Radiocarbon Age of Archaeological Consolidants and Adhesives Used in Archaeological Conservation

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Consolidants and adhesives used to conserve archaeological artifacts must be carefully removed prior to radiocarbon dating of the artifact. It is therefore paramount to understand how the artifact was conserved and which conservation products were used in order to determine:

1. the best location on the artifact to sample
2. how to remove the consolidant physically and/or chemically
3. whether or not the consolidant was successfully removed

The first two considerations are a matter of communication between the archaeologist, the conservator, and the radiocarbon laboratory, but the third consideration can be a bit tricky to determine.

The archaeologist usually knows the approximate time period of the artifact given the context in which it was found so when the age is not as expected, it is possible the consolidant was not completely removed. However, without knowing the radiocarbon age of the consolidant – this is purely speculation.

Here we present results from the radiocarbon analysis of 20 consolidants and adhesives commonly used for archaeological conservation. The consolidants and adhesives cover both natural (animal and fish glues, tree resins, starches) and synthetic materials (acrylics, poly (vinyl acetates), poly (vinyl butyrals), polyethylene glycol, glycerol, cellulose ethers, cellulose esters, cyanoacrylates and soluble nylon) and are selected from those commonly in use now, as well as a few that were used historically but are now avoided due to poor aging qualities.

Little is known about what effects conservation treatments used to bond or consolidate archaeological material have on radiocarbon dating. This paper will present data that may indicate in which direction – young or old – conservation treatments may skew radiocarbon dates, the importance of knowing the history of older samples and how these results should be interpreted.

Case Study: Charleston Lake Vessels - dated before and after consolidant removal

Three Charleston Lake samples were selected to test assumptions concerning temporal trends in Middle Woodland decorative motifs - pseudo scallop shell impressed (last half of the first millennium BC) and cord wrapped stick impressed (first millennium AD). The dates confirm these expectations, and refine trends in vessel form. Particularly interesting is the revised Vessel 5 date, as it sits squarely within the revised temporal range for Vinetette I ceramics (Tache and Hart 2013). It is not unique in its antiquity with regard to other ‘Point Peninsula’ dates from southeastern Ontario, such as the Wyght site (Spence et al. 1990); however, it is situated in the problematic Halstatt plateau, thus the precision is low on the calibrated date.

Increasing potential for contamination
Increasing F14C

Group 1. Modern 14C signature
Biologically sourced (plant and animal)

Group 2. Mixed ages
Modified biogenic products

Group 3. 14C “dead”
Petrogenic sources
Synthetic polymers, acrylic compounds

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