

Owner: Princeton University Art Museum (PUAM)
Object Number: 2019-10
Artist/Maker: Sotho artist, Southern Drakensberg, South Africa
Object: Belt (*umutsha*)
Date: Late 19th – early 20th century
Medium: Glass beads, sinew, and fiber
Dimensions: 6.3 × 69.2 cm (2 1/2 × 27 1/4 in.)



Provenance: Mme. Nelly Van Den Abbeele; Christie's Paris, June 12, 2003; [Axis Gallery, New Jersey, by purchase from the above auction]; PUAM, acquired by the above, 2019.

Examiner: Daisy Diamond (Objects Conservation Summer Intern, PUAM; Graduate Fellow, Winterthur/University of Delaware Program in Art Conservation (WUDPAC), Class of 2026)

Consulted: Elena Torok (Associate Objects Conservator, PUAM)
Perrin Lathrop (Assistant Curator of African Art, PUAM)
Jeff Evans (Manager of Visual Resources/Photographer, PUAM)
Lara Kaplan (Objects Conservator and Affiliated Assistant Professor, WUDPAC)
Katherine Sahmel (Conservator and Lab Head for Textiles Conservation, WUDPAC)
Andrea Goldstein (Textile Conservation Fellow, Winterthur Museum, Garden, and Library)
Julia Sybalsky (Conservator, Natural Science Collections, American Museum of Natural History)

Report Date: July 25th, 2024

Contents

1 Introduction

- 1.1 Report Purpose
- 1.2 2019-10 Description

2 2019-10 Detached Cord

- 2.1 Visual Investigation
- 2.2 Earlier Documentation
- 2.3 Conclusions

3 Materials Analysis

- 3.1 Overview
- 3.2 Sinew Reference Stereomicroscopy
- 3.3 2019-10 Stereomicroscopy
- 3.4 Sinew Reference Polarized Light Microscopy (PLM)
- 3.5 2019-10 PLM
- 3.6 Further Research

4 Bibliography

1. Introduction

1.1 Report Purpose

In the summer of 2024, this *umutsha* was brought to the PUAM conservation lab to re-join a detached beaded cord, assumed to originate from one of the ends. However, after investigation it was determined this beaded element belongs to a different *umutsha* outside of PUAM's collection (refer to 2. *Detached Cord*). Additionally, the location and extent of sinew used in this object required further investigation, as the technique of threading sinew with beadwork is one useful characteristic for dating the object (refer to 3. *Material Analysis*). This report summarizes the findings from archival research, stereomicroscopic investigation, PLM, and consultation with conservators who specialize in organic materials.

1.2 2019-10 Description

This belt is an *umutsha* composed of a tightly coiled fibrous material covered with fabric and decorated with rows of small glass beads attached to a backing at regular intervals (fig. 1) (Hosford and Davison 1988). The pink, green, and black beads are attached in patterns distinctive of works from the southern Drakensberg region of South Africa, particularly beadwork made by the Southern Sotho, Lesotho, or Northern Nguni people. Beaded garments like this were a form of personal expression and status, as beads were expensive and often used as currency throughout the 19th century (Petridis and Nel 2011, 105). Foundations for beadwork in South Africa often included grass or other plant material with a backing of goatskin, cotton, canvas, or woolen blanketing (Hosford and Davison 1988).



Figure 1. 2021 documentation of the *umutsha*. Image courtesy Princeton University Art Museum.

2. 2019-10 Detached Cord

2.1 Visual Investigation

This cord has been associated with the object since it entered the PUAM collection. The detached cord was stored as separate from, but associated with, this object. There is a small black thread tied to the base of the cord. Although the cord length, bead colors, and bead sizes are consistent with the rest of the object, the pattern, knotting technique, and cord thickness are notably distinct (fig. 2).¹ Each side of the *umutsha* has eight beaded cords with no area

¹ Documented with an iPhone 15, ISO 64, f1.6, 1/120s, July 2024.

indicative of a fully missing cord. At present, a new housing enclosure has been constructed to minimize deformation caused by prior storage in a folded position (fig. 3).



Figure 2. Detached beaded cord (top) and two beaded cords attached to the *umutsha* (center and bottom).



Figure 3. Previous housing enclosure (left) and new housing enclosure (right).

2.2 Earlier Documentation and Conclusions

In 2011, the *umutsha* was displayed in an exhibition at the Cleveland Museum of Art with the cord attached by the black thread at a slightly longer length than the rest of the beaded cords (fig. 4). In 2003, this *umutsha* was purchased alongside another similar object by Axis Gallery from Christie's auction (fig. 5). Although the image is low resolution, it appears the other *umutsha* has beaded elements with contrast and colors that are more similar to this detached component. The other *umutsha* is also slightly larger, and may have slightly thicker beaded cords consistent with the thickness of this detached cord. It is also possible that this corded element was detached from its original object at the time of auction, as the cord appears much longer than the others in the photograph.

