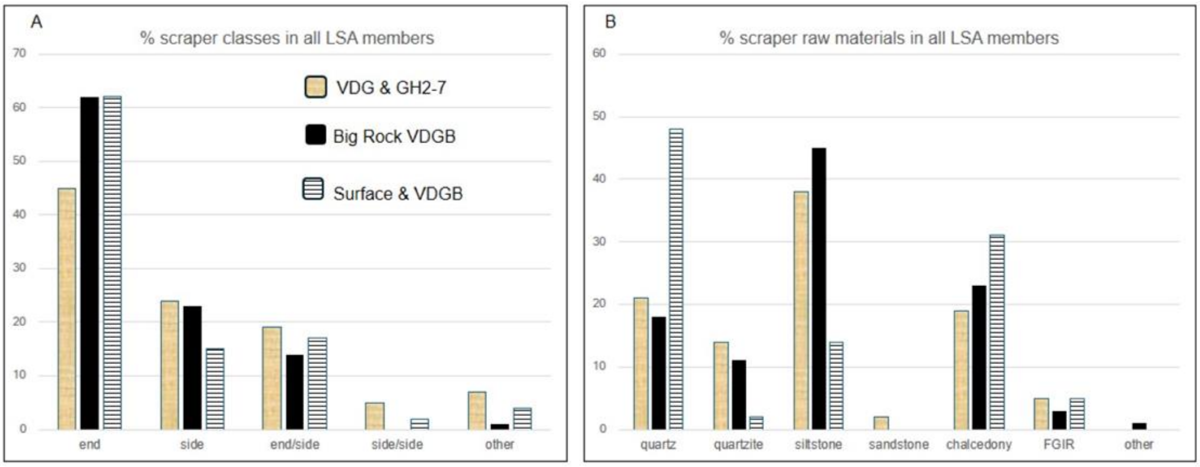

Figure 10. Percentages of scraper classes (a) and their raw materials (b, where FGIR=fine-grained igneous rock) in all three Later Stone Age members of Welgevonden Rock Shelter (see also SOM Table 2).

The knapping process at Welgevonden

The large frequency of cores (n=345, Table 3) at Welgevonden attests to frequent on-site knapping. In the uppermost members there are high frequencies of quartz cores (SOM Fig. 7) and quartz formal tools (Fig. 11). Bipolar cores are especially prominent (Fig. 12) and these core lengths in the two uppermost members form normal distribution curves with peaks between 12 and 16 mm (SOM Fig. 8), whereas the core lengths in the older members, Big Rock VDG & Ghost Hearth 2-7, are more equally distributed in the five length ranges between 10 and 20 mm. Notwithstanding that more than 60% of cores in the two uppermost members are made of quartz (SOM Fig.7), not one of the Later Stone Age members has more than 9% of quartz flakes larger than 20 mm (Fig. 13). This is accounted for by the small size of quartz nodules that are used for cores (see SOM Fig. 8). Siltstone flakes larger than 20 mm are most frequent (Fig. 13), followed by quartzite ones. Chalcedony flakes and cores are rare, yet there are abundant chalcedony scrapers as well as a few other types of formal tools. This suggests that the chalcedony scrapers and formal tools were not made at Welgevonden, but were brought there, perhaps already mounted on their handles. This interpretation is informed by the raw material study of 900 chips <10 mm from separate plans in member Big Rock VDGB (Fig. 14). Here, chalcedony chips comprise between 8 and 3% of the raw materials, whereas quartz made up 56 and 35% of the chip categories. Siltstone and fine-grained igneous rock were sometimes between 20 and 30% of the chip raw materials. The small number of chalcedony chips that are present in the rock shelter might have come from resharpening of curated tools rather than from the initial production phase. Siltstone blocks were sourced from the geographically restricted Vaalwater Formation that has its western-most extension in the south-west of Kaingo Game Reserve. Quartz, chalcedony and specular haematite nodules occur within the sandstone conglomerates and they can be collected from areas where there has been weathering of the sandstone. Some quartz veins are present, too, and larger pieces of quartz can be found in the veins than in the conglomerates.

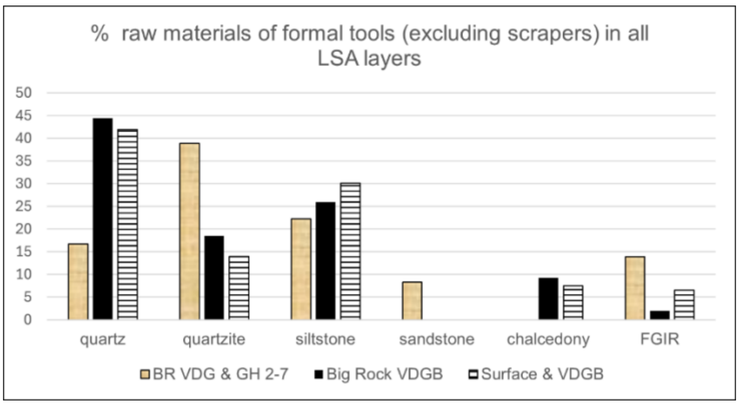

Figure 11. Percentages of raw materials on which formal tools (excluding scrapers) were made in the three Welgevonden Rock Shelter Later Stone Age members (FGIR=fine-grained igneous rock).

