**Export/sampling permits**

Please note an export permit must be linked to an object or site that has to be created on SAHRIS! If the object/site you want to work on has not been created yet, you would need to do so. Thanks!

The proposal should include (you can fill these in below):

* a list of participants (name, affiliation, phone no, email addresses) and how they are involved;
* the name and address of the facility, including address, it is being scanned at;
* name and address of the museum/university department that currently hosts the object;
* names of the responsible person(s) during transport and while the fossil is at the facility;
* the period/time frame during which the fossil(s) will be outside the country;
* detailed information on the fossil(s), especially as it is a "unique" specimen;
* detailed information on the research project behind it & methodology including expected outcomes (i.e., the reason for export);
* the written confirmation of the institution that currently hosts the object that the object may be used as proposed and be returned in good condition;
* should there be any damage/destructive analysis (e.g., coating for higher resolution) undertaken, this needs to be stated in detail;
* Statement why this study cannot be done in South Africa.

**Applicant (name and affiliation): this is usually the museum curator!**

Ms. Celeste Booth

Archaeology, Albany Museum

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**Applied for (principal researcher):**

Ms. Margaret-Ashley Veall, D.Phil Candidate

Research Laboratory for Archaeology and the History of Art

School of Archaeology – University of Oxford

Dyson Perrins Building, South Parks Road

Oxford OX1 3QY United Kingdom

**Participants with affiliations, email addresses, phone numbers (& their role):**

1) Ms. Margaret-Ashley Veall, Research Laboratory for Archaeology and the History of Art, University of Oxford, +44 (0)7946145473, [margaret-ashley.veall@arch.ox.ac.uk](mailto:margaret-ashley.veall@arch.ox.ac.uk)

Role: Principle Researcher

2) Ms. Celeste Booth Archaeology, Albany Museum Somerset Street, Grahamstown, Eastern Cape, South Africa +27 46 622 2312 [c.booth@am.org.za](mailto:c.booth@am.org.za)

Role: Curator, primary permit holder

3) Prof. Peter Mitchell, St. Hugh’s College, St. Margaret’s Road, Oxford OX2 6LE, +44 (0)1865 274951, [peter.mitchell@st-hugh’s.ox.ac.uk](mailto:peter.mitchell@st-hugh's.ox.ac.uk)

Role: Doctoral Supervisor

4) Prof. David Pearce, Rock Art Research Institute, School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, 1 Jan Smuts Ave Braamfontein 2000, Johannesburg, South Africa, [david.pearce@wits.ac.za](mailto:david.pearce@wits.ac.za)

Role:

The material will be **air transported** to the Research Laboratory for Archaeology and the History of Art, University of Oxford (facility/institution) on **February, 2016** (month, year) by DHL couriers (name of person responsible for transport) and brought back by \_\_ (leave blank if same person as above).

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (name) will be involved with the \_\_\_\_\_\_\_ (e.g., transport/scanning) of objects and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (whatever else).

**Institution incl. address that currently hosts the object:**

Department of Archaeology, Albany Museum

Somerset Street, Grahamstown

Eastern Cape, South Africa

+27 46 622 2312

Contact for Collections:

Ms. Celeste Booth, Albany Museum Somerset Street, Grahamstown, Eastern Cape, South Africa +27 46 622 2312 [c.booth@am.org.za](mailto:c.booth@am.org.za)