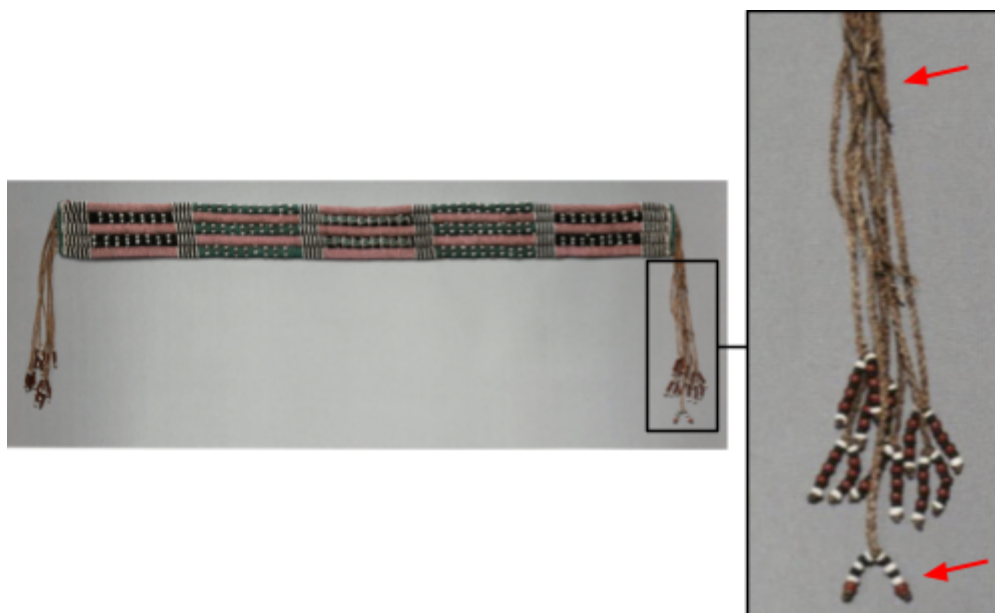


Figure 4. The *umutsha* in a 2011 exhibit at the Cleveland Museum of Art. Upper red arrow indicates the black thread used for attachment. The lower red arrow indicates the presently detached cord. Image courtesy Petridis and Nel 2011.

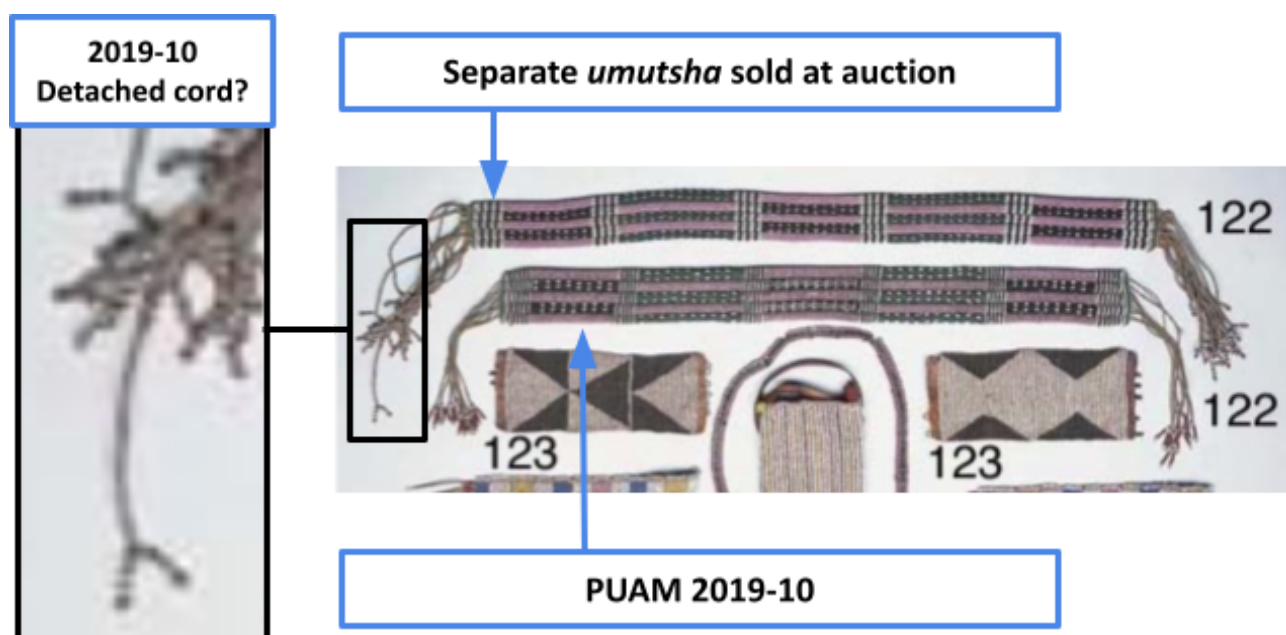


Figure 5. 2003 auction documentation of the *umutsha* 2019-10 (numbered 122, lower) and second *umutsha* (numbered 122, upper) sold together at auction. Image courtesy Christie's 2003, lot 122.

2.3 Conclusions

The detached cord associated with 2019-10 likely belongs to a separate *umutsha* sold in the same auction lot as this object. Perrin Lathrop, Assistant Curator of African Art at PUAM, suggested that it would be worthwhile to contact Gary Van Wyk (garyvanwyk@axisgallery.com) and Lisa Brittan (lisabrittan@axisgallery.com) of Axis Gallery to inquire about the current location of the second *umutsha* and potentially reunite the detached cord with its original context.

3. Material Analysis

3.1 Overview

The beaded and non-beaded sides of the *umutsha* contain sinew, and the beadwork is attached with sinew. The composition of the corded elements is still unclear at this time. Materials investigation was conducted with stereomicroscopy and polarized light microscopy (PLM).

Sinew cordage can have varied appearances based on the animal source, preparation methods, and degradation experienced (figs. 6-8). Sinew is prepared from the tendons of various animals by cleaning, drying, splitting, and twisting the material and could be used for fine sewing, decorative elements, or structural functions. The earliest materials used for beading were twisted vegetable fibers or rolled sinew; these were later replaced by cotton (Hosford and Davison 1988).



Figure 6. Vessel; snuff-box (c. 1880-1900). South Africa. Skin (?), sinew (?), blood (?), glass, and fiber. Image courtesy British Museum (Af1939,15.9).



Figure 7. Top of a needle case (1850s). South Africa (Zulu?). Iron, leather, sinew (?), and fiber. Image courtesy British Museum (Af1859,0908.26.a-b).



Figure 8. Leg ornaments (c. 1877-80). South Africa. Glass, ostrich sinew (?), and leather. Image courtesy British Museum (Af1910,1005.41.a-b).

