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70 years later – New research at Holley Shelter, a Middle and Later Stone Age site in KwaZulu-Natal, South Africa

In 1952, Gordon Cramb published the first report on his excavations at Holley Shelter, in KwaZulu-Natal, South Africa. Although Cramb's work implied organic preservation associated with a unique stone tool assemblage from a Middle Stone Age (MSA) context, Holley Shelter disappeared from the archaeological landscape until 2015, when we provided a reinvestigation of the lithic assemblages from the 1950s. Our study indicated a tentative chronological framework around Marine Isotope Stage 3 (MIS3) for the human occupation of the site. However, Cramb's excavations did not produce reliable chronometric ages and the botanical and zoological finds from Holley Shelter remain for the most part unstudied. This is problematic as the site constitutes one of the few inland MSA rock shelters of KwaZulu-Natal featuring organic preservation. In 2022, 70 years after Cramb's first report, we started a new research project focusing on renewed excavations to obtain archaeological remains from a controlled stratigraphy, absolute chronometric ages and reliable data on the palaeoenvironment at the border between the coastal belt and the midlands of KwaZulu-Natal. Here, we provide initial results from the first field campaign in 2022 on the stratigraphic sequence and archaeological finds and discuss their implications for future multidisciplinary research.

Significance:

- Environmental change can have a strong impact on hunter-gatherer behaviour, migration and technological choices. It is thus crucial to contextualise archaeological material with a strong palaeoenvironmental record.
- The inland of KwaZulu-Natal, South Africa, represents an understudied region in terms of Stone Age archaeological sites and palaeoenvironmental record.
- Holley Shelter is one of the few sites in South Africa with excellent organic preservation and a deep stratigraphic record, which provide a great opportunity to investigate human-landscape interaction and technological change throughout the Middle and Later Stone Age.

Previous work

Holley Shelter on Fountainhill Estate near Wartburg, KwaZulu-Natal (KZN) (Figure 1) has been known since the 1950s due to extensive excavation activities by Gordon Cramb[1,2]. In total, Cramb excavated during five campaigns at Holley Shelter between 1951 and 1959. He published his results in two contributions to the *South African Journal of Science*, the first one in 1952 – exactly 70 years ago.