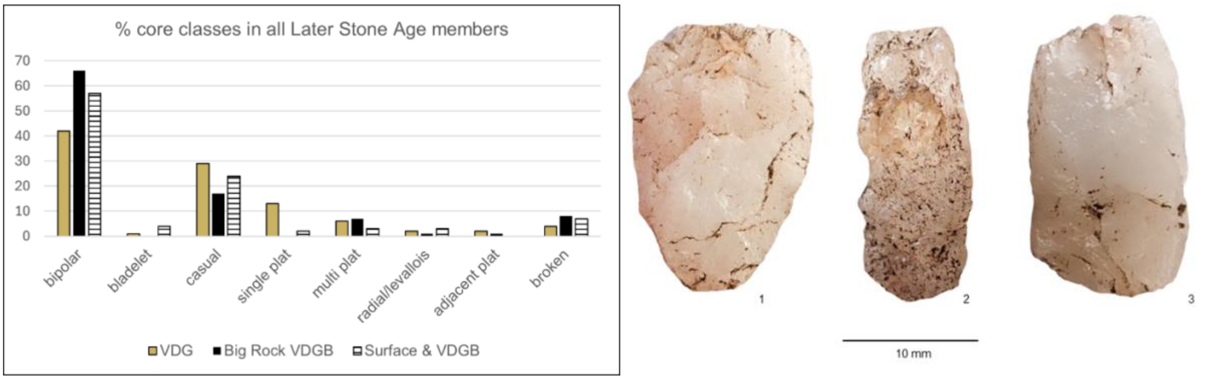

Figure 12. Frequencies of core classes in the three Welgevonden Rock Shelter Later Stone Age members (left). Bipolar cores, mostly made on quartz (examples, right) predominate the assemblage.

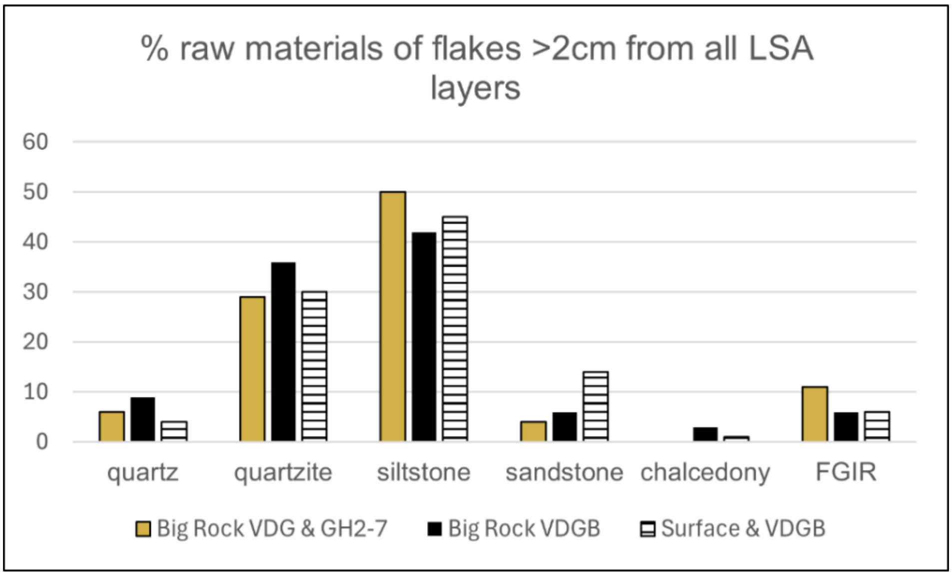

Figure 13. Percentage frequency of raw materials of flakes larger than 20 mm in the three Later Stone Age members of Welgevonden Rock Shelter (FGIR=fine-grained igneous rock).

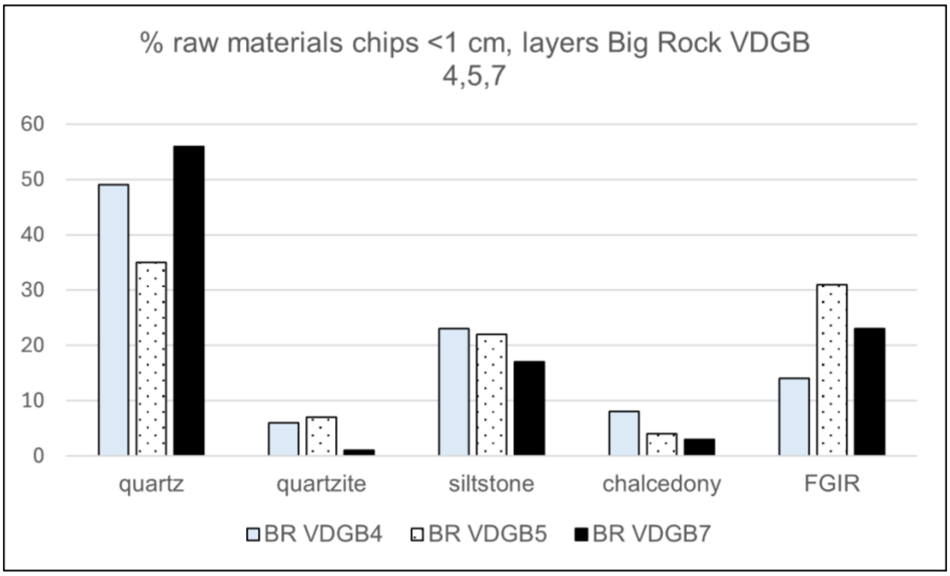

Figure 14. Percentages of chip (<10 mm) raw materials in member Big Rock VDGB, plans 4, 5 and 7 (FGIR=fine-grained igneous rock).

Blade/bladelet cores are uncommon in the Welgevonden sequence, but flake length:breadth ratios (Fig. 15) show that elongated flakes (L:B>2 with lengths exceeding 20 mm, but lacking blade parallel ridges) comprise up to 18% of the collection. Wide flakes with breadth greater than length (L:B 1.0 to 0.5) form a substantial part of the assemblage and comprise 31% of the oldest member, Big Rock VDG & Ghost Hearth 2-7 (Fig. 15).

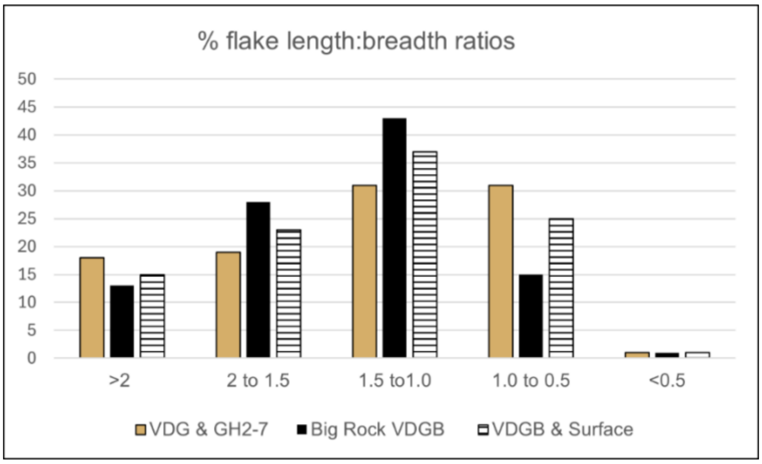

Figure 15. Percentages of flake L:B ratios in the Later Stone Age members of Welgevonden Rock Shelter.