3.2 Sinew Reference Stereomicroscopy

Lara Kaplan, Objects Conservator and Affiliated Assistant Professor at WUDPAC, provided images of minimally processed deer sinew just starting to be separated into strands and 2-ply sinew cord for comparison (fig. 9). The less processed sinew is fuzzier and slightly more opaque than the 2-ply twisted cord. At higher magnification, individual fibers are visible with crimped texture and non-uniform widths (fig. 10). This sample is from Alaska rather than South Africa, so the species and processing techniques are different from those used for the *umutsha*.



Figure 9. Minimally processed deer sinew and twisted strands from Alaska viewed under magnification. Images courtesy Lara Kaplan (email correspondence, July 2024).

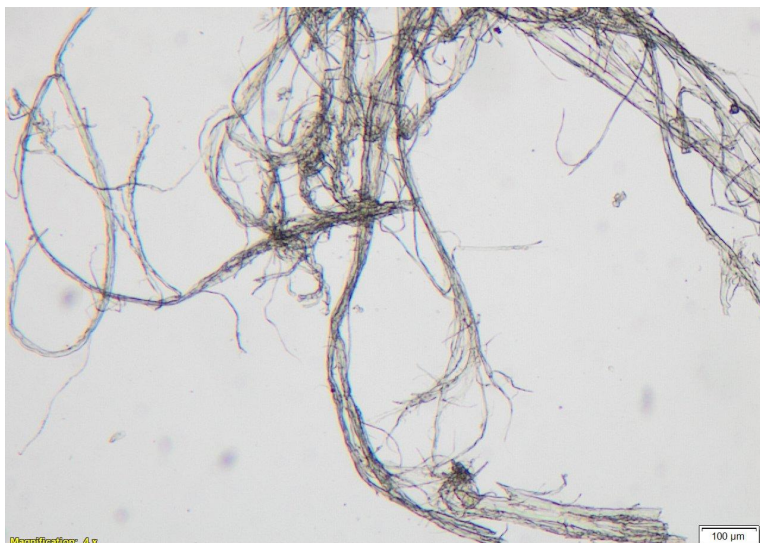


Figure 10. Minimally processed deer sinew from Alaska viewed under higher magnification. Images courtesy Lara Kaplan (email correspondence, July 2024).

3.3 2019.10 Stereomicroscopy

All areas of the object were examined using a stereomicroscope. Sinew is used on this object to attach the beaded elements (fig. 11) and provide structural support (fig. 12).² Sinew cords typically have a waxy and slightly translucent appearance in comparison to the other natural fibers.

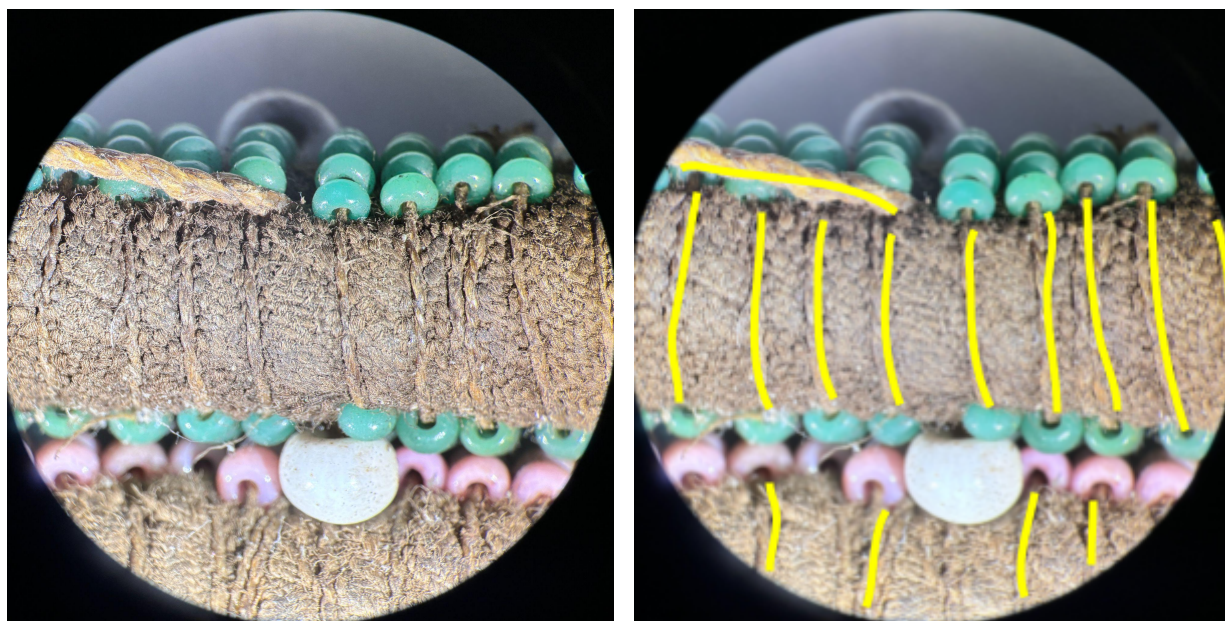


Figure 11. Sinew threads on the underside of the textile used to attach beads (left), diagrammed in yellow (right).

² Figures 11-12 documented through the eyepiece of a Leica M80 Stereomicroscope with an iPhone 15, ISO 64, f1.6, 1/60s, July 2024.

