Identification of Factors Relevant to Preservation of Claude Laurent's Glass Flutes: Model Studies vs. Actual Observations

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Abstract

The GWU-LOC-VSL team is studying glass flutes made in Paris by Claude Laurent from 1806-1848. Less than 200 flutes exist today worldwide, and 20 are housed in the Library of Congress's Dayton C. Miller (DCM) Collection. The project is aimed at improving care for these rare musical instruments through better understanding of glass deterioration observed in many of the flutes. Initial sampling of glass from damaged joints of two of the flutes enabled composition analyses and direct observation of a modified surface layer resulting from about 200 years of natural aging. These analyses have been supplemented by two complementary lines of inquiry: studies of glass simulants, and continuing non-destructive assessment of the actual flutes (microscopy, surface pH, fluorescence, XRF, fiber optic reflectance spectroscopy (FORS)). Unexpectedly, to date only 2 out of 20 DCM Collection Laurent flutes may be identified as high-leaded "crystal," while the remaining flutes are composed of potash glass formulations. The rarity of leaded glass instruments by Laurent and his workshop has been verified by examination of 21 additional flutes and piccolos in other collections. The two sampled DCM flutes contain only three major components: SiO2, K2O (ranging from 16.5 to 20.5 wt%), and CaO. These types of flutes are prone to attack by moisture, while the leaded glass flutes appear in relatively stable condition. Studies are proceeding toward assessment of the relative risk factors of the potash glass flutes. Simulated glasses of simplified compositions spanning the potassium range, plus two representing the actual flutes sampled, and one PbO-glass were prepared and subjected to aqueous attack by accelerated aging methods. Preliminary results have previously been reported, but this presentation will report the results of more extensive testing, provide quantitative values for kinetics of attack, and highlight variation as a function of composition. Results of the model studies will be compared to recent non-destructive analytical characterization of the actual flutes to assess the preservation needs of these exceptional historical artifacts.

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