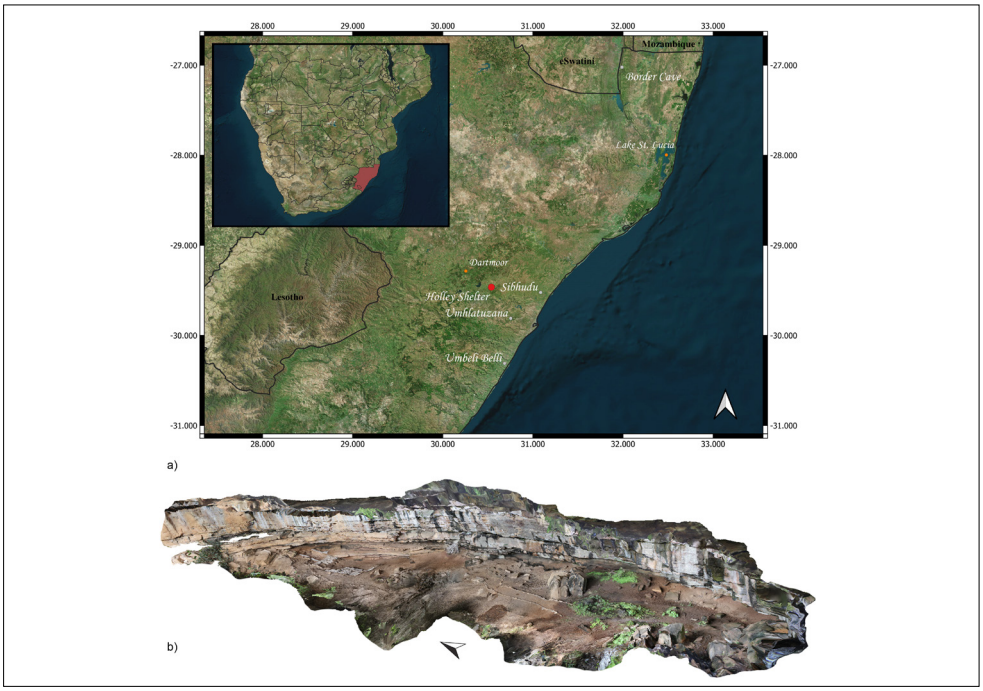

Figure 1: (a) Location of Holley Shelter and other archaeological and palaeoenvironmental sites mentioned in the text. (b) Three-dimensional model of the site produced with Agisoft Metashape Professional (by G. Bader).

In 2015, Bader et al.[3] performed a new study on the stone tool assemblages excavated by Cramb, aiming to evaluate the chrono-cultural framework of the Middle Stone Age (MSA) occupations. They recognised three distinct occupational horizons. The upper unit contained assemblages dominated by blades on hornfels with a characteristic core removal strategy, facetted platforms and frequent splintered pieces on hornfels. The middle part of the sequence was characterised by the same blade technology, fewer splintered pieces and a high number of unifacial points. The lowermost unit had lower artefact numbers dominated by quartz and bipolar percussion. When compared to lithic assemblages of the region, Holley Shelter showed similarities to the Sibudan assemblages at the MSA site of Sibhudu[4,5], indicating a potential age of 60–50 ka.

Research questions

The MSA of South Africa plays a key role in current discussions on the early cultural evolution of our species. In KZN, only six MSA rock shelter sites have been excavated, with key sites such as Sibhudu[5] and Border Cave[6]. Holley Shelter and Border Cave are the only two published inland MSA rock shelters in KZN, providing potential for good organic preservation. While Border Cave, far in the north of KZN, recently received increasing attention due to new research by Backwell and colleagues[6], Holley Shelter was last excavated in the 1950s.

The site provides the unique opportunity to gain information on the palaeoenvironment in the central hinterland of KZN well into the Pleistocene. In this area, for example, the oldest pollen record currently reaches back to about 12 000 cal BP at Dartmoor.[7] Older records about palaeolandscapes and palaeoenvironments come from Border Cave in the north and the coastal area in the east, e.g. Lake St. Lucia[8] or from Sibhudu[9]. Thus, in the course of ongoing effort to investigate past human behaviour and palaeoecology, we began new excavations at Holley Shelter in 2022 with the following research questions for our first 4-week campaign:

1. Are there intact archaeological deposits left?
2. Does the site feature a discernible stratigraphic sequence which can be dated?
3. Is there preservation of organic remains?
4. Can we confirm the existence of distinct techno/typological units in the stratigraphic sequence?

Preliminary results

Cramb excavated in two areas of the shelter. In his first campaign in 1951, he dug in the southern part, near the entrance (Figures 1 and 2), documenting a Later Stone Age (LSA) occupation at the top, and typical MSA artefacts including bone tools below.[2] Although substantial amounts of intact deposits remain, we refrained from excavating this area in our 2022 campaign due to massive rock slabs lying on the deposits. We might expand excavations to this part of the shelter in future work, as Cramb documented LSA artefacts only in this smaller area, whereas the larger area yielded exclusively MSA material. In the following campaigns, Cramb focused on this larger 'habitable area' at the northern end of the shelter.