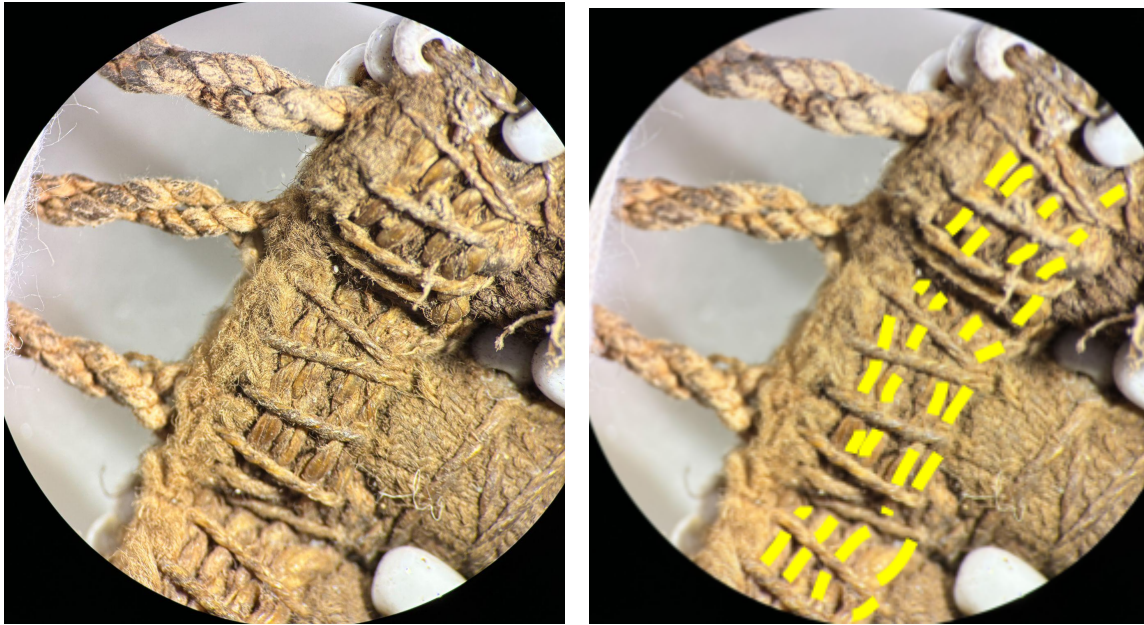


Figure 12. Sinew threads on the underside of the textile used for structural support (left), diagrammed in yellow (right).

The composition of the 16 thicker cords at either end of the *umutsha* cannot be definitively identified as sinew at this time and further analysis may be necessary (figs 13-14).³ Katherine Sahmel, Conservator and Lab Head for Textiles Conservation at WUDPAC, and Lara Kaplan shared through email correspondence that the microscopy images of the *umutsha* have a “fuzzier” and less translucent appearance than what is typically observed with sinew; however, this could be attributed to variation in processing techniques (July 2024). Julia Sybalsky, Conservator of Natural Science Collections at the American Museum of Natural History, agreed that definitive material identification was not possible from the images alone. Julia Sybalsky also indicated that the darker exterior of the cords may not be an applied coating: “both sinew and plant fiber cordage are made from structures that are not homogenous, and naturally have layers; the way the darker areas are split and wound into the cordage is consistent with that idea and may not represent any added material” (email correspondence; July 4th, 2024).



Figure 13. Cord detail.

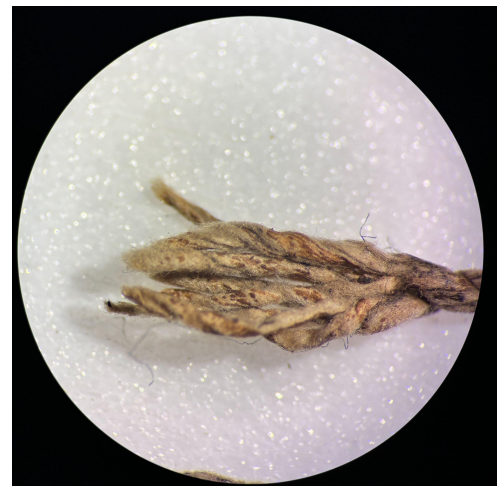


Figure 14. Cord detail, frayed edge.

³ Figure 13 documented through the eyepiece of a Leica M80 Stereomicroscope with an iPhone 15, ISO 80, f1.6, 1/60s, July 2024. Figure 14 documented through the eyepiece of a Leica M80 Stereomicroscope with an iPhone 15, ISO 125, f1.6, 1/120s, July 2024.

3.4 Sinew Reference PLM

PLM reference images of deer sinew from Alaska were captured with an iPhone through the eyepiece of a polarized light microscope by Andrea Goldstein, Textile Conservation Fellow at the Winterthur Museum, Garden, and Library (figs. 15-21). This sample has a positive sign of elongation.

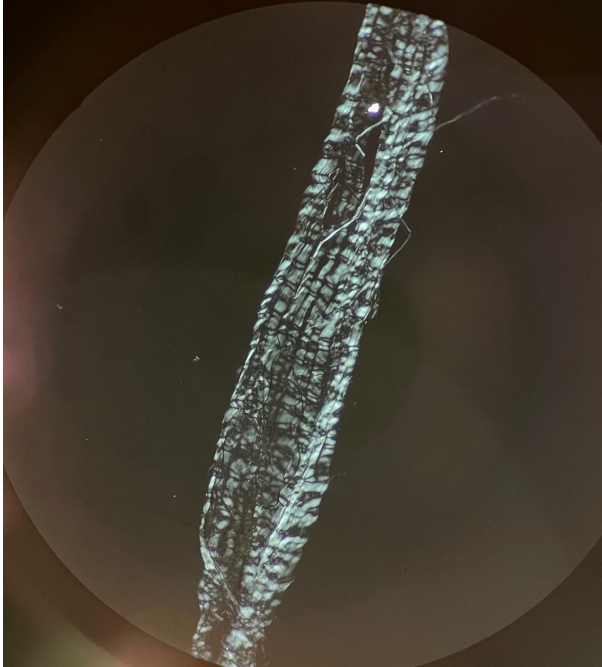


Figure 15. Crossed polars, sinew, 400x.