Ground stonework

Eighty-four pieces of stone from the three Later Stone Age members have grinding striations (Table 3, Figs 16 & 17) and 13 ochre fragments have been ground. Seven fragments that do not refit have holes bored in them and they are broken bored discs. The flat discs with small holes will be investigated further, but they may have been used as spindle whorls by Iron Age farmers. Most of the ground stone fragments seem to have derived from upper grindstones that broke. Some of them may have been used together with the shallow cupule on the huge boulder in square R2 where a grinding surface is pecked (SOM Fig. 9). It may have been used as the lower part of the grinding equipment for food or colouring material. Two small, pecked fragments may be anvils for use with bipolar cores. By far the largest single class of ground objects consists of grooved stone. There are 23 grooved stones in the uppermost member, VDGB to Surface. Some of these stones have two or more U-shaped grooves sometimes of slightly different breadths (Fig. 18). Most grooves have breadths between 2 and 4 mm, with the peak distribution between 3 and 4 mm. These would be suitable for grinding and smoothing the majority of ostrich eggshell beads found in the same layers. The larger grooves may have been used for processing bone points or for applying poison to them.

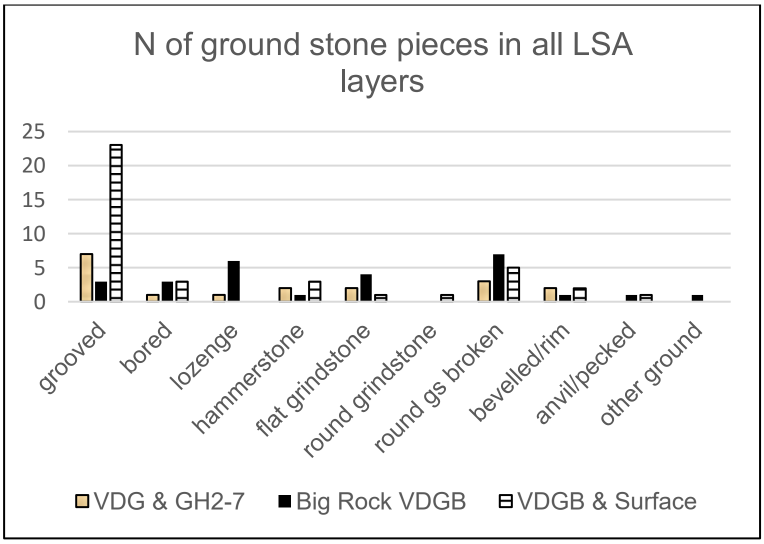

Figure 16. Frequencies of ground stone classes in all the Welgevonden Rock Shelter Later Stone Age members.

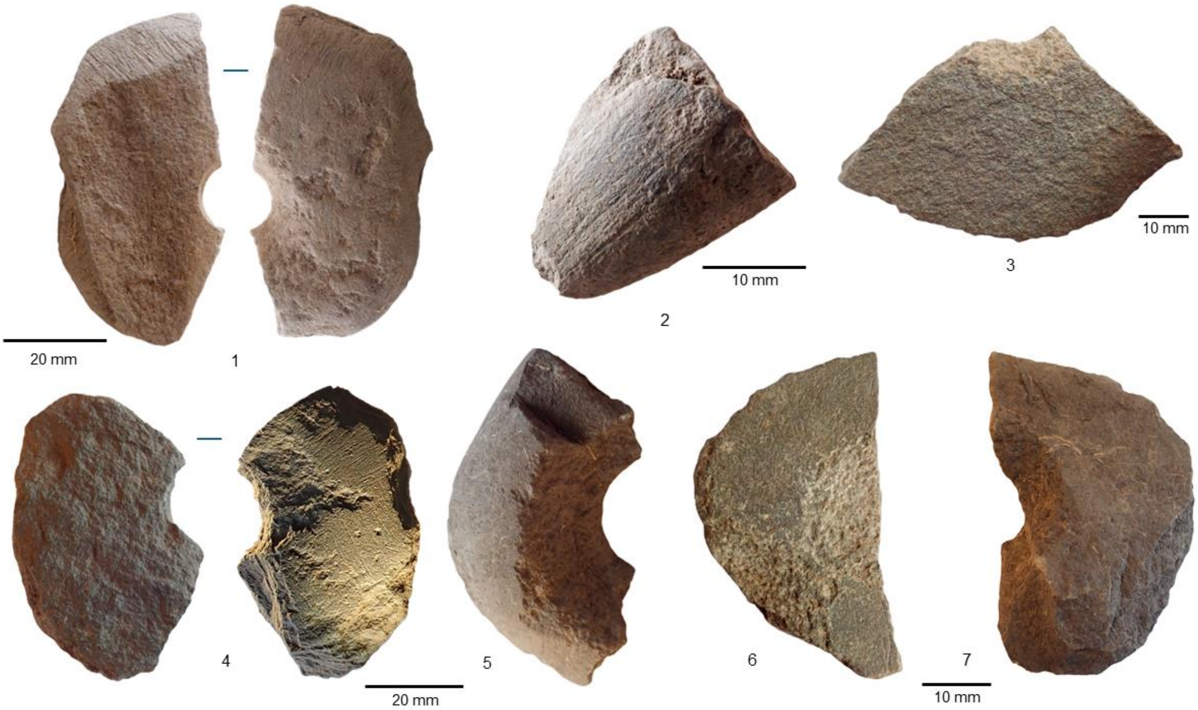

Figure 17. Welgevonden broken ground stone pieces and pecked quartzitic sandstone discs. Bored disc, R3 Big Rock VDGB2, LI 842 (1); ground 'lozenge', R3 Big Rock VDBB3, LI 923 (2); pecked, bored disc (hole at top), R2 VDGB4, LI 123 (3); bored disc, R2 VDGB4, LI 118 (4); bored disc, R3 Big Rock VDGB2, LI 793 (5); pecked disc, R2 VDGB3, LI 88 (6); bored disc, R3 Big Rock VDG5, LI 1746 (7).

