

Scottish mammoth tusks at National Museums Scotland

By Vicen Carrió (1) and Sílvia Da Rocha (Conservation ICON - HLF Funded Intern) (2)
National Museums Scotland, Edinburgh, Scotland, UK; v.carrio@nms.ac.uk and darocha.silvia@gmail.com

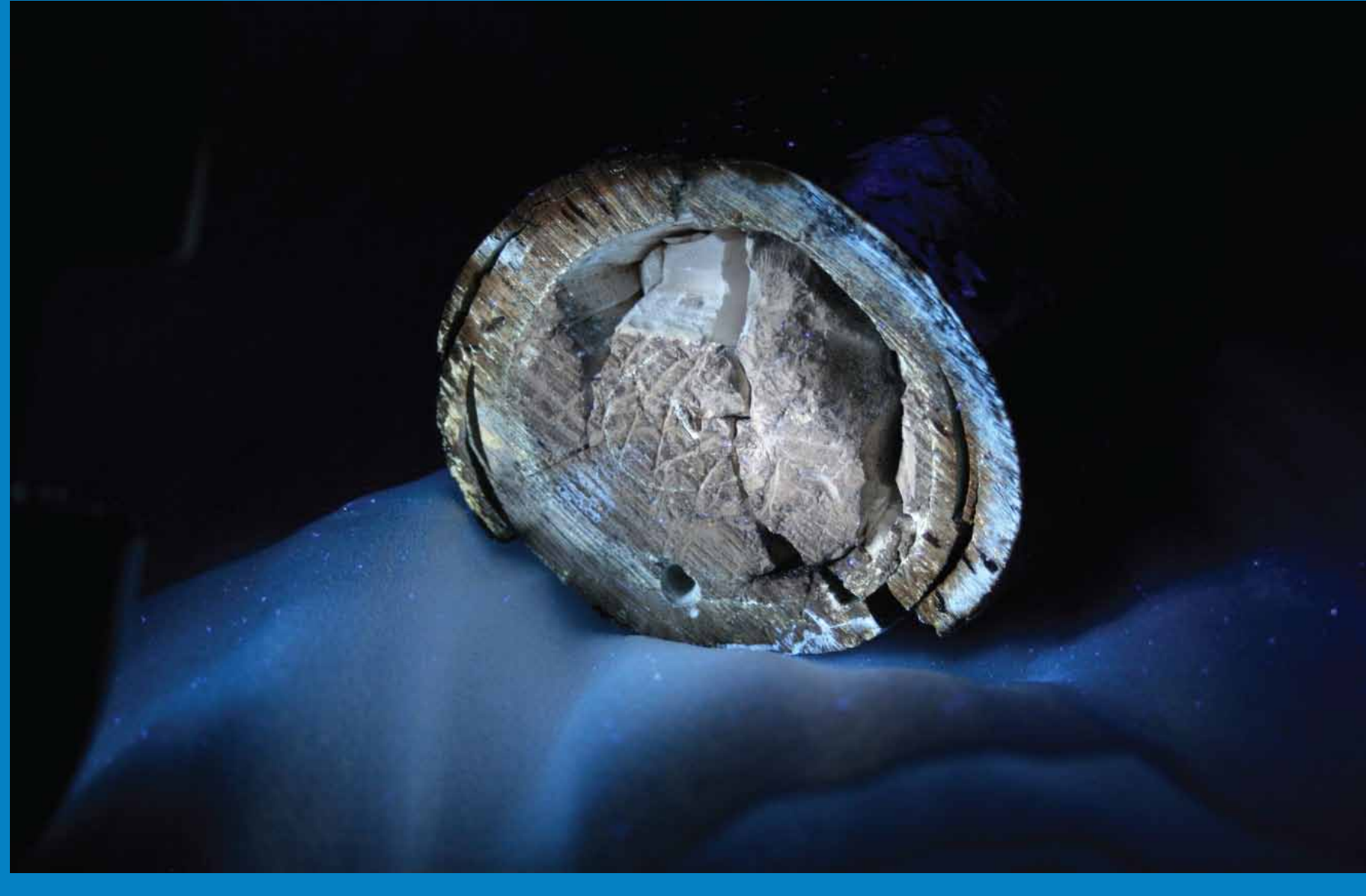
Abstract:

National Museums Scotland in Edinburgh (UK) recently undertook the conservation of several specimens of mammoth tusks from Scotland to compliment a travelling mammoth exhibition from the Field Museum in Chicago. The specimens chosen consisted of one complete pair of tusks (possibly from the same animal), and two partial tusks from two different mammoths. They were registered in the museum's collections in the mid-19th to the early 20th Century. After many years in storage, the tusks had suffered degradation,

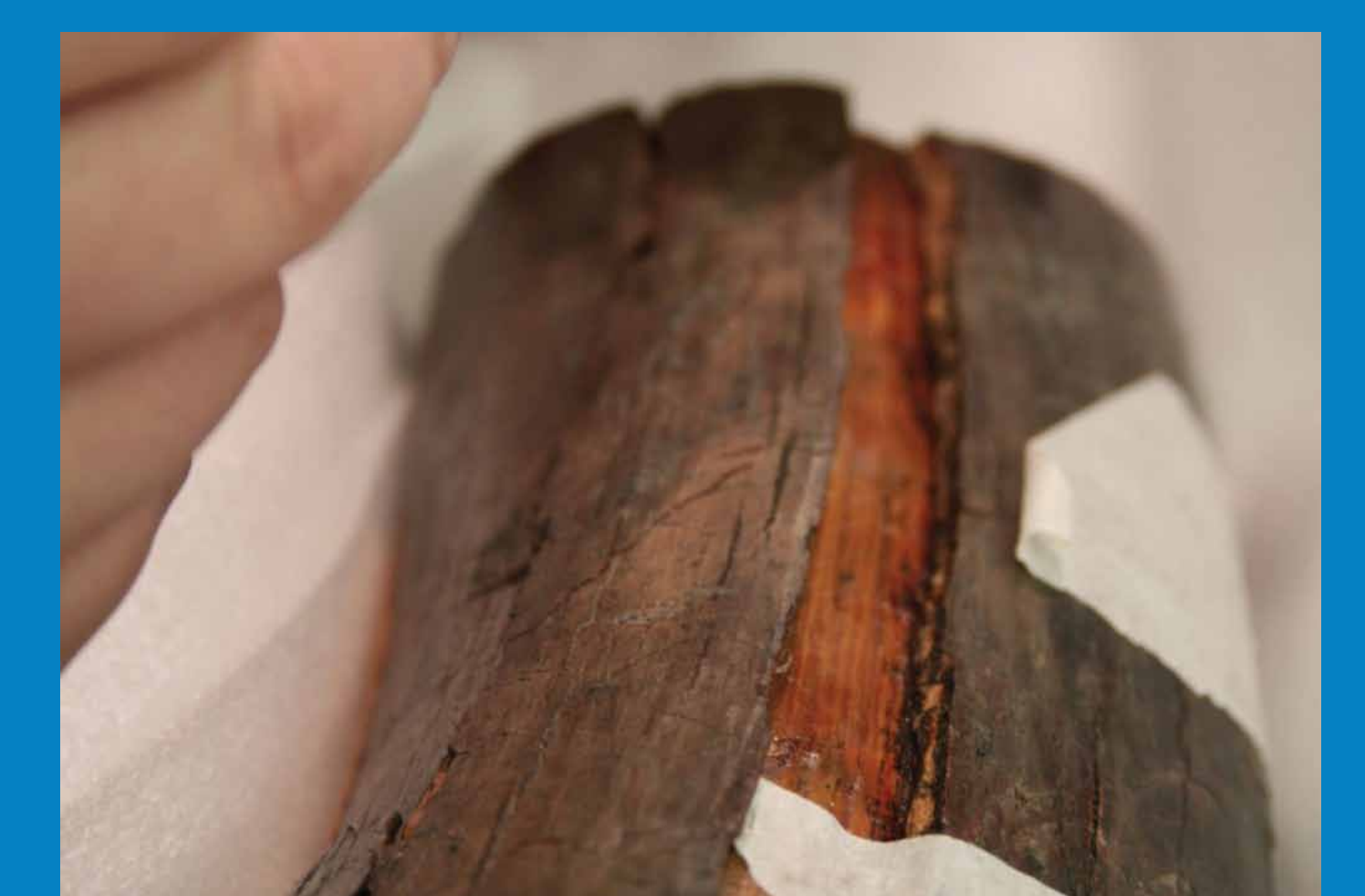
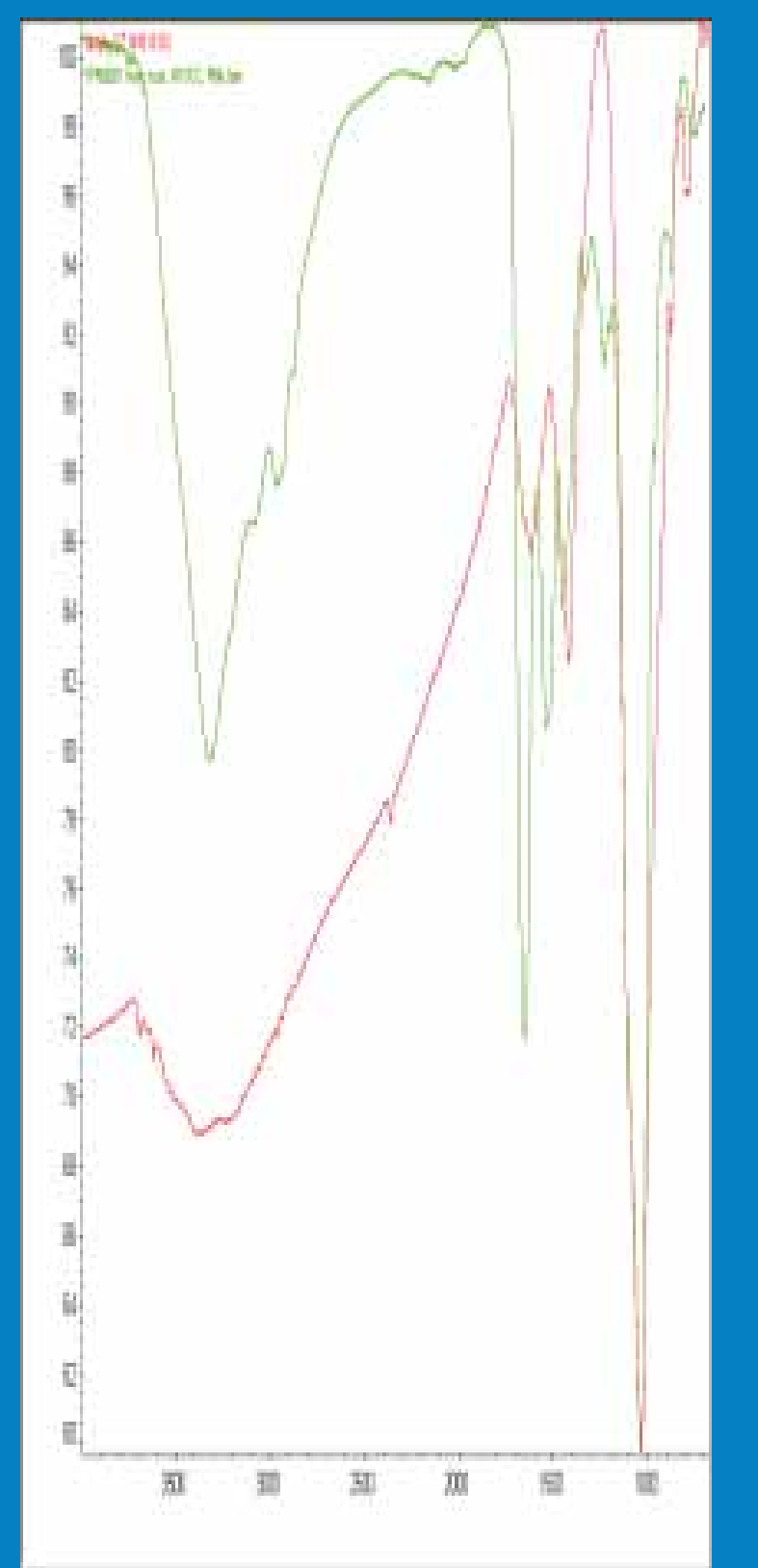
contamination, and subjected to fluctuations in relative humidity and temperature. Some consideration had been given in the past to the tusks' preservation as they displayed signs of previous coatings, mounts, and adhesives. There were no written records of previous storage or treatment, however past conditions were obvious given the physical state of the tusks. Research, visual examination, and analytical examination including UV, FTIR, and C14 was undertaken, after which conservation treatment was begun to reverse the historical treatment and