Cramb used a square grid system in this area and painted the letters of his squares on the shelter backwall.[3] We focused on this area as it was easily accessible and had the highest chance to preserve the full sequence of archaeological deposits. Two test trenches were opened. The first at the northern end of the shelter bordering Cramb's former main excavation area, including squares 12/57, 12/58 and 12/59 (Figure 2), is also called the 'northern section'. Whereas Cramb used square yards for his excavation grid, we are using square metres and hence we can only coarsely correlate them with each other. Different from Cramb who used an alphanumeric code for his squares (e.g. X1, W2), our squares' names are purely numeric, according to their absolute coordinates (e.g. square 12/57 starts at $x = 12\,000$ and $y = 57\,000$). A second trench was sunk

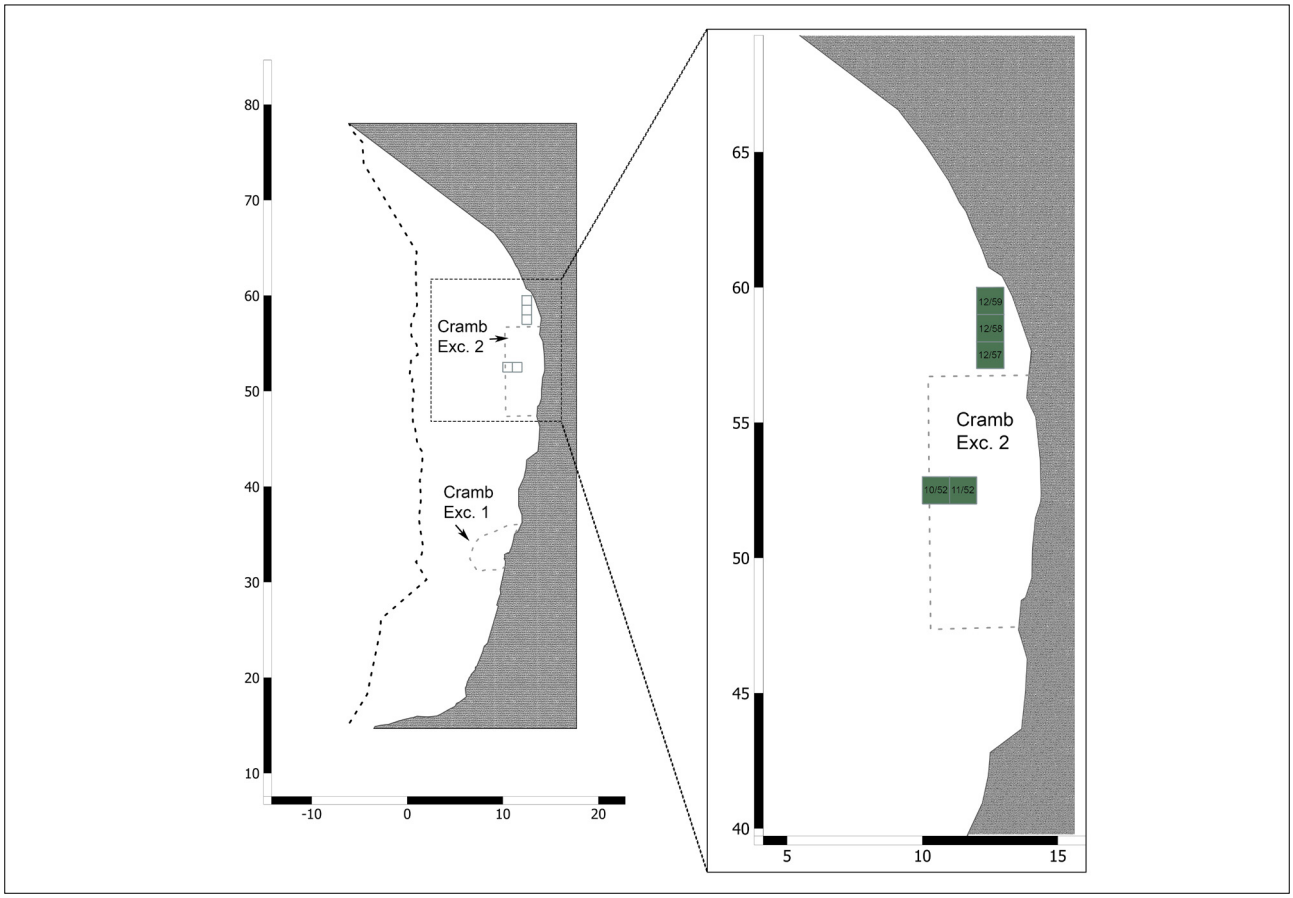

Figure 2: Excavation plan of Holley Shelter. Cramb Exc. 1 and 2 mark the areas of Cramb's excavations in the 1950s. Exc. 1 = 'smaller habitable area', Exc. 2 = 'larger habitable area'. Green squares were excavated by the TSAARU team in 2022. Figure by G. Bader.