Figure 18. Grooved stones from Welgevonden Rock Shelter. Percentage distribution of breadths of U-shaped grooves on grooved stones in all Later Stone Age members (left). Examples of grooved stones (right): Big Rock Ghost Hearth 4, LI 1725 (1); VDGB 5, LI 176 (2, note two sizes of grooves); VDGB 5, LI 156 (3).

Non-lithic artefacts

Almost all ostrich eggshell beads and bead manufacturing products were found in the uppermost member, VDGB and Surface (Fig. 19). One ostrich eggshell bead and one piece of worked bone were recovered from the basal member, Big Rock VDG & Ghost Hearth 2-7 (Table 5 & Fig. 19). Most ostrich eggshell bead diameters are between 3.6 and 4.0 mm (Fig. 20), a size appropriate for smoothing and polishing with the grooved stones, which have appropriately sized U-shaped grooves (Fig. 18). Some of the grooved stones may have been used for polishing and smoothing bone shafts and points. The fragmented pieces of worked bone (Table 5) are mostly shafts from broken points. The whittled bone fragment from the manufacture of a point has a ring-fracture on its end. Four fragments of iron beads were found in the dripline part of square R3 (layer VDG 3, BP 576). A fragment of a red glass bead was found in square R2, layer VDGB 4 (BP 132).

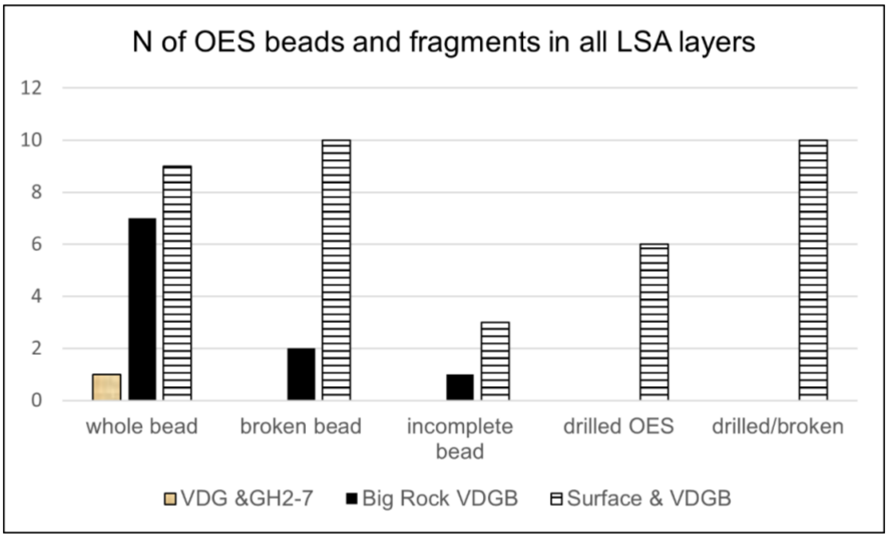

Figure 19. Welgevonden Rock Shelter frequencies of ostrich eggshell beads, broken beads, incomplete beads and eggshell pieces in the process of bead manufacture.

Table 5. Frequencies of worked bone from all Later Stone Age members of Welgevonden Rock Shelter. The shafts are likely to be broken points.

Stratigraphic member	Shaft broken	Point manufacture	Spatula	Flake
BR VDG & GH2-7	1	0	0	0
Big Rock VDGB	3	1	1	1
Surface & VDGB	5	0	2	1

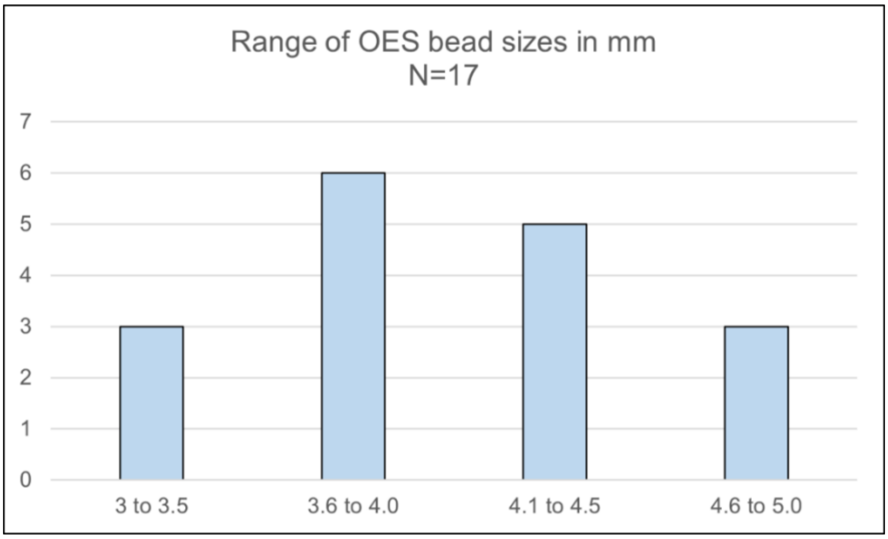

Figure 20. Frequencies of whole ostrich eggshell bead diameters.

ZooMS identification of bone fragments

Of the ten bone fragments submitted for ZooMS identification, only one sample from square R2, layer VDGB 4 (BP 132) yielded a potential identification. Steenbok, impala or waterbuck are represented, but it is not possible to narrow the identification to one of these species. All three animals are common to the Waterberg.