**Facility incl. address at which the experiment will be done:**

Research Laboratory for Archaeology and the History of Art

Dyson Perrins Building, South Parks Road

Oxford OX1 3QY

United Kingdom

**Table of objects or upload file:**

Table 1: List of samples obtained from stone tools and hafted implements requested for export.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ALBANY MUSEUM - Samples Requested for Export** | | | | | | | | |
| Sample No. | Artefact No. | Level | Typology | Sample Type | Color | Dimensions (mm) | Weight (including vial) | Notes |
| 1 | Melkhoutboom - 69/151 | W | scraper | 4 fragments | black/brown | All <1mm | 2.69g | Removed from proximal surface |
| 2 | Melkhoutboom - 69/151 | W | scraper | swab | white | 18mm X 3mm | 2.65g | Removal from right distal-medial, on both ventral and dorsal edge and surface (artefact label intact) |
| 3 | Melkhoutboom - 69/93 | MB | scraper | 2 fragments | black/brown | 1 frag - ~2mm, 1 frag - <1mm | 2.60g | Fragments removed from bag |
| 4 | Melkhoutboom - 69/93 | MB | scraper | swab | white | 19mm X 4mm | 2.70g | Removal from right distal-medial, on both ventral and dorsal edge and surface (artefact label intact) |
| 5 | Melkhoutboom - 69/107a | MB | scraper | 3 fragments | black/brown | All <1mm | 2.58g | Fragments removed from bag |
| 6 | Melkhoutboom - 69/107a | MB | scraper | swab | white, brown/red stained | 21mm X 4mm | 2.69g | Removed from central-left medial, dorsal surface, 7 semi-dissolved fragments picked up during sampling |
| 7 | Melkhoutboom - 69/107a | MB | scraper | swab | white, grey staining | 17mm X 5mm | 2.68g | Removed from right distal edge and surface on dorsal and ventral sides; some mastic trace touched on ventral surface (artefact label intact) |
| 8 | Melkhoutboom - 69/107b | MB | scraper | 1 fragment | black/brown | 2mm | 2.59g | Removed from left dorsal medial/proximal surface near edge; fragment is crumbling and other particulates from sample also in vial |
| 9 | Melkhoutboom - 69/107b | MB | scraper | swab | white, grey staining | 29mm X 4mm | 2.69g | Removed from left distal and lateral (steep) edges and surface |
| 10 | Melkhoutboom- 69/107c | MB | scraper | 2 fragments | black/brown | All <1mm | 2.60g | Fragments crumbling, removed from dorsal proximal surface (central), and left edge |
| 11 | Melkhoutboom- 69/107c | MB | scraper | swab | white, grey staining | 22mm X 4mm | 2.78g | Removed from right distal surface |
| 12 | Melkhoutboom- 69/107c | MB | scraper | swab | white, brown/yellow staining | 24mm X 4mm | 2.81g | Removed from left and right proximal edges |
| 13 | Melkhoutboom - 69/150s | W | scraper | Fragments, <20 | black | <1mm | 2.69g | Fragments are particulates, removed from cavity located on medial surface, dorsal side |
| 14 | Melkhoutboom- 69/150s | W | scraper | swab | white, black/brown staining | 25mm X 4mm | 2.80g | Removed from cavity located on medial surface, dorsal side |
| 15 | Melkhoutboom - 69/150s | W | scraper | swab | white, grey staining | 20mm X 5mm | 2.81g | Removed from dorsal side, left distal surface and edge |
| 16 | Melkhoutboom - 69/150l | W | scraper | 8 fragments | black/brown | All <1mm | 2.69g | Removed from dorsal side, cavity on proximal surface (V-shaped, central) |
| 17 | Melkhoutboom - 69/150l | W | scraper | swab | white, grey/brown staining | 24mm X 4mm | 2.81g | Removed from dorsal side, right distal surface and edge |
| 18 | Melkhoutboom - 69/75 | CAF | adze | 17 fragments | black/brown | All <1mm | 2.72g | Removed from proximal left surface near edge |
| 19 | Melkhoutboom -69/75 | CAF | adze | swab | white, black/brown staining | 24mm X 5mm | 2.79g | Removed from dorsal and ventral sides, left edge and surface |
| 20 | Melkhoutboom - 69/42s | OMB | adze | 2 swabs | white, black/brown staining | 30mm X 5mm; 25mm X 6mm | 2.94g | Removed from dorsal side, left in location with most noticeable staining |
| 21 | Melkhoutboom - 69/42s | OMB | adze | 2 swabs | white, black/brown staining | 24mm X 4mm; 19mm X 4mm | 2.88g | Removed from dorsal and ventral sides, right near concave edge |
| 22 | Melkhoutboom 69/42l | OMB | adze | 9 fragments | black/brown | Ranging between <1-3mm | 2.72g | Removed from ventral side, left edge and surface opposite edge with concavity |