at the western extension of Cramb's main excavation area (Figure 2). Following his field notes, he excavated only 60 cm deep without reaching bedrock there. The aim of this trench (squares 10/52 and 11/52) was to document the lower extent of these deposits below the 60-cm pit. Our layer taxonomy follows the system applied by the Sibhudu team using names from top to bottom in alphabetical order. Due to the musical preference of the excavators we decided to name the layers in honour of our favourite rock and metal bands.

Our new excavations confirm the existence of intact and stratified archeological deposits in both trenches. Table 1 provides an overview of finds measured in the field and recovered from screening of sediments. In the northern section, below a 5–10-cm thick disturbed surface horizon, we reached the first intact layer AVA (Avantasia), an orange-brown (5YR 4/4) layer of sandy silt deposits with several charcoal inclusions (Figure 3). AVA contains several small hearths, typical MSA stone artefacts and substantial amounts of faunal remains. Few of the stone tools are retouched but many of them have faceted platforms. Hornfels is the most common raw material but occasionally sandstone artefacts occur. Below AVA, layer BIB (Beast in Black) is clearly distinguishable as a grey (5YR 5/2) sandy silt (Figure 3). In the southern part, BIB contains a massive hearth expanding almost over the entire square. BIB is substantially richer in artefacts, including numerous splintered pieces similar to the ones identified in the Cramb collection (Figure 4d–f)[3], unifacial points (Figure 4a–c), frequent blades and points with faceted platforms, large amounts of faunal remains (Figure 4g–p) and big pieces of charcoal. Fossilised plant remains were also recovered. There appears to be a clear correlation between higher find densities and the hearth features, whereas the surrounding areas contain only a few artefacts.