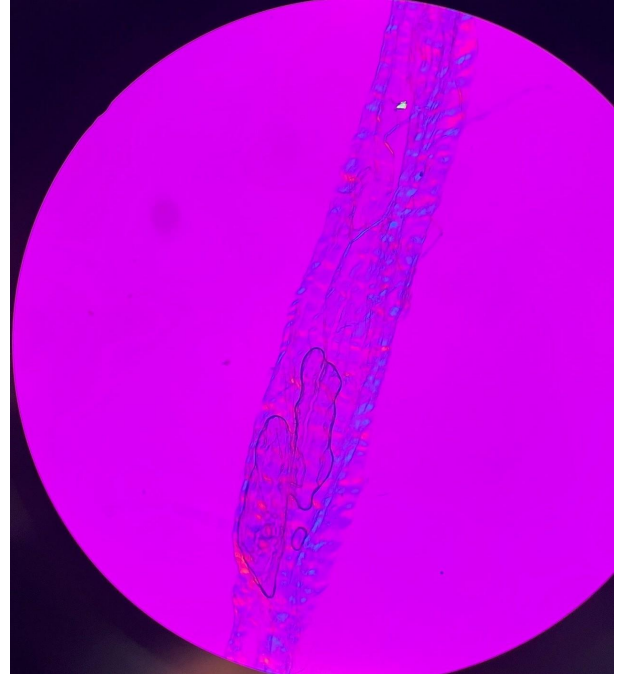


Figure 16. Cross-polars with compensator plate, sinew, 400x.



Figure 17. Crossed-polars, sinew, 400x.

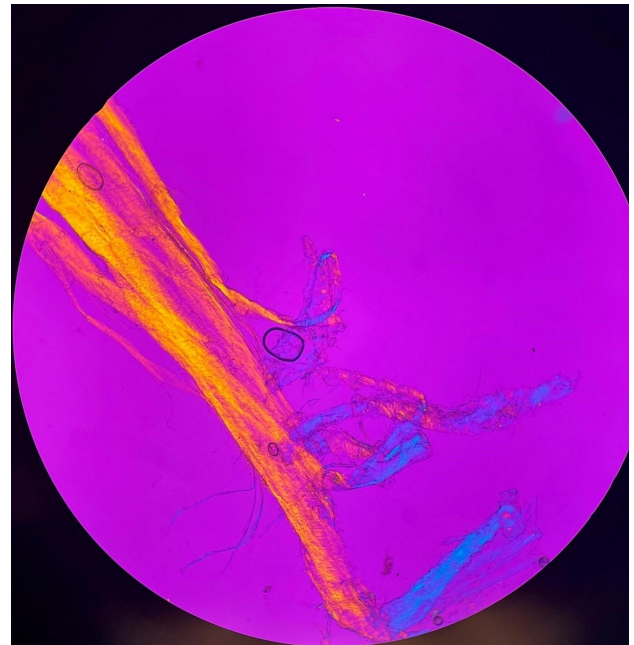


Figure 18. Cross-polars with compensator plate, sinew, 400x.

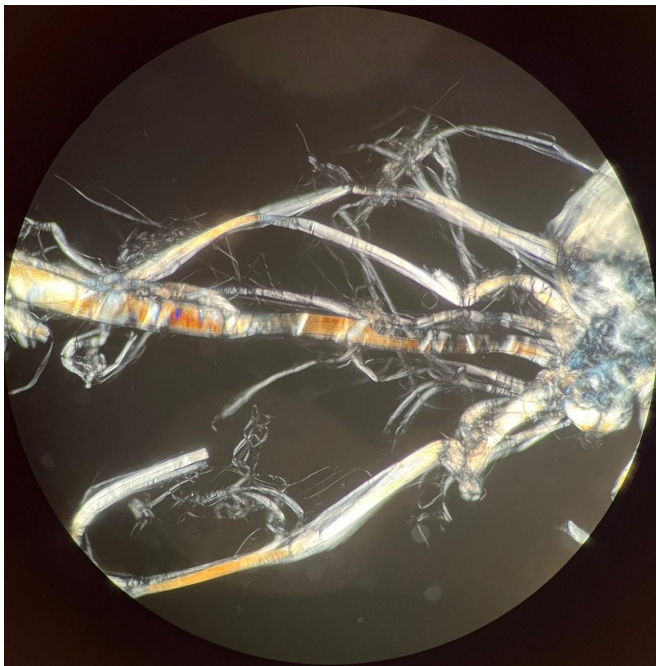


Figure 19. Crossed-polars, sinew, 400x.

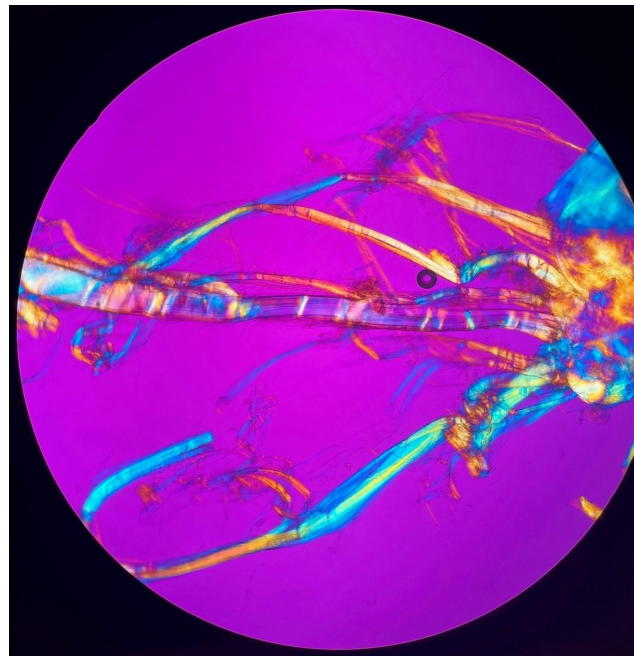


Figure 20. Cross-polars with compensator plate, sinew, 400x.

