Dome restoration gives hall new lease on life

Statues get fiber glass facelift

by Earl Cain

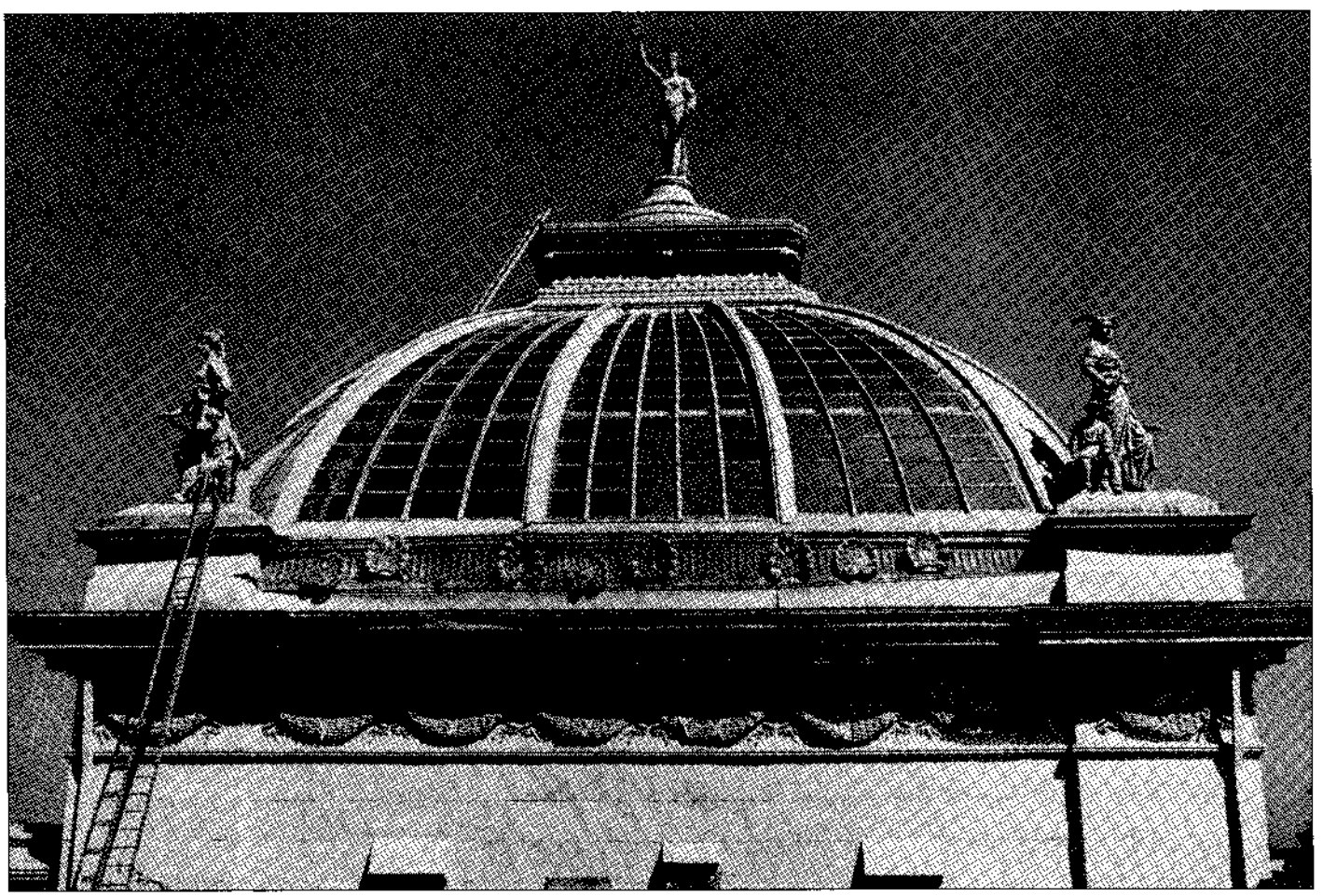
There's no greater test of a contractor's skill and ingenuity than a rooftop renovation. Installing state-of-the-art roofing on a building of historical or architectural significance presents problems that will never be encountered on a standard reroofing job. Often, the greatest threats to the weathertight integrity of the roof are the very elements that must be preserved or refurbished.