| 23 | Melkhoutboom -69/42l | OMB | adze | swab | white, brown staining | 27mm X 3mm | 2.80g | Removed from ventral side, right edge and surface |
| 24 | Melkhoutboom- 69/201 | W | borer | 2 swabs | white, black/brown staining | 17mm X 4mm; 24mm X 7mm | 2.89g | Removed from entire proximal end, all surfaces and edges |
| 25 | Melkhoutboom - 69/201 | W | borer | swab | white, brown staining | 22mm X 4mm | 2.77g | Removed from dorsal side, distal end |
| 26 | Melkhoutboom - 69/229 | W | borer | swab | white, grey staining | 20mm X 4mm | 2.74g | Removed from proximal end, dorsal |
| 27 | Melkhoutboom -69/229 | W | borer | swab | white | 19mm X 4mm | 2.76g | Removed from distal end, dorsal |
| 28 | Melkhoutboom -69/37 | OMB | scraper | swab | white, brown/yellow staining | 18mm X 4mm | 2.76g | Removed from dorsal (L) and ventral (R) sides, proximal edge and surface |
| 29 | Melkhoutboom - 69/37 | OMB | scraper | swab | white, grey staining | 22mm X 5mm | 2.80g | Removed from steep distal edge, left (dorsal) |
| 30 | Melkhoutboom - 69/37 | OMB | segment | swab | white, yellow staining | 23mm X 4mm | 2.79g | Removed from backed surface (including tip), on ventral and dorsal sides |
| 31 | Melkhoutboom - 69/37 | OMB | segment | swab | white, grey staining | 21mm X 4mm | 2.78g | Removed from opposite end to No. 30 |
| 32 | Melkhoutboom - 69/132 | MB | segment | 4 fragments | black/brown | All <1mm | 2.70g | Removed from proximal edge and backed surface |
| 33 | Melkhoutboom - 69/95s | MB | segment | 4 fragments | black/brown | All <1mm | 2.69g | Removed from proximal edge and backed surface |
| 34 | Melkhoutboom - 69/30 | OMB | segment | swab | white, black/brown staining | 25mm X 6mm | 2.82g | Removed from proximal edge and backed surface |
| 35 | Melkhoutboom - 69/30 | OMB | segment | swab | white, grey staining | 22mm X 4mm | 2.81g | Removed from edge opposite No. 34 |
| 36 | Melkhoutboom - 69/95s | MB | segment | swab | white, brown staining | 18mm X 5mm | 2.75g | Removed from opposite end to No. 33 |
| 37 | Melkhoutboom - 69/132 | MB | segment | swab | white | 25mm X 5mm | 2.80g | Removed from opposite end to No. 37 |
| 38 | Melkhoutboom - 69/100 | M | borer | 1 fragment | black/brown | <1mm | 2.69g | Removed from proximal end, and ventral near edge and surface |
| 39 | Melkhoutboom - 69/100 | M | borer | swab | white, brown staining | 24mm X 5mm | 2.79g | Removed from proximal end, all edges and surfaces |
| 40 | Melkhoutboom - 69/100 | M | borer | swab | white, grey/black staining | 24mm X 7mm | 2.77g | Removed from ventral distal end |
| 41 | Melkhoutboom - 69/13 | S | scraper | swab | white, brown/yellow staining | 23mm X 6mm | 2.78g | Removed from proximal end only, difficult to remove (DCM:MeOH mix) |
| 42 | Melkhoutboom - 69/13 | S | scraper | swab | white, brown/yellow staining | 26mm X 5mm | 2.86g | Removed from same surface (H2O mix) |
| 43 | Melkhoutboom - 69/13 | S | scraper | 2 swabs | white | 16mm X 6mm; 27mm X 4mm | 2.98g | Removed from right dorsal, distal edge and surface |
| 44 | Melkhoutboom - 69/63 | CAFu | scraper | 2 swabs | white, grey staining | 17mm X 7mm; 27mm X 4mm | 2.95g | Difficult to remove. |
| 45 | Melkhoutboom - 69/63 | CAFu | scraper | swab | white | 22m X 5mm | 2.77g | Removed from dorsal side, distal edge and surfaces |
| 46 | Melkhoutboom - 69/283 | M | segment | swab | white, yellow staining | 21mm X 4mm | 2.79g | Removed from right dorsal side, medial/proximal edge, surface |
| 47 | Melkhoutboom - 69/283 | M | segment | swab | white, grey staining | 20mm X 6mm | 2.75g | Removed from dorsal left side, distal/medial edge, and surface |
| 48 | Melkhoutboom - 69/95l (quartzite) | MB | segment | 2 swabs | white, brown/yellow staining | 23mm X 6mm; 21mm X 4mm | 2.88g | Removed from proximal backed edge and surface, and dorsal central surface and edge. Swab also picked up particulates |
| 49 | Melkhoutboom - 69/95l (quartzite) | MB | segment | swab | white | 20mm X 5mm | 2.76g | Removed from left dorsal distal edge and surface |
| 50 | Melkhoutboom - 69/134 | MB | segment | swab | white, brown/yellow staining | 24mm X 4mm | 2.79g | Removed from the backed surface and ventral edge near label |