Rock art

The location of the two rock art sites (WEL1 and WEL2) near the excavated Welgevonden Rock Shelter is marked on Figure 2.

WEL1: The WEL1 fine-line paintings are on the intersecting walls of a narrow crevice (Panels 1 and 2 – SOM Figs 10-12). Panel 1 (SOM Fig. 11) benefits from the protection from rain and sun of the rock in front of it and has exceptional preservation. Panel 2 (SOM Fig. 12) is exposed to full afternoon sunlight resulting in a more pronounced deterioration of many of its paintings. The paintings are red, brown, yellow, orange and black. The majority of depictions are human figures (SOM Table 3), setting this site apart from others on the reserve, like Kaingo Sheep Rock Shelter and Woodstock Rocks, where animals take centre stage (Wadley et al. 2022, 2023). As is the case elsewhere in the region, images of men predominate and there is only one woman in WEL1. The diverse pigment colours, distinct painting styles used for human figures, and the overlaying of images, suggest at least three different painting events.

We cannot do the rock art justice in this general paper, but we select a few interesting images for discussion.

On the far left of Panel 1 is a man with an elongated body. He seems to clutch a balloon-like object (Fig. 21) that is a one-stringed violin or musical bow, topped with a calabash serving as a resonator (see also Wadley & Laue 2025: 248). While the bow string being played is not visible, it may originally have been rendered in white pigment, a colour susceptible to fading.

Figure 21. A man playing a musical instrument at site WEL1. Only the upper body is shown here to magnify the short bow held in the hand on the man's right. The hand on the left holds the long, one-stringed bow with a round resonator on its top. The photograph is enhanced with Dstretch (yre).

Another unusual depiction in Panel 1 is a slender man with stick-like legs, large feet and exaggerated penis and buttocks. On his head are horns, ears or feathers that either represent a headdress or animal-human transformation (SOM Fig. 13). In the Waterberg, images of therianthropes – part-human, part-animal figures – are rare when compared to areas such as the Drakensberg. Such enigmatic figures are often interpreted as ritual specialists that harnessed the powers of certain animals (e.g., Lewis-Williams 1981, 1990).

Panel 2 is dominated by a large, orange, heavily built human figure (probably a man) that bends forward with fingers extended on one hand (Fig. 22). The headgear that resembles a baseball cap (Fig. 22 [a]) may be a bird beak headdress of the kind discussed in Wadley and Laue (2025). This figure is under earlier yellow paintings (Fig. 22a & b).

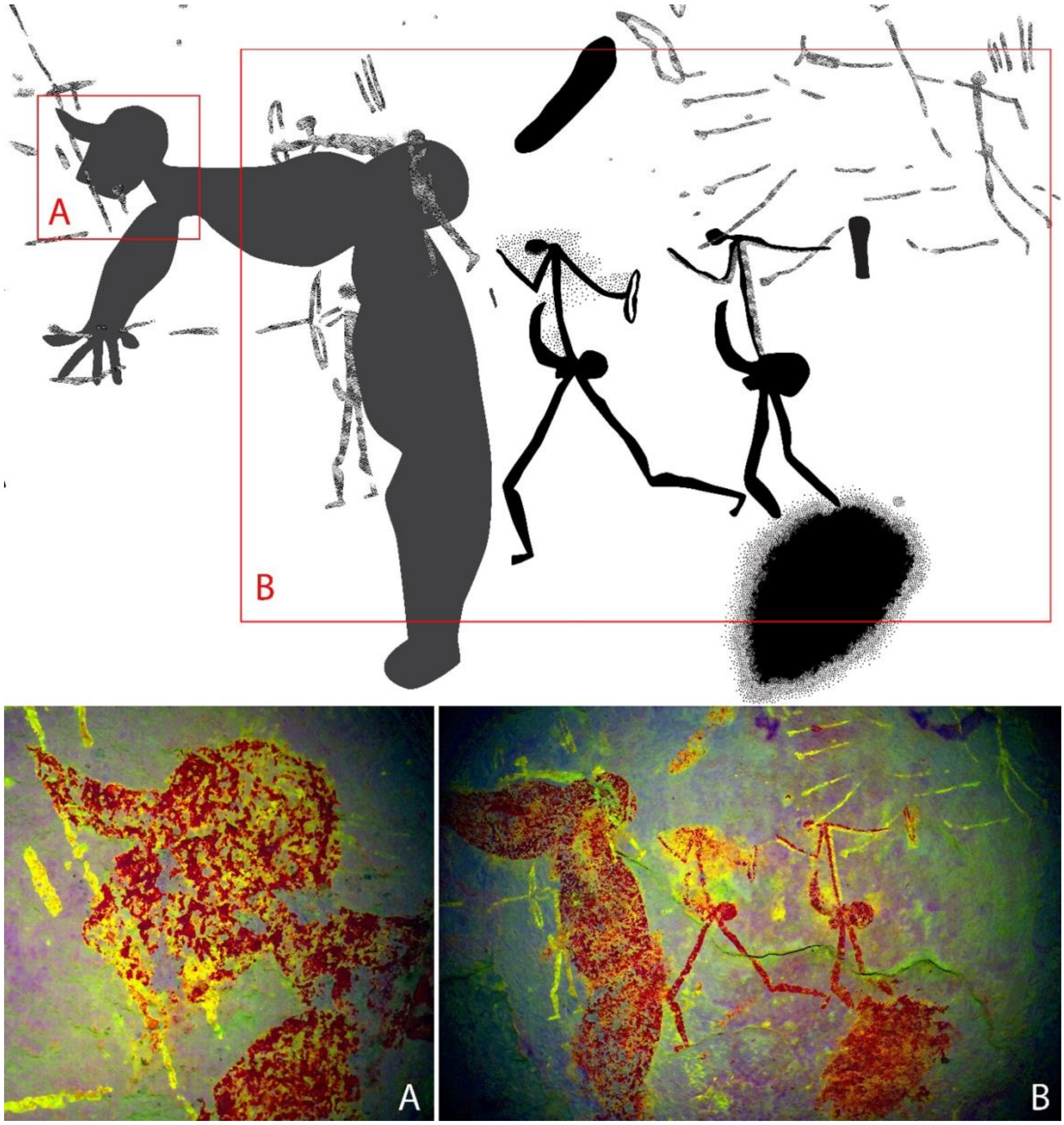

Figure 22. Panel 2 at WEL1 with a painting of a large, bending man and several small hunters. Top: a tracing of the panel. Bottom: close-up photograph of the man's head, showing the single protrusion from his forehead (a); yellow figures shooting arrows under the large figure (b). Note that the rear running man behind the large figure is bichrome, which is rare for human figures in the Waterberg. He is painted red, but has yellow lines along the spine and the underarms. Yellow arrows seem to fly across the rock. The photographs are enhanced using Dstretch (lds).

