Animal Hard Tissues in Cultural Objects

Teaching Targets

This course aims to introduce students of conservation to the structure, chemistry and properties of the hard tissues used in the creation of cultural objects before the advent of modern synthetic polymers. Many of these materials have such desirable qualities that they remain in use today despite the availability of artificial substitutes. Students will also lean about the degradation of these materials, ways to slow or prevent deterioration and possible ways to conserve objects made of these natural polymeric materials.

Outline of Teaching

- What are hard tissues?
- The evolution of mineralized tissues
- The chemistry and ultrastructure of skeletal tissues
- Introduction to bone and antler
- Introduction to tooth dentine and enamel
- The evolution of un-mineralized tissues
- The microstructure of bone, antler dentine and enamel
- The microstructure of horn, tortoiseshell, baleen and feathers
- Deterioration of hard tissues
- Conservation strategies for hard tissues
- Ethical issues in hard tissue preservation

Reading:

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Tripati, S. and Godfrey I. (2007) Studies on elephant tusks and hippopotamus teeth collected from the early 17th century Portuguese shipwreck off Goa, west

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Turner-Walker, G. (1998) The West Runton fossil elephant: a pre-conservation evaluation of its condition, chemistry and burial environment. *The Conservator* 22, 26-35.
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Turner-Walker, G. (for 1998) Pyrite and bone diagenesis in terrestrial sediments: Evidence from the West Runton Fresh Water Bed. *Bulletin of the Geological Society of Norfolk*.48: 3-26. (published 1999)
Turner-Walker, G. (in press) Degradation pathways and conservation strategies for ancient bone from wet, anoxic sites. *Proceedings of the 10th Triennial Meeting of the ICOM-CC Working Group for Wet Organic Archaeological Materials.* H. D.J. Huisman K. Strætkvern (Eds.) *10-15th September 2007.*
Turner-Walker, G. Nielsen-Marsh, C. M. Syversen, U. Kars H., Collins M. J. (2002) Sub-micron spongiform porosity is the major ultra-structural alteration occurring in archaeological bone, *International Journal of Osteoarchaeology* 12: 407–414.

Websites

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http://england.prm.ox.ac.uk/englishness-Working-animal-teeth.html
http://aic.stanford.edu/jaic/articles/jaic32-03-003_indx.html