| 51 | Melkhoutboom - 69/134 | MB | segment | swab | white, grey staining | 23mm X 4mm | 2.77g | Removed from dorsal side, distal edge and surface |
| 52 | Melkhoutboom - 69/46 | CAF | adze | swab | white, black/brown staining | 24mm X4mm | 2.79g | Removed from mastic outlined section, ventral side, edge, and opposite surface in corner |
| 53 | Melkhoutboom - 69/46 | CAF | adze | swab | white, black/brown staining | 22m X 5mm | 2.78g | Removed from distal edge, dorsal |
| 54 | Melkhoutboom - 69/61 | CAF | adze | swab | white, black/brown staining | 18mm X 4mm | 2.78g | Removed from dorsal left side |
| 55 | Melkhoutboom - 69/61 | CAF | adze | swab | white, black/brown staining | 18mm X 5mm | 2.80g | Removed from ventral left side |
| 56 | Melkhoutboom - 69/49 | CAFu | scraper | swab | white, black staining | 28mm X 7mm | 2.79g | Removed from dorsal side, left proximal corner and platform. Dry frag flaked from medial left surface |
| 57 | Melkhoutboom - 69/49 | CAFu | scraper | swab | white, grey staining | 22m X 4mm | 2.79g | Removed from dorsal side, right distal steep edge |
| 58 | Melkhoutboom - 69/49 | CAFu | scraper | swab | white, grey staining | 25mm X 8mm | 2.78g | Removed from dorsal side, right, proximal end by and on platform |
| 59 | Melkhoutboom - 69/49 | CAFu | scraper | swab | white | 28mm X 5mm | 2.79g | Removed from distal steep edge |
| 60 | Melkhoutboom - 69/276 | M | scraper | 2 swabs | white, brown/yellow staining | 23mm X 7mm; 22mm X 6mm | 2.89g | Removed from dorsal side, medial black stain, and ventral left medial edge |
| 61 | Melkhoutboom - 69/276 | M | scraper | swab | white, black/brown staining | 21mm X 5mm | 2.78g | Removed from dorsal, distal edge |
| 62 | Melkhoutboom - 69/305 | M | scraper | swab | white, black/brown staining | 27mm X 5mm | 2.77g | Removed from dorsal and ventral, proximal edge and surfaces |
| 63 | Melkhoutboom - 69/305 | M | scraper | swab | white, yellow staining | 29mm X 5mm | 2.82g | Removed from distal edge, dorsal |
| 64 | Melkhoutboom - 69/226 | W | segment | 2 swabs | white, grey staining | 26mm X 4mm; 16mm X 4mm | 2.95g | Removed from proximal backed edge |
| 65 | Melkhoutboom - 69/226 | W | segment | swab | white | 29mm X 4mm | 2.77g | Removed from distal edge |
| 66 | Melkhoutboom - 69/240 | W | segment | 2 swabs | white | 21mm X 6mm; 24mm X 5mm | 2.97g | Removed from whole tool |
| 67 | Melkhoutboom - 69/238 | W | segment | swab | white, black/brown staining | 29mm X 4nm | 2.81g | Removed from backed edge |
| 68 | Melkhoutboom - 69/238 | W | segment | swab | white | 24mm X 4mm | 2.82g | Removed from opposite edge to No. 67 |
| 69/70 | Melkhoutboom - 69/134 | MB | scraper | 3 fragments | black/brown | 2 frags 4-5mm, 1 frag <1mm | 2.74g | Removed from right dorsal medial/proximal edge surface, includes plant remains that fell out of mastic |
| 71 | Melkhoutboom - 69/134 | MB | scraper | swab | white, grey staining | 25mm X 5mm | 2.78g | Removal from left dorsal side, distal edge surface |
| 72 | Melkhoutboom - 69/136 | MB | scraper | swab | white, black/brown staining | 20mm X 5mm; 22mm X 4mm | 2.87g | Removal from 1) dorsal side, right proximal medial surface and edge, and 2) ventral proximal surface |
| 73 | Melkhoutboom - 69/136 | MB | scraper | swab | white, black/brown staining | 28mm X 4mm | 2.80g | Removed from distal central edge |
| 74 | A1543 |  | hafted implement | 17 fragments | red/brown | 3-4mm | 2.72g | Fragments from proximal end where specimen would connect to shaft. Frags of both smooth, shiney and mat composite obtained |
| 75 | A1543 |  | hafted implement | semi-dissolved fragment and dried residue | orange/brown | sample dried 10mm up edge of vial | 2.70g | Evaporated sample, DCM:MeOH |
| 76 | C961 |  | hafted implement | 4 fragments | black/brown | <1-2mm | 2.72g | Removed loosened fragments from distal portion of mastic and from proximal edge near XX incising |
| 77 | Melkhoutboom - 69/48 | OMB | adze | 14 fragments | black | <1 - 1mm | 2.72g | Removed from dorsal and ventral sides, medial |
| 78 | Melkhoutboom - 69/48 | OMB | adze | swab | white, black/brown staining | 22mm X 4mm | 2.82g | Removed from distal, right edge |