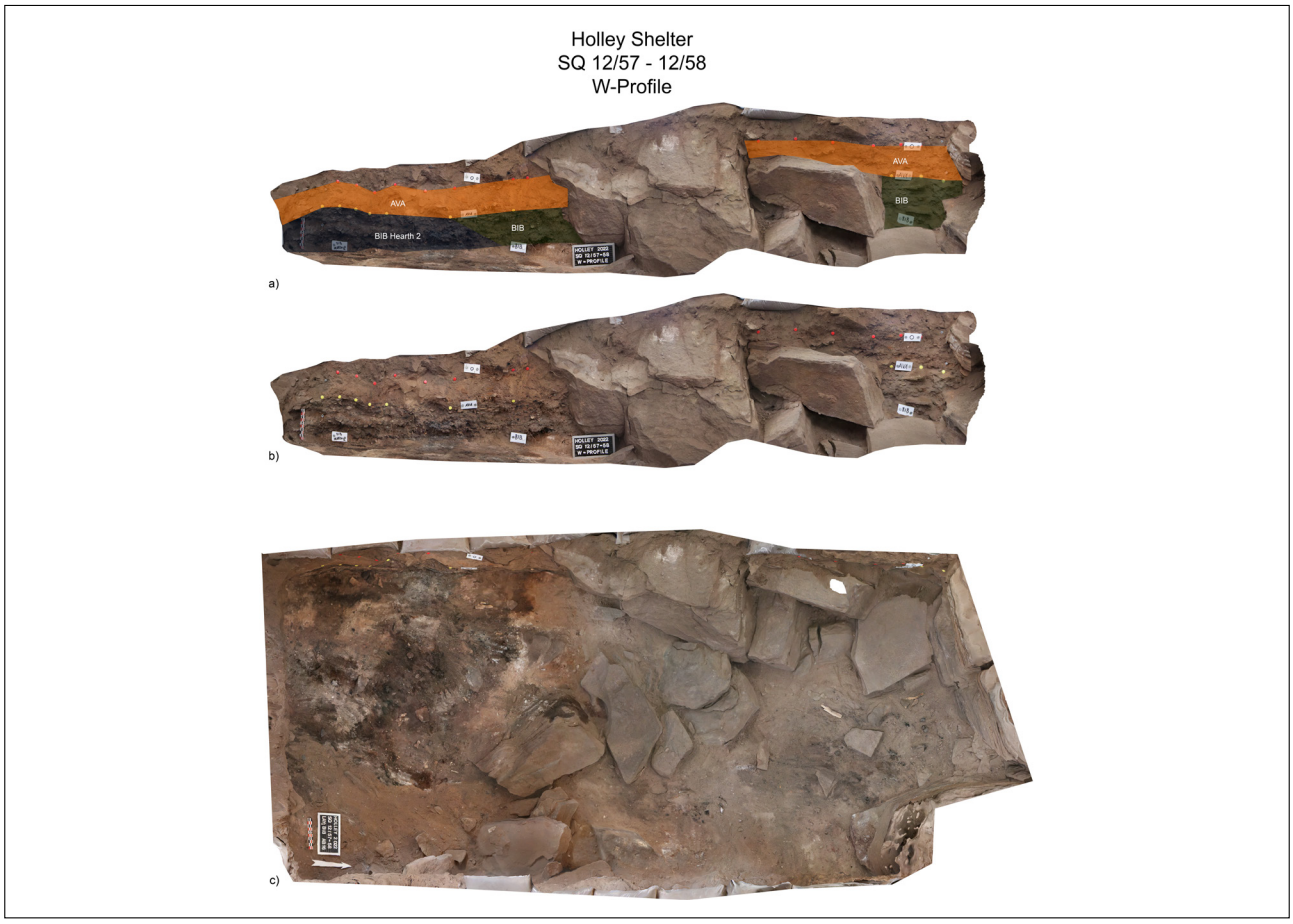

Figure 3: (a) West-profile of the northern section with layers redrawn, (b) west-profile of the northern section (original), and (c) three-dimensional model of the northern section at the end of the 2022 excavation season. Figures by G. Bader.

Table 1: Archaeological finds, per layer, from the 2022 excavation campaign at Holley Shelter

Layer	Lithics >2cm (*n*)	Lithics <2cm (*n*)	Fauna identifiable (*n*)	Fauna non-identifiable (g)	Charcoal >2cm (*n*)	Charcoal <2cm (g)	Ochre >2cm/ worked (*n*)	Ochre <2cm (g)
AVA	123	311	204	1679.9	39	85.1	4	47.5
BIB	385	521	309	2573.8	107	389.7	17	279.4
YBA	95	90	26	258.3	28	35.2	13	40.8
GYS	91	103	2	45.1	8	31.7	4	54.8
GWS	81	167	6	86.4	19	82.8	1	22.7
GBA	76	75	0	5.4	23	50.5	4	4.6
Total	**851**	**1267**	**547**	**4648.9**	**224**	**675**	**43**	**449.8**

Figure 4: Artefacts from layer BIB in the northern section at Holley Shelter: (a–c) unifacial points, (d–f) splintered pieces, (g, h, k, m, n, o) identifiable faunal remains, (i, j) bone flakes, (l, p) bones with cutmarks. Photos by G. Bader.

