

**RESTORATION OF THE CALDER SCULPTURES ATOP
CITY HALL, PHILADELPHIA
A Groundbreaking Preservation Project**

Background

In 2003, the City of Philadelphia launched a plan to address the structural stability and preservation needs of eight heroic bronze sculptures created by Alexander Milne Calder for the clock tower of City Hall, to protect the physical integrity of the architectural and sculptural features. The work is part of a larger, groundbreaking effort to restore the exterior of City Hall.

Clock Tower Sculptures and History

Alexander Milne Calder, who emigrated to the United States from Scotland in 1869, is the first of three generations of Calders who created the Calder sculptures that grace Philadelphia. Alexander Milne spent 20 years creating some 250 sculptures for Philadelphia's City Hall. Included in his creations is the 37-foot bronze statue of William Penn atop the tower, and the eight bronze sculptures that were installed from 1894-1896 above the clocks/clock level: four eagles (perched above each clock face); a Native American warrior with a dog; a Native American woman with a child; a Swedish man with a child; and a Swedish woman with a child and lamb. The sculptures were cleaned and treated for the first time since their installation.

Funding and Key Personnel

- The City of Philadelphia's Public Art Program is steward for over 1000 public artworks.
- Stephanie Naidoff, Director of Commerce for the City of Philadelphia, and Joan Schlotterbeck, Commissioner, Department of Public Property—which includes the Public Art Program—oversaw the project.
- The conservation team was Chicago's Conservation of Sculpture & Objects Studio Inc., directed by Andrzej Dajnowski.
- The project was partially funded by the City of Philadelphia (\$1,150,000) with generous support from The Pew Charitable Trusts (\$450,000), Save America's Treasures (\$300,000), the National Endowment for the Arts (\$80,000), and the Getty Foundation (\$75,000.)
- Andrew Lins, Senior Conservator of Decorative Arts and Sculpture at the Philadelphia Museum of Art, served as the City's oversight conservator for this project, providing analytical support together with a review of the previous treatment of William Penn and an inspection of the supports for the sculptures with Adam Jenkins of the Museum's conservation department.
- Vertical Access, led by Kent Diebolt, inspected the exterior of the building to prepare the scope of work for conservators' proposals.

Phases of Work and Timing

- Hands-on work began in spring 2005.
 - Workers spent much of the first year removing and replacing some 2,500 corroded iron bolts and fasteners with custom fabricated bronze and stainless steel, conducted a thorough cleaning of interior of sculptures, stabilized the cast iron mounting plates, and patched weakened bronze.
 - Workers cleaned corrosion from the exterior surfaces of the bronze, freshly patinated the bronze to match the brown-black patina of the William Penn sculpture on top of the tower, and applied a protective clear coating.
- Work was completed in October 2006.

FACT SHEET

- In spring 2007, the sculptures will be illuminated with a new lens system, and an interpretive plaque will be installed at the north entrance to City Hall to provide information about the sculptures' historical context.

Groundbreaking Laser Technology

- The sculptures were cleaned with the latest models of laser technology. Using highly energized pulses of light, laser cleaning vaporizes the corrosion and particulates, like dirt and soot, on the surface, producing gases and fine powder that are readily contained.
- Lasers have never before been used for a project of this scale.
- The cleaning and conservation treatment (cleaning, patination and protective coating) are expected to last 15-20 years.
- Lasers remove the greenish-blue copper sulfate and chloride corrosion and red copper oxide on the bronzes.
- The corrosion attack on the bronzes has been caused mainly by gaseous pollutants like sulfur dioxide, acid rain, wind-borne particles and salts from industrial sources, and moisture in the air.

Scientific Analysis

- Conservation scientists at the Philadelphia Museum of Art studied the copper corrosion products using specialized analytical instruments for fine art conservation, including X-Ray Powder Diffraction, Infrared Spectroscopy, and Scanning Electron Microscopy.
- Scientific analysis is necessary to monitor the removal of the corrosion. Failure to completely remove active corrosion species would result in premature failure of the protective coating system and catalyze future deterioration of the priceless sculptures.
- As a result of the analytical work to monitor the cleaning process, new insights about the interaction of the laser beam with weathered bronze surfaces emerged, including an understanding of micromelting and microcratering from vaporization of some components of the corrosion.

Other Facts

- Together, the eight sculptures weigh over 70 tons.
- The figures are 24' high, and the eagles have a wingspan of 15 feet.
- The figures weigh approximately 24,500 to 28,600 pounds. The Eagles weigh approximately 9,000 pounds.
- The sculptures are constructed in pieces and are bolted together, making hollow forms. As part of the initial research, workers removed, studied, and test cleaned the 125-pound big-toe portion of William Penn's shoe.
- A significant part of the black encrusted substance on sculptures likely dates back to the first decades of exposure to the coal that fired the nearby locomotives.