stabilise the specimens. Initial treatment consisted of the removal of surface dirt, paint residues and coatings. Adhesives such as failed epoxy-based and animal glue applications were removed with solvents, including experimentation with pineapple juice that resulted in the successful removal of the epoxy-based adhesive. These treatments also served to clean the original surface for future stabilisation. Paraloid B72 in varying concentrations in acetone was used as an adhesive and consolidant. Large voids created by the warped and delaminated

layers had led to diminished contact points, requiring the use of a bulk adhesive to effectively join the two surfaces together. Pulled threads of Kozo Japanese tissue paper were used in a Paraloid B72 10% in acetone mixture to create a strong but flexible backing for the top layer. The successful conservation treatment of the mammoth tusks meant they could then be used as part of a lecture series about the history, discovery and study of mammoths in Scotland.



The FTIR analysis of the black efflorescence found in the cementum layer was compared with elephant ivory, indicating hydroxyapatite



Z.1915.5 Scottish Mammoth Tusk

Examination:

- Research of specimen history, including origin, taxonomy, original appearance
- ID specimen with UV light and FTIR. Spectra gathered for ID of unidentified efflorescence (from inside of cementum layer)
- Normal reflected light and UV photographic documentation

Treatment:

- Cleaned surface with IMS and acetone: removal of paint, dirt layer
 - Paper label cleaned with deionised water
 - Use of pineapple juice to dissolve epoxy-based adhesive, after testing on small area; cleared with deionised water
 - Cleaned the inner surface of the unattached layers with deionised water; consolidated with Paraloid B72 5% in acetone.
 - Consolidated all damaged, loose areas with Paraloid B72 5% in acetone
 - Syringed into the cracked, delaminated and vulnerable cementum layers
 - Attaching layers to the specimen surface with Paraloid B72 50% in acetone, further stabilised and adhered with pulled fibres of Kozo Japanese tissue paper, dispersed in Paraloid B72 10% in acetone. Pulp inserted into cavities with tweezers to add stability
- C14 Data dates the task to 27100 ± 200