One of Hamada's most challenging renovations was the metal-domed roof of Philadelphia's Memorial Hall. Hamada was contracted by the Fairmount Park Commission, City of Philadelphia, to restore the roof's ornamental metal work.

Nothing about the Memorial Hall project was easy. Years of neglect had turned what one reporter called "the city's most often seen, least often visited landmark" into an architectural hazard. City officials had closed off the dome's rotunda because they feared the roof would tumble down around visitors' heads.

The dilapidated dome's ornamentation only hinted at the building's illustrious past. The Hall was built in 1875-76 by the City of Philadelphia and the Commonwealth of Pennsylvania to serve as an international art gallery for our nation's Centennial exhibition.

Earl Cain is executive vice president of Hamada, Inc., a Philadelphia-area firm specializing in roofing and sheet metal. On the Memorial Hall project, former NRCA president Robert Linck was the consultant.



Hamada's renovation of Philadelphia's Memorial Hall begins with a trail of ladders leading to the top of the Hall's dome.

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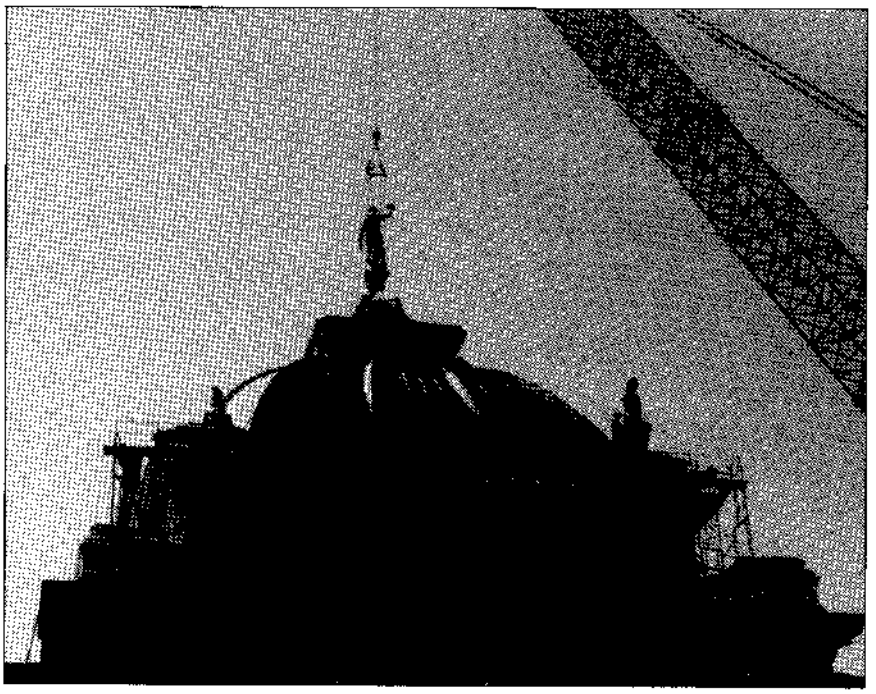
The structure is the only major building remaining of the 249 built on the Centennial grounds.

The area around the Hall is now called Fairmount Park, and the Park's administrators currently use the Hall as their headquarters. Once the Hall is fully restored, the Park Commission hopes to schedule balls, exhibitions and events in the building. These are activities that used to be held regularly in the Hall until the roof's condition became hazardous.

The Great Hall of the building is enclosed with a double-glass dome rising 150 feet above the ground. Commuters on Philadelphia's Schuylkill Expressway can see the top of the building poking through the trees as they drive by. The restoration of the dome's metal work included extensive repairs to the dome itself as well as to the seven statues mounted on the dome and entrance hall area. In addition, Hamada was to rebuild the perimeter balustrade and water table, repair 32 garlands mounted on the dome's four elevations, and install a new anchoring system to keep snow and ice from tearing loose the 44 decorative shields mounted at the base of the dome.