In the Waterberg, arrowheads are painted in a variety of shapes, including lance-shaped, crescent-shaped and straight, narrow heads. All three arrow types are shown at WEL1 (Fig. 23). Crescent-shaped arrowheads, relatively common in the Waterberg, are almost unknown in the rock art further south. Many of the yellow arrows shown in Figure 22 have crescent-shaped heads. Also in panel 2 is a battle-axe (SOM Fig. 14 [left]), which is a rare depiction in hunter-gatherer art. The image is intriguing given that such battle-axes were made by Iron Age farming communities. Similar items can be observed in the finger-painted farmer art, for example, the motif from a nearby Kaingo site (SOM Fig. 14 [right]).

Figure 23. A variety of arrowheads from WEL1. Lance-shaped and straight, narrow arrowheads on Panel 1 (left). Lance-shaped and crescent-shaped arrowheads from Panel 2 (right). The photographs are enhanced with Dstretch (crgb).

WEL2: The images on a sloping, exposed rock face adjacent to a deep crevice may represent a single painting episode. Five, red, elongated men are visible and there are another three (or more) faded men and a faded antelope that may once have had a white head and a white infill in its body (SOM Fig. 15 & SOM Table 4). Each man wields a pair of unusual pick-like tools (Fig. 24). The shape of the tool heads suggests that they were likely made of metal, implying a connection to Iron Age farming communities. We have not yet been able identify these implements in ethnographic records.

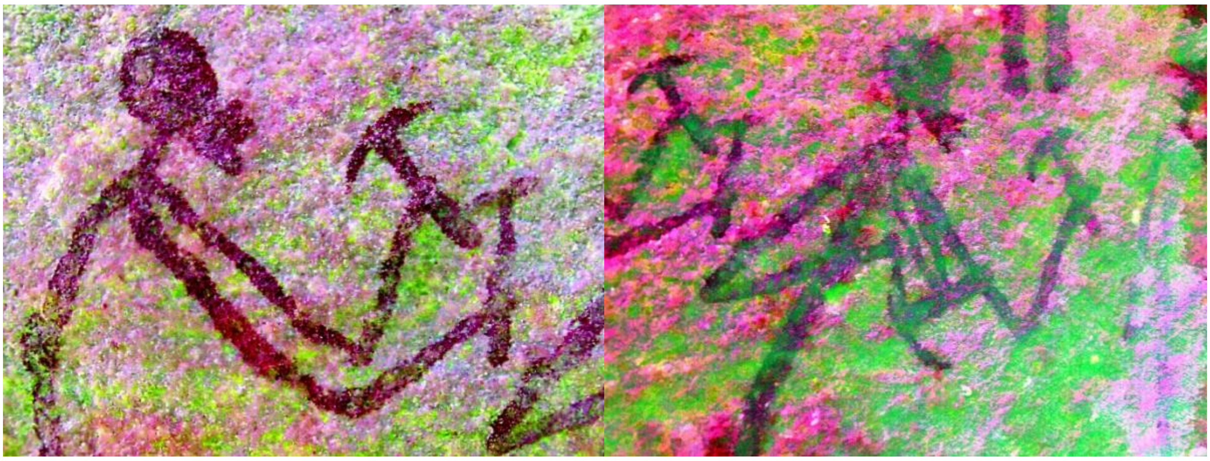

Figure 24. Men holding pick-like implements at WEL2. One implement is suspended, presumably on a thong, from the neck of the man on the right. The photographs are enhanced with Dstretch (crgb).

4. Discussion

The late Holocene occupation of Welgevonden Rock Shelter took place in a landscape that probably resembled the present one. Twelve woody taxa that still grow in the Waterberg region were identified through the charcoal analysis and all these taxa tolerate warm conditions (Germishuizen & Meyer 2003; Mucina & Rutherford 2006; The Waterberg Tree Group 2024). The 12 taxa were selected for use as fuelwood because, perhaps, they were easily accessible and abundant on the landscape near the Welgevonden archaeological site. They represent both cultural artefacts and environmental proxies for the period represented by the archaeological record of the site. More than 90% of the species that occur within the identified genera are bushveld species while the remaining are riverine and grassland species (van Wyk & van Wyk 2013). This suggests that savanna vegetation has persisted both during and after the occupations of the site. *Combretum apiculatum*, *C. imberbe, Senegalia mellifera* subsp. *detinens* and *Vachellia nilotica* subsp. *kraussiana* are reported to make excellent firewood and were probably collected specifically for this purpose. Some trees represented in the dataset could have been harvested for more than just fuelwood: species such as *Vachellia erioloba*, *Vachellia tortilis*, *Rhoicissus revoilii* and *Ficus sur* (also with large, edible fruits) have various plant parts that are reported to have medicinal properties (van Wyk & van Wyk 2013; van Wyk et al. 2022). These trees could have been harvested for medicine prior to their wood being burned for fuel. Likewise, the wood of species such as *Combretum molle*, *Ficus sur* and *Pterocarpus rotundifolius* subsp. *rotundifolius* is suited for making wooden artefacts (van Wyk & van Wyk 2013) and this use may have preceded burning of the wood.