Colonel Beechey's Mammoth Tusks

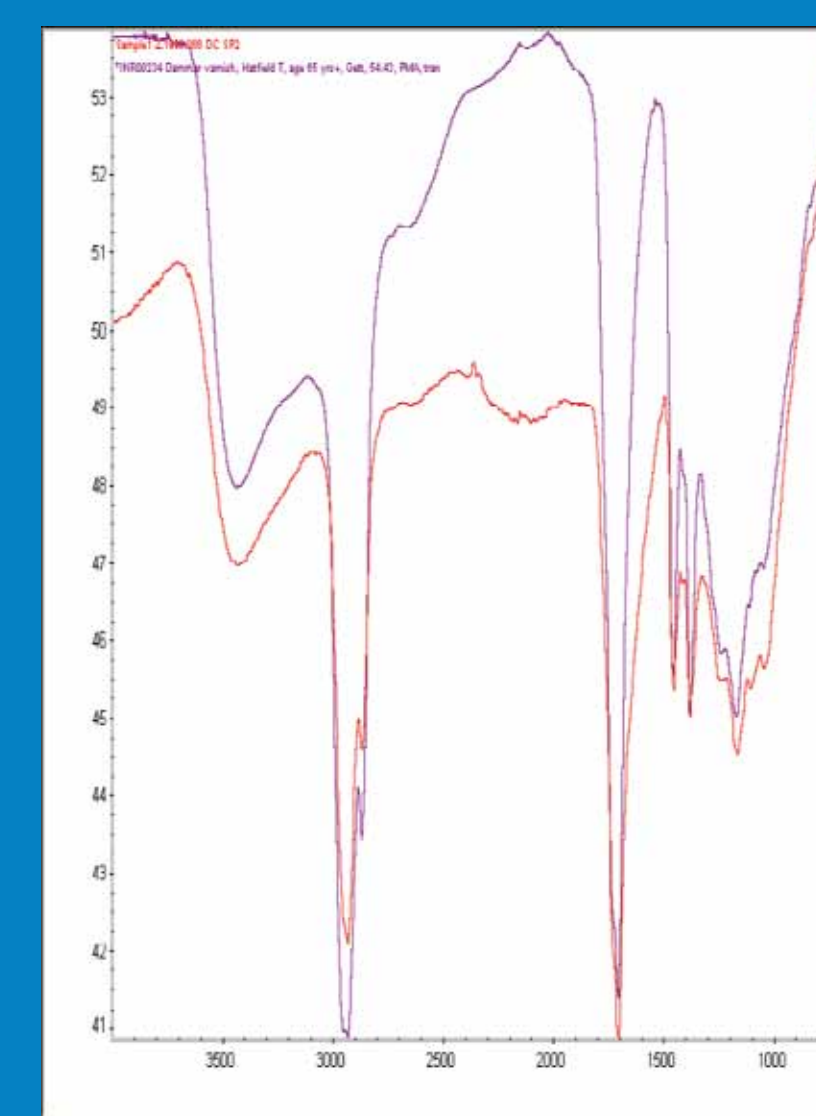