The statue "Columbia" rises from its moorings during the hoisting operation that brought five of the dome's statues to the ground for repairs.

The statues were set down inside a fenced compound where workers refurbished them with solder and fiber glass-reinforced epoxy.

Flashing statues

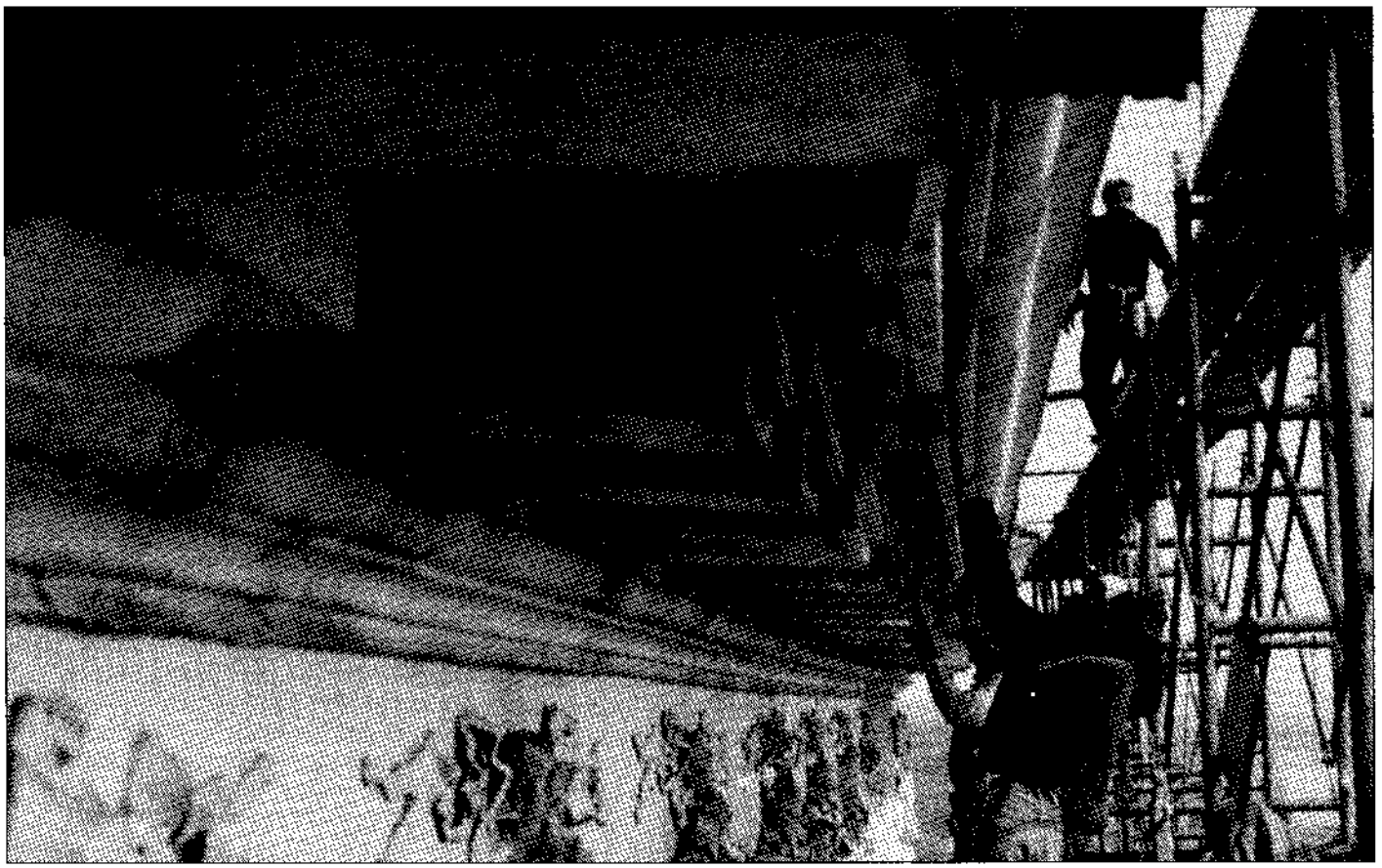
The project began in September of 1984. Bill Pompilii, Hamada's project superintendent, determined to use two separate crews. The sheet metal roofing crew's assignment was to replace the old sheet zinc water table at the base of the balustrade. The workers used flat seam roofing made of 20-ounce, lead-coated copper for the job.