There is little overlap between the plant lists derived from charcoal and seed identifications. To some extent this is because of the different agents of accumulation; most seeds probably entered the shelter via birds or other seed-eating creatures, whereas the charcoal was the direct result of human activity. The date of ~270 bp places the most recent occupations of the shelter within the 'Little Ice Age', yet the cooler temperatures seem not to have inhibited the growth of some woody bushveld species such as *Combretum* sp.

The small Welgevonden Rock Shelter was first used by *Homo erectus* groups that manufactured Acheulean artefacts from the locally available quartzite boulders in the open area adjacent to, and west of, the rock shelter (Fig. 2). Some Acheulean products are mixed with Middle and Later Stone Age ones in the sediments. Admixture may from time-to-time have occurred because of animal burrowing, roof collapse, or flooding, but during the thousands of years when the rock shelter was occasionally exploited, it seems likely that useful rocks and minerals – 'antique lithics' – would have been harvested and recycled from earlier occupations. The inclusion of fragmented large cutting tools (LCTs) or Middle Stone Age points within the Later Stone Age members does not, therefore, suggest to us that the site is irrevocably disturbed. The stratigraphy and the repeatedly used hearth feature with stone surrounds, imply reasonable contextual integrity. We are further encouraged by, first, the recovery of Iron Age ceramics only from the upper member VDGB and Surface and, secondly, recovery of items like ostrich eggshell beads, and thin, worked bone shafts and points exclusively from the Later Stone Age members described here. A relatively undisturbed Middle Stone Age occupation is present below Big Rock VDG and this assemblage will be described in another publication.

The large fireplace with rock surrounds occupies half of square R3. It lacks clear ash and charcoal strata so we named it 'Ghost Hearth'. The rocks within and surrounding the fireplace are coated with a patina of ash that was chemically identified as calcium carbonate by Dr Linda Prinsloo, using FTIR and Raman analysis. It may be possible to date the patina using the Uranium-Thorium dating technique, but this possibility is still being investigated. The hearth was first lit in the Middle Stone Age and in the basal layers of the trench it is positioned slightly east of its later placement in layer Big Rock VDGB. When hearths are refreshed by scraping ashes and debris from their centres, they tend to migrate (Yellen 1977) and this may have happened through time at Welgevonden.

The long occupation gap between the Middle Stone Age and the Later Stone Age found at several Waterberg sites is probably also reflected at Welgevonden, but we cannot be sure of this unless it becomes possible to develop a chronological record for the site. The small shelter was possibly occupied by ancestors of the Bushmen until relatively recently. This is suggested by the radiocarbon date of 270±30 bp (Beta-715454), obtained from charcoal collected from layer VDGB 3, one of the upper Later Stone Age horizons of the excavation. As this report demonstrates, there are many Later Stone Age tools, such as small end scrapers, made on quartz and chalcedony, as well as backed tools that include segments and backed blades. Small end scrapers are characteristic of Late Holocene assemblages in many parts of South Africa: in the extreme north (e.g., van Doornum 2005), in the south (e.g., Deacon 1972) and in the centre (e.g., Wadley 1987, 2000). As mentioned earlier, chalcedony flakes, chips and cores are rare at Welgevonden Rock Shelter, yet there are many complete (or broken) chalcedony scrapers. Chalcedony scrapers and other formal tools made from this mineral or other types of cryptocrystalline silica were brought ready-made to Welgevonden, perhaps already hafted. This scenario was also observed at Kaingo Sheep Rock Shelter (Wadley et al. 2022 – where the mineral's frequency was reported using its broad name – cryptocrystalline silica) and such knapping practices may be widespread because chalcedony also appears to have been transported from a distance at some sites, such as at Buterix 1, Eastern Cape (Guillemard 2025). In the Waterberg, the sandstone conglomerates trap mineral nodules like chalcedony and agate until weathering frees them. Such nodules can sometimes be found lying near their host rocks.

The drill-like tools – borers – may have been used for piercing ostrich eggshell during the production of beads. In addition to the finished beads, we found fragments of the shell and pieces that were in the process of bead manufacture. Although bead manufacture took place in Welgevonden Rock Shelter, it was not as frequent an occurrence as in Kaingo Sheep Rock Shelter (Wadley et al. 2022). Many grooved stones suitable for smoothing the beads were recovered, together with stones with wider grooves that might have been used for polishing bone points or for applying poison to points. A few fragments of worked bone points and shafts were present, but animal bone was generally scarce and highly fragmented, probably because the site sometimes gets wet during rains and preservation of organic remains is not good. The large boulder in the centre of the excavation trench has a grinding hollow on top, suggesting that it was used for processing plant food (like seeds) and possibly medicinal herbs (SOM Fig. 9). We did not see traces of ochre on this rock, but the few pieces of ground ochre that we found may have been used to make powder for paint.

The hunter-gatherer painting of a battle-axe at WEL1, and the discovery of ceramics and iron beads in the rock shelter excavation, suggest that hunter-gatherers and Iron Age farmers lived in the Waterberg contemporaneously. Furthermore, there was possibly close contact between hunter-gatherers and Iron Age farmers in the region. The placement of the symbolic battle-axe alongside imagery of their own symbolic weaponry implies that the hunter-gatherers may have had some understanding of the ritual practices and belief systems of their neighbours. Iron Age farmers may have used the rock shelter and other crevices on the Welgevonden hillside for ritual purposes when the area was not occupied by hunter-gatherers. Secluded rock shelters are thought to have been used for rain-making ceremonies in the past (Aukema 1989) and the practice may have continued into the historical period when Schlömann (1896) was told that a Waterberg painted site had been used as a 'church' where people prayed for rain. The Welgevonden hill with its wide-angle view of the surrounding landscape and stored water in rock cisterns was not only a useful resource for early Waterberg residents, but is also likely to have been symbolically important. Early farming communities are thought to have used hilltops with rock cisterns as places for working with rain (Huffman 2007) and the cisterns became metaphors for working with rain (Schoeman 2006, 2009). Landscape was similarly integral to the Bushman worldview (Deacon & Foster 2005) and cognitive links between cisterns and rain may have been shared by Bushmen and Iron Age farmers of the region. The WEL1 painting of a man with a one-stringed musical instrument may be a clue to Bushman rain control practices in the area. Bleek and Lloyd's instructor, *Dia!kwain*, said that musical instruments like the one-stringed violin are appropriate for calling rain (Bleek & Lloyd 1968). Of course, we do not know whether southern and northern Bushmen shared such beliefs, so we cannot be entirely sure of the link between rain and the musical instrument painted at WEL1.