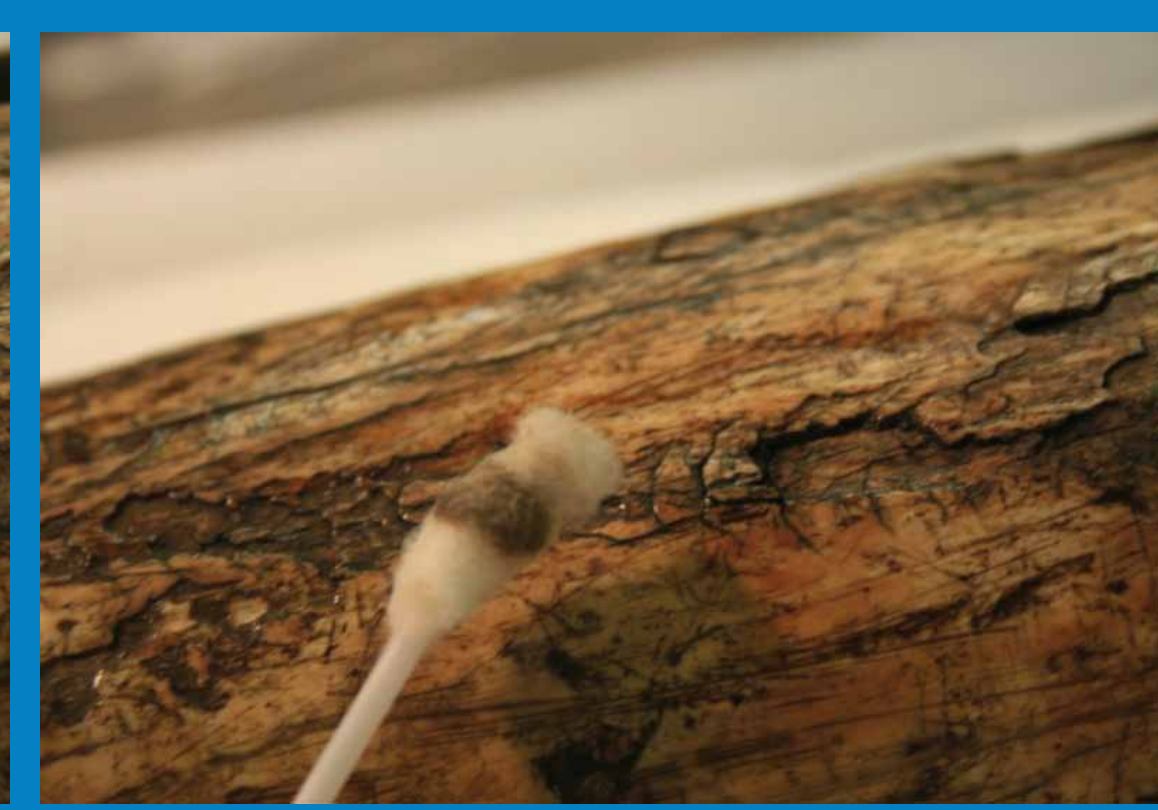
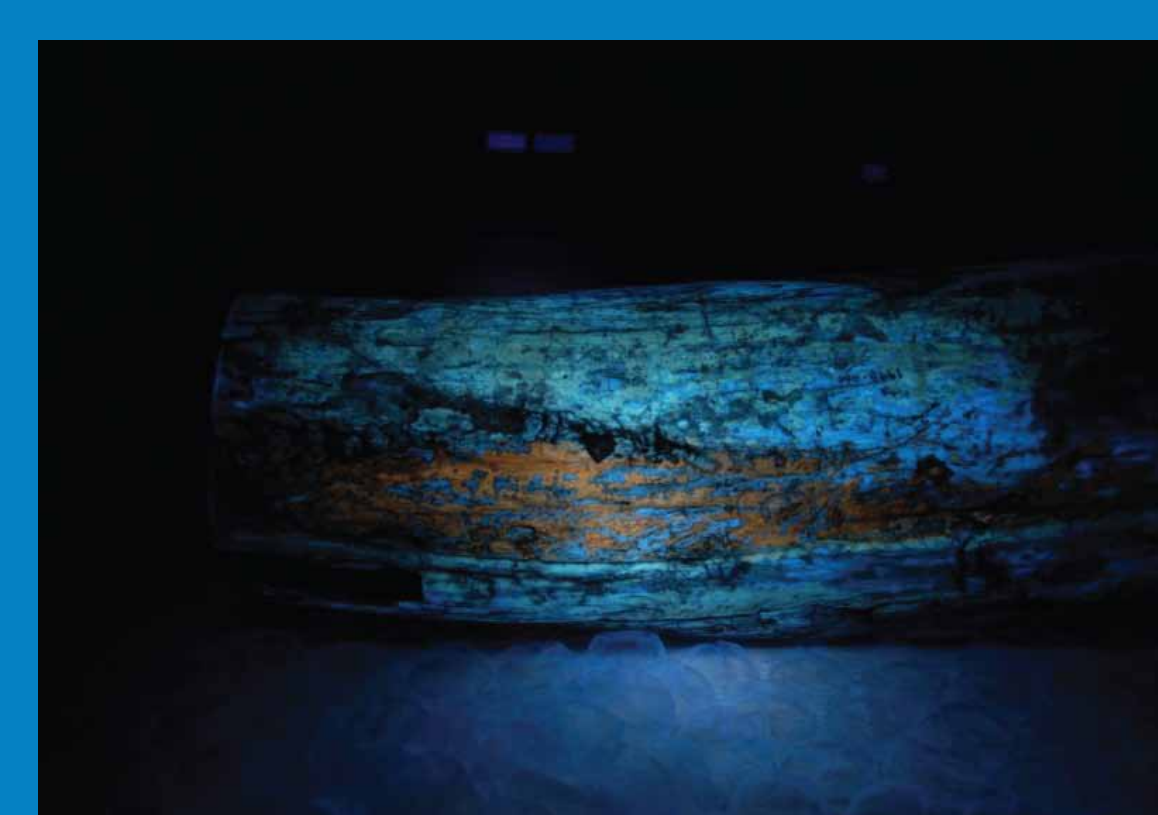
Examination:

- Normal reflected light and UV photographic documentation

Treatment:

- Surface cleaned with vacuum suction and paintbrushes; removing dirt, dust, pebbles, and other material from cracks on tusk surface
- Removal of sample from area of exposed pulp cavity (dentine)
- Removal of further particulates with the use of compressed air (canned)
- Manual removal of small pebbles with tweezers
- Paint removal from all surfaces, drops, smears, and accidental transfer from previous displays
- Cleaning all surfaces with IMS, removal of fingerprints and accumulated layer of dirt from hands, fingers touching surface
- Removal of paint using IMS, scalpel, porcupine quills

C14 Data dates the task to 46600 ± 2200.



Analysis of a coating that fluoresced under UV light, suggesting a resinous coating, probably Dammar

Z.1998.066 Scottish Mammoth Tusk

Examination:

- Normal reflected light and UV photography, documentation
- Research of specimen history
- ID specimen with UV light and FTIR. Spectra gathered suggested an organic coating, probably Dammar

Treatment:

- Cleaned surface with IMS and acetone: removal of paint, dirt layer and coatings
- Paper label cleaned with deionised water
- Use of scalpel and porcupine quill to remove paint on surface
- Consolidated all damaged, loose areas with Paraloid B72 5% in acetone. Syringed into the cracked, delaminated and vulnerable cementum layers

Conclusion

- Historical misidentification of the Mammoth tusks as elephant tusks had led to deterioration. An upcoming Mammoth exhibition gave conservation the opportunity for further study and preparation
- Modern examination such as C14 dating and FTIR contributed to further understanding the tusks
- Conservation concentrated on removing the vestiges of dated treatments and stabilising the fragile ivory structure
- The use of pineapple juice as an enzymatic solvent successfully removed a difficult adhesive
- The tusks are now stabilised, allowing them to be exhibited and studied