**Site including age at which object was found:**

Objects may be divided into two categories: 1) Melkhoutboom Cave material; and, 2) hafted implement without provenience.

1. Melkhoutboom Cave material: The site was added to the SAHRIS online system coded as MHB by the applicant. This application links to that site entry. Based on records and maps consulted at the Albany Museum, the site is located on the 1:50 000 map 3325BD. It is found within the boundaries of the farm Melkhoutboom 8, with the nearest inhabited town listed as Paterson.

There are uncalibrated radiocarbon dates associated with the objects (Deacon 1976). Layers M and W are between 6980 +/- 65yBP and 5900 +/- 90yBP, with W overlaying M. Artefacts from these stratigraphic units have been described as Formative Wilton (Deacon, 1976: Table 3). Material from layer MB is dated to between 5900 +/- 90yBP and 2870 +/- 90yBP, and is described as Developed or Climax Wilton (Deacon 1976: Table 3). Finally, material from CAF, CAFu, OMB, and S layers are all younger than 2870 +/- yBP and ascribed from the Post-Climax Wilton Industry (Deacon 1976: Table 3).

1. Hafted Implements: A1543 and C961

These pieces are among a small collection of exceptionally preserved archaeological composite tools found in the early stages of archaeological exploration in South Africa. Scientific analysis of these pieces has included use-wear analysis (Binneman, 1983) and X-rays (Deacon, 1966) to gain further insight into the function and manufacture of the tools, however, to date no further work has been conducted to discern the composition and origins of the mastic adhesives. There is scant information to associate these pieces with known archaeological cultural sequences in the region. There are also no absolute dates associated with these pieces.