While the first crew worked on the water table, a second crew repaired the flashings at the base of the dome's sculptures. The four statues depicting agriculture, commerce, industry and mining were mounted at the corners of the dome's base. A fifth statue, titled "Columbia," was affixed to the top of the dome. Each sculpture consisted of two figures, one about 12 feet high and the other in a sitting position about 6 feet high, mechanically joined at the base.

Pompilii's plan was to remove the five works of art and their original zinc and lead flashings from the building, and store them in a secure area on the ground. According to the specifications, the crew was to tear off the flashings first and then carefully lift the statues and the steel base plates on which they were mounted from the roof and lower them to ground level with a crane. The statues were to be inspected and repaired while the new steel plates and flashings were being installed on the dome.

The new flashing system was intended to correct the original design's flaws. With the statues on the ground, a new half steel plate was to be installed with the same configuration as the one removed at each location. Over this plate an 8-pound lead separator sheet and new 20-ounce, lead-coated copper flashings were to be tied into the dome surfaces. When reinstalled, the statues would be isolated from the flashings, eliminating the works of art as a source of leaks.

This, at least, was the plan. But, "A contractor who tackles or specializes in restoration work soon learns to expect unforeseen problems," stated Vince Carroll, Hamada's project manager. Workers on this project ran into difficulties as soon as the old flashings were removed from the corner statues' bases. They discovered that each of the base plates under the statues was not in one piece as they had expected. Instead, the plates had been installed in four separate sections. The



plates, which were made of 3/4-inch-thick cast iron, were also badly deteriorated from exposure to water, which had been penetrating the flashings for years.

The best laid plans...

These unwelcome discoveries threw a monkey wrench into the plans because each base plate was to support the statue to which it was attached as the statue and plate were being hoisted from the roof. The statues, being made of cast zinc with light steel flat bars for interior support, were too fragile to support themselves during this operation.

The problem was solved by leaving the cast-iron plates bolted to the gerry beams they were attached to on the roof, and lifting the statues, base plates and gerry beams as a single unit. After the statues were on the ground and securely supported, the gerry beams were removed and returned to their original locations with the new 1/2-inch steel base plates attached. The statues were separated and lifted off the old cast-iron plates and were remounted on new 1-inch, hot-dipped galvanized steel plates.

A ceremony held during the dramatic raising of the statue "Columbia" from its perch atop the dome marked the beginning of the restoration project. As a crane hoisted the statue aloft, journalists gathered around to take pictures and listen to representatives of the Park Commission explain the reasons for the restoration of the building. A few weeks later, an article describing the renovation project appeared in a Sunday edition of the *Philadelphia Inquirer.*

Repairs proceed on the ground

The cast-zinc corner statues were repaired by soldering where it was feasible. For repairs too large to solder, Carroll researched and proposed that a two-component epoxy resin reinforced with a fiber glass mesh be used. To protect the statues from exposure to the weather, they were painted with a ply-lastic vinyl coating.

Repair procedures for "Columbia," the statue mounted at the top of the dome, were a little different. This piece was the only statue fabricated with sheet copper over a steel flat bar frame. When Pompilii examined the statue, he found that its exterior sheeting had broken loose from the frame in many places. To remedy this condition, the workers cut an access hole