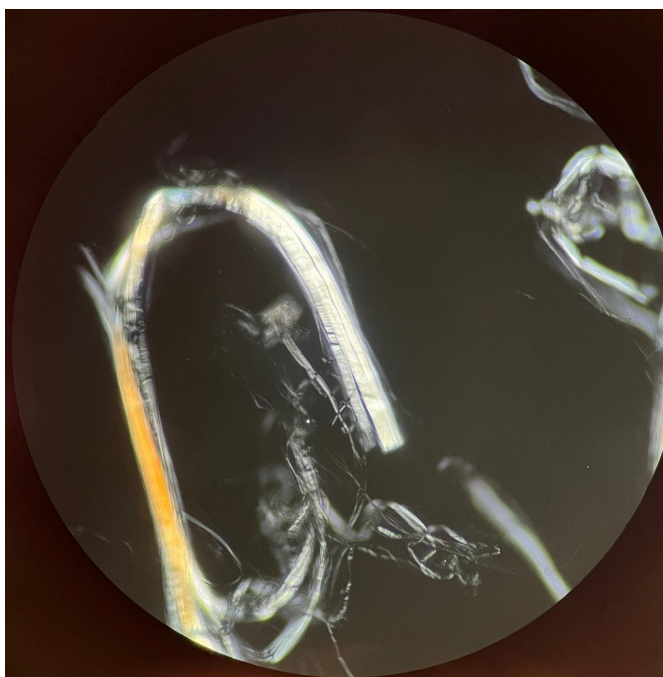


Figure 21. Crossed-polars, sinew, 400x.

3.5 2019.10 PLM

Permission to sample for PLM was granted by Perrin Lathrop on July 1st, 2024 and provided additional insights on the 16 corded elements on either end of the *umutsha*. The corded elements are not cotton due to the absence of helical twists, bast due to the absence of nodes, or wool due to the absence of scales (fig. 22).⁴ The fibers are highly crimped and fine with a non-uniform width and some widening along the ends of fibers (fig. 23).⁵ In the dark field, the material exhibits first-order extinction colors with near-complete extinction parallel to the polarizer and analyzer (fig. 24).⁶



Figure 22. Overall view of fibers. PLM, bright field, 200x (left) and sample location (right).



Figure 23. Widening along the ends of fibers. PLM, bright field, 200x.

⁴ Documented with an iPhone 15, ISO 125, f1.6, 1/60s, June 2024, through the eyepiece of an Olympus BH-2 polarized light microscope.

⁵ Documented with an iPhone 15, ISO 200, f1.6, 1/60s, July 2024, through the eyepiece of an Olympus BH-2 polarized light microscope.

⁶ Documented with an iPhone 15, ISO 1000, f1.6, 1/24s, July 2024, through the eyepiece of an Olympus BH-2 polarized light microscope.

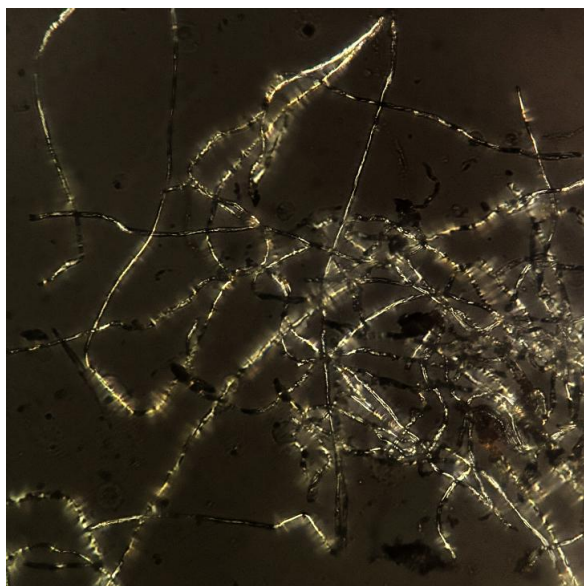


Figure 24. Overall view of the fibers. PLM, dark field, 200x.

3.6 Further Research

Additional analysis would help provide more definitive identification. FTIR and microchemical tests could be performed to confirm the presence of proteins or carbohydrates. The object is self-sampling, so fibers could be analyzed with staining or shrinkage tests (email correspondence with Julia Sybalsky; July 4th, 2024). Additional conversations with conservators who work with sinew and cultural heritage from South Africa would significantly support this materials research.

4. Bibliography

- “Arts D’Afrique: Collection de Mme Van Den Abbeele, Live Auction 5072. Lot 122.” Christie’s, 3 June 2003, www.christies.com/en/lot/lot-4116983?ldp_breadcrumb=back.
- Hosford, June and Patricia Davison, “Conserving Ndebele Beadwork,” *Curator: The Museum Journal* 31, no. 2 (June 1988): 85–95, <https://doi.org/10.1111/j.2151-6952.1988.tb00677.x>.
- Petridis, Constantijn, and Karel Nel. 2011. *The Art of Daily Life : Portable Objects from Southeast Africa*. Cleveland: Cleveland Museum of Art.

Owner: Princeton University Art Museum (PUAM)
Object Number: 2019-8
Artist/Maker: Thembu artist, South Africa
Object: Collar
Date: late 19th–early 20th century
Medium: Glass beads and sinew
Dimensions: 27.9 × 22.2 cm (11 × 8 3/4 in.)



Examiner: Daisy Diamond (Objects Conservation Summer Intern, PUAM; Graduate Fellow, Winterthur/University of Delaware Program in Art Conservation (WUDPAC), Class of 2026)

Consulted: Elena Torok (Associate Objects Conservator, PUAM)
Perrin Lathrop (Assistant Curator of African Art, PUAM)

Report Date: July 25th, 2024

Report Purpose

This object was brought into the conservation lab in the summer of 2024 at the request of Perrin Lathrop to determine the location and extent of sinew used.

Sinew

The beads of this collar are threaded onto sinew and joined in interlocking rows (figs. 1-3).¹ No other fibers were observed under stereomicroscopic examination. Sinew threads are prepared by cleaning, drying, splitting, and twisting tendons from an animal source and could be used for fine sewing, decorative elements, or structural functions. The sinew has a waxy, slightly translucent appearance under magnification.

¹ Documented with an iPhone 15, ISO 100-125, f1.6, 1/120-1/60s, July 2024 through the eyepiece of Leica M80 Stereomicroscope.