A1543 is described as ‘[a] stone implement fixed by means of resin to a wooden handle…Found with a skeleton in a cave near Plettenberg Bay…Purchased December 1908…’ (Deacon 1966:87, originally published by Hewitt, 1912). C961 is described as a ‘handle with resin attached, from a cave at Plettenberg Bay’ (Deacon 1966:88, originally published by Hewitt, 1912).

**Time frame:**

Transport to the Research Laboratory for Archaeology and the History of Art, University of Oxford : February 25, 2016

Return date: September 30, 2016

**Aim/rationale:**

 The materials described in this permit are requested for export to undergo chemical analysis as a component of a doctoral project entitled: “Stuck like glue: Assessing variability in hafting adhesives during the southern African Later Stone Age” based at the Research Laboratory for Archaeology and the History of Art at the University of Oxford. The primary aim of this research is to identify the organic composition of hafting adhesives, or mastic, from stone tools from a number of Later Stone Age sites located in a variety of geographies and ecologies. In this manner, the analyst wishes to identify whether the composition of adhesives were variable or stable, spatially, temporally, and geographically during the Later Stone Age of the Holocene. Collections at Melkhoutboom Cave were selected for this doctoral study due to the relatively high frequency of mastic trace identified on stone tools from excavations in 1930 (Hewitt, 1931), 1967, and 1969 (Deacon, 1976). The site of Melkhoutboom boasts long cultural sequences spanning the microlithic (Robberg and Wilton), and non-microlithic (Oakhurst) traditions (Lombard et al., 2012) with descriptions of mastic trace noted on many formal tool typologies. It is also ideally situated in the Thicket Biome, unlike the other sites selected for this doctoral project.

**Methodology (short):**

The identification of the composition of an adhesive will be divided into the characterisation of organic and inorganic component. The inorganic analysis will be conducted with scanning electron microscopy (SEM) accompanied by energy dispersive X-ray spectroscopy (EDS) (Pawlik and Thissen 2011, Dinnis et al. 2009). The organic components will be analysed by pyrolysis gas chromatography coupled mass spectrometry chromatography coupled mass spectrometry (py-GC-MS) (Andreotti et al. 2006), (GC-MS) (Charrie-Duhaut et al. 2013) and Fourier transform infrared spectroscopy (FTIR) (Prinsloo et al. 2014). These techniques have been highlighted in a number of molecular residue papers, and are known for their ability to characterise distinct molecular components of a residue in tandem with data acquired from plant and animal-based reference collections.

**Confirmation/permit by museum (**Attached?):

Letter attached to permit application. ECPHRA permit also attached.

**Damage/destructive analysis? (if yes, explain in detail)**

Sampling was conducted at the Albany Museum. The sampling procedures did not damage the structural integrity of the stone tools, and the material that is requested for export are cotton swabs, and mastic fragments.

**Statement why this study cannot be done in South Africa:**

The majority of the instruments noted above are currently housed in the Research Laboratory for Archaeology and the History of Art in Oxford. The equipment, especially the GC-MS, has been optimised for the analysis of the constituents of residues. The Agilent gas chromatographer coupled mass spectrometer has run samples from both archaeological and ethnographic specimens from a variety of geographic regions in both the northern and southern hemisphere. As a component of this research project, a collection of reference spectra obtained from plant and animal materials from southern African species (collected from Kew Gardens in London, and the Royal Botanic Gardens in Edinburgh), and the archaeological material would thus need to be analysed on the same instrument for comparative results. This is standard practice among other laboratories that analyse archaeological material (i.e. Charrie-Duhaut et al. 2013, Burger et al. 2009).

Permission has also been acquired from the University of Pisa, Department of Chemistry and Industrial Chemistry to use the pyrolysis- GC-MS instrument currently in use by the Chemical Science for the Safeguard of Cultural Heritage group for some of the larger fragment samples in March 2016. This analytical process will serve to complement the GC-MS analysis conducted at the Oxford lab and identify whether the mastics are composed of multiple mixtures of organic materials.

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