In the smaller trench at the bottom of the old Cramb excavation area, the first 10 cm of the deposits represent backfilling and disturbance over the past 60–70 years. The sediments below, however, are intact. Because we cannot yet correlate the layer system from the northern section with the Cramb area, we decided to use descriptive layer names in this trench which will be replaced by alphabetical names once we can connect both trenches. The first intact layer in the Cramb area is yellow brown ash (YBA), a hearth feature containing substantial amounts of hornfels artefacts, faunal and botanical remains and frequent charcoal. The top surface of YBA lies approximately 1.20 m below the top surface of AVA in the northern section. Underneath YBA follow layers grey yellow speckled (GYS), grey white speckled (GWS) and grey brown ash (GBA). GWS also features well-preserved, small hearths. Stone artefacts in those lower layers are typically knapped from sandstone and quartz, the latter often flaked by bipolar technique. Although bone preservation is poor, charcoal is still preserved and there is good evidence for further botanical remains.

A further important observation concerns the distribution of stone artefact categories. In 2015 we suggested that Cramb's original assemblage was likely biased due to high numbers of modified pieces and low numbers of small debitage in the collection. However, our new excavations so far confirm this trend. A total of 851 single finds >2 cm are opposed to 1267 pieces of small debitage <2 cm of which only 182 are <1 cm. At the same time, the upper horizons AVA and BIB as well as YBA contain considerable amounts of tools ranging between 6.3% and 9.4% of the lithic assemblage (including splintered pieces which are the

focus of more detailed residue and microwear studies to ascertain their function). In AVA and BIB, splintered pieces and unifacial points are most frequent, as in the old collections. In contrast, the lowermost horizons show only 0–1% modified tools and lack retouched points or splintered pieces. In general, the find densities of lithics are comparatively low but variable, with the lowest value in AVA (n=1555/m^3) and the highest values in BIB (n=3682.9/m^3) and GWS (n=4829.4/m^3).

Discussion

The new excavations at Holley Shelter revealed a well-stratified archaeological sequence with excellent organic preservation and clearly delineated anthropogenic hearth features. Our preliminary results confirm earlier observations of occupational horizons with different techno-typological characteristics. AVA and BIB correlate well with Cramb's Inches 0–6 and 6–12, exhibiting large numbers of hornfels flakes and blades with faceted platforms and splintered pieces. GYS, GWS and GBA overlap with Cramb's lower Inches 30–36 and 36–42, having little to no hornfels artefacts, lower find numbers in general, bipolar percussion on quartz nodules and rare retouched tools.

The low number and proportion of waste products (small debitage) at Holley Shelter stand in sharp contrast to MSA sites closer to the coast in KZN such as Sibhudu or Umbeli Belli, which suggests comparatively little on-site reduction of raw materials and – in combination with higher find densities being associated directly with clearly delineated hearth features – potentially indicates more small-scale and short-term stays. This would imply a different site function for Holley Shelter compared to the more residential MSA sites closer to the coast – a hypothesis which requires further testing.

Future perspectives

Many research questions at Holley Shelter remain active targets for future work in the coming years. In order to provide an absolute chronological framework, we took samples for both optically stimulated luminescence and ^{14}C dating from the sequence. Due to excellent organic preservation, we intend to establish a comprehensive archive for palaeoenvironmental and climate reconstructions reaching back in time much further than previously possible in the central part of KZN. We therefore created a research network with South African and European researchers focusing on pollen, phytolith, macro-botanical, faunal, charcoal, and geoarchaeological analyses – with additional studies on lithics and ochre – all currently underway. The new excavations at Holley Shelter have the potential to provide a novel perspective and essential contribution towards a broader understanding of hunter-gatherer behaviour and palaeoenvironment during the MSA, providing a bridge in time and space to the well-known research areas along the coast in the east (Sibhudu, Umbeli Belli, Umhlatuzana), the highlands of Lesotho in the west (Sehonghong, Melikane) and the mountainous north (Border Cave, Sibebe). Complementary work by our team on several other rock shelter and open-air sites in KZN and Eswatini intends to fill gaps in our knowledge and provide a regional perspective on human material culture, exchange networks and palaeoecology throughout the Pleistocene in southeastern South Africa.

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Competing interests

We have no competing interests to declare.

Authors' contributions

Both authors designed the study, collected and processed the data, and wrote the manuscript.

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