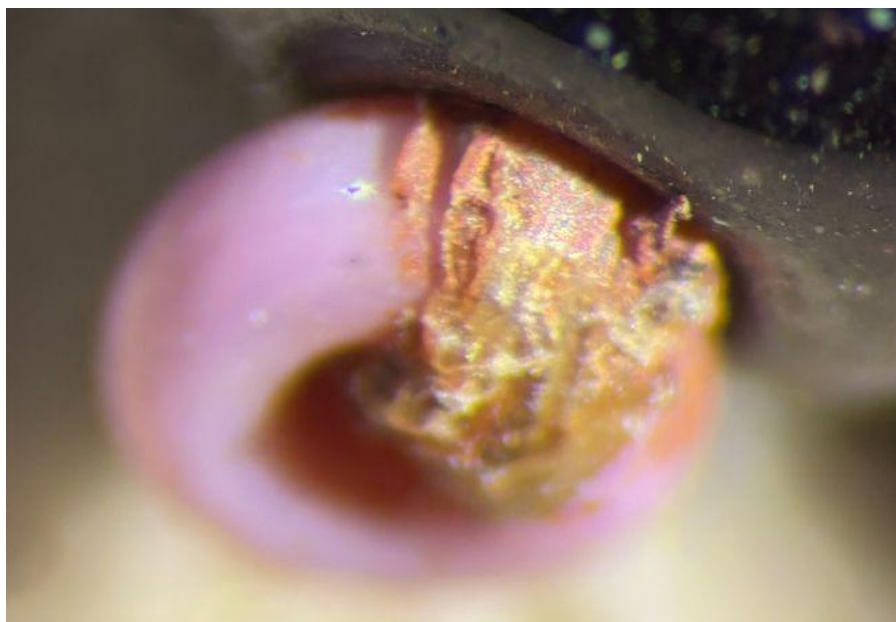


Figure 1. Sinew at the edges of the collar.



Figure 2. Knotted sinew at the edges of the collar.

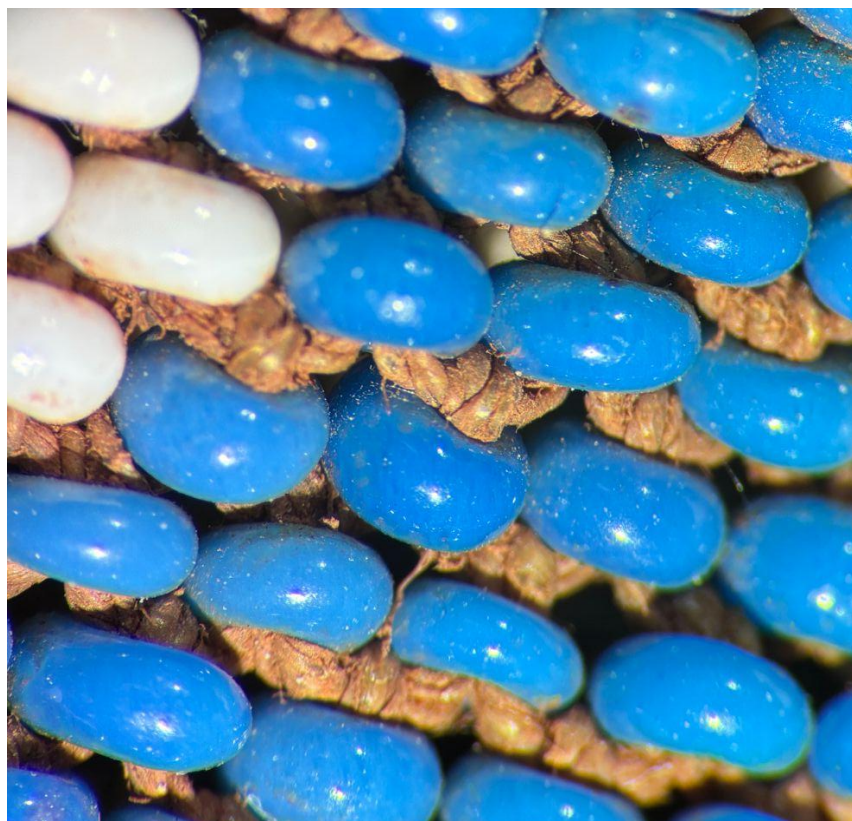


Figure 3. Interlocking beadwork joined with sinew on the collar.

Owner: Princeton University Art Museum (PUAM)
Object Number: 2019-9
Artist/Maker: Sotho artist, southern Drakensberg, South Africa
Object: Apron
Date: late 19th–early 20th century
Medium: Glass beads, sinew, fiber, and seeds
Dimensions: 14 × 20.3 cm (5 1/2 × 8 in.)



Examiner: Daisy Diamond (Objects Conservation Summer Intern, PUAM; Graduate Fellow, Winterthur/University of Delaware Program in Art Conservation (WUDPAC), Class of 2026)

Consulted: Elena Torok (Associate Objects Conservator, PUAM)
Perrin Lathrop (Assistant Curator of African Art, PUAM)

Report Date: July 25th, 2024

Report Purpose

This object was brought into the conservation lab in the summer of 2024 at the request of Perrin Lathrop to determine the location and extent of sinew used.

Sinew

The beads of this apron are threaded primarily onto sinew with some additional fibrous materials present in interlocking rows (fig. 1).¹ Sinew threads are prepared by cleaning, drying, splitting, and twisting tendons from an animal source and could be used for fine sewing, decorative elements, or structural functions. The sinew has a waxy, slightly translucent appearance under magnification. Some elements are joined with fiber, potentially indicative of a repair (fig. 2).² There is also mold observed in regions of contact between sinew and seeds; however this biological activity is inactive at this time (fig. 3).³

¹ Documented with an iPhone 15, ISO 200, f1.6, 1/60s, July 2024 through the eyepiece of Leica M80 Stereomicroscope.

² Documented with an iPhone 15, ISO 80-125, f1.6, 1/60s, July 2024 through the eyepiece of Leica M80 Stereomicroscope.

³ Documented with an iPhone 15, ISO 32-40, f1.6, 1/137-1/120s, July 2024 through the eyepiece of Leica M80 Stereomicroscope.

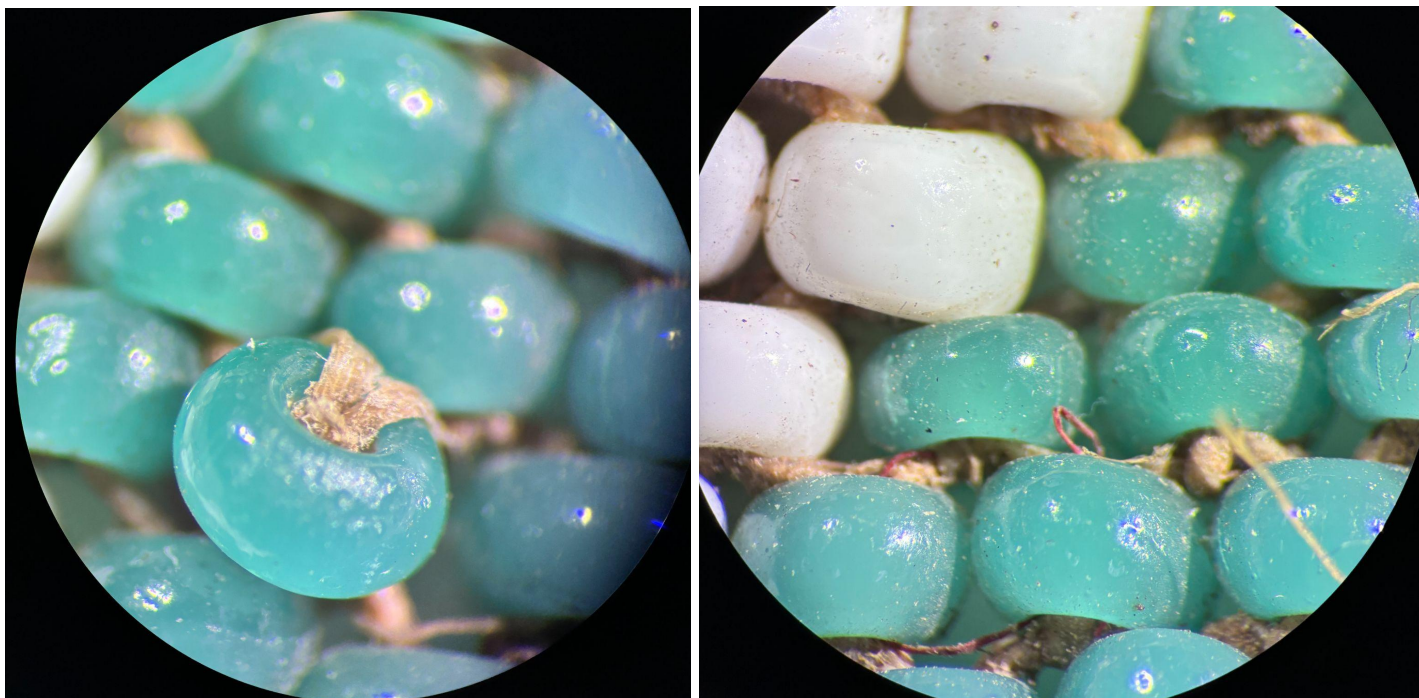


Figure 1. Sinew used to attach beaded elements with some small fibers woven into the beadwork (right).



Figure 2. Sinew (left) and fiber (right) elements.

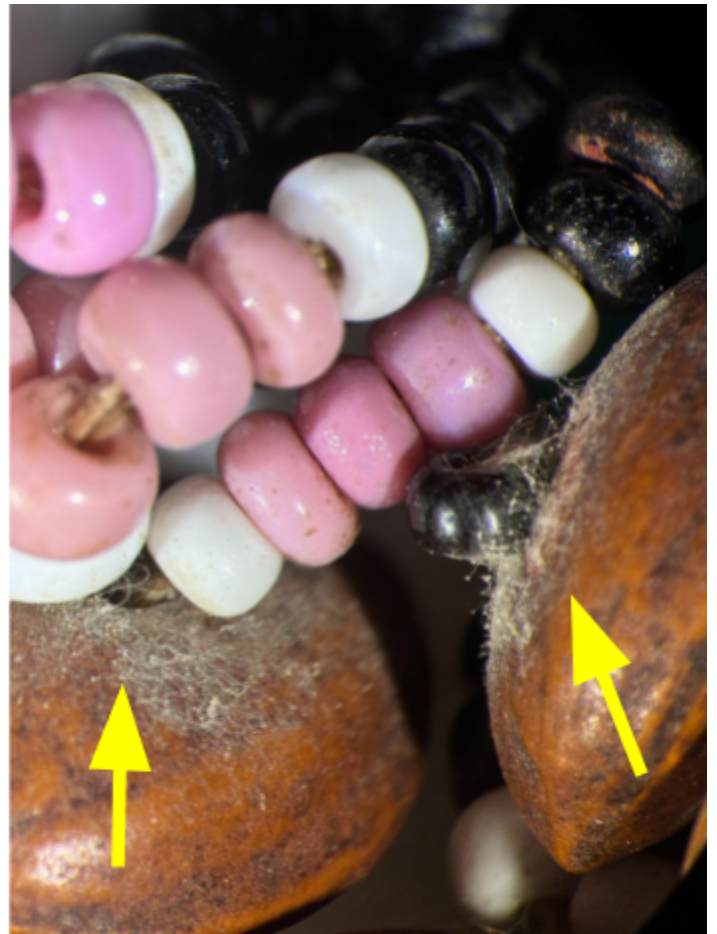


Figure 3. Mold observed where sinew is in contact with seeds along the lower edge of the apron.