Unlike Woodstock Rocks and Kaingo Sheep Shelter, Welgevonden's ceramics are almost exclusively (save for one surface sherd) from the Eiland facies. Eiland ceramics, often with herringbone decoration, were made from about 1000 years ago to AD 1300 and they are strongly associated with rock shelters where Iron Age farmers are thought to have worked to control rain. The decorated pots would have had rain medicines placed in them before being hidden in the crevices of rock shelters. Later, other Iron Age farmers, probably Tswana-speakers, may have been near this site as is evidenced by the surface find of a Letsibogo facies sherd and the iron beads found in the excavation. The Letsibogo facies dates between AD 1500 and AD 1700 (Huffman 2007), which could match the date of 270±30 bp obtained from the charcoal sample in layer VDGB 3. Ancestors of the Bushmen seem to have continued making use of Welgevonden Rock Shelter when Iron Age farmers settled in the Waterberg with Moloko Phase ceramics (the Letsibogo facies has been recorded in the region west of Makapansgat to Botswana [Huffman 2007]). Significantly, there are no white finger-paintings near Welgevonden Rock Shelter;

both WEL1 and WEL2 are exclusively painted with fine-line art. This suggests that Northern Sotho boys' initiations (generally associated with finger-paintings that are thought to be part of instruction for the boys) were not conducted in this locale, but elsewhere on Kaingo, for example, in several Dwaalhoek sites (see Wadley & Laue 2025: chapter 11).

Also significantly, Welgevonden Rock Shelter lacks rock art and its excavated contents imply that it was a camp site. In contrast, the nearby painted rock shelter WEL1 and rock face WEL2, have unsuitable living spaces and no material culture items were found under the painted panels. This separation of secular tasks in Welgevonden Rock Shelter from the painted site activities, which probably had spiritual meaning, is striking. While we cannot know exactly what type of sacred sites were used by the occupants of Welgevonden Rock Shelter, there are several possibilities. David Witelson (2022, 2023) uses performance theory to propose that making images is but one amongst several performances carried out by Bushmen. Thus, rock faces are ritually altered through the performance of painting (Witelson 2022, 2023). In some instances, painting performance may have been part of working with rain, as already suggested above, but there are other possibilities. Bushman boys' group initiation rites, recorded in various ethnographies, involved separation from their families and groups for about a month. Ethnographic records of initiations are available for Ju/'hoansi (Marshall 1999), Nharo (Bleek 1928a) and !Ko boys (Heinz 1978). During their seclusion, boys were taught cultural practices and beliefs as well as hunting lore. Southern Bantu-speakers also conformed to boys' initiation practices that involved seclusion from the village while boys were taught civil and other responsibilities (Hammond-Tooke 1981, 1993). Northern Sotho/early farmer initiation lessons included finger-painted animals and other motifs as visual aids for teaching boys beliefs and social rules (van Schalkwyk 2002; Smith 2006). Since there are no finger-paintings near Welgevonden Rock Shelter we can be certain that this area was not used for farmer initiations, but that farmers used the area for other purposes.

Some of the Welgevonden hunter-gatherer occupants from the last few hundred years are likely to have been the artists that made the fine-line paintings. The repeated overpainting of imagery in WEL1 suggests time depth to the practice of painting there. While we cannot ascertain the intervals between the painting episodes at WEL1, it seems that people repeatedly returned to the site because it was of deep cultural/spiritual significance (for example, see Lewis-Williams 1981, 1990). Superpositioning in hunter-gatherer art is not random because later images are not applied to obscure earlier ones; rather, they were positioned deliberately over or near earlier paintings to draw on their perceived power (Lewis-Williams 1974). Thus, the earlier and later art can be interpreted as intrinsically linked. WEL1, furthermore, depicts several different types of arrowheads and Panel 2 is filled with flying arrows, some of which have crescent-shaped tips. For the people who made the paintings, arrows were not simply weapons for hunting and fighting, but were part of a complex belief system (Vinnicombe 1976; Deacon 1992; Wadley & Laue 2025: chapter 6). They were linked to important rituals such as a boy's First Kill ceremony (e.g., Metzger 1950; Marshall 1976, 1999; Lee 1979; Biesele 1993) and they were seen as metaphors for the potency or power experienced by ritual specialists during altered states of consciousness (e.g., Katz 1982; Garlake 1987; Eastwood 1999). When Dorothea Bleek visited Bushmen in Angola, she wrote that specific arrowhead shapes were used for shooting certain classes of animals (Bleek 1928b). To some extent the weapon types reserved for particular animals may have had a practical reason, but beliefs associated with the animals may also have played a role. Some of the backed lithics recovered from the Rock Shelter may have served as crescent-tips for arrowheads of the kind shown in some paintings, while the bone points might mirror the slender, straight weapons shown in Figure 23. We have not excavated any artefacts that compare with the lance-shaped arrowheads in Figure 23. Perhaps they were made of iron, like recent Kalahari arrowheads (Wiessner 1983), but the paintings need not signify real weapons.

The small portion of Kaingo Game Reserve represented in Figure 2 is richly endowed with traces of occupation from (perhaps) as early as a million years ago to the past few hundred years. The area is attractive because of its quartzite outcrops that provide toolstone, the rock cisterns that are a source of seasonal water, the rock formations that provide shelter, surfaces for painting and secret crevices for hiding medicines for working with rain. It is also likely, however, that the extraordinary view of animalpopulated plains and the unusual rock formations created a 'power of place' (Whitley 1998) that was recognised by early Iron Age farmers as well as by earlier communities that used stone technology.

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Supplementary online material

Wadley et al. Supplementary Online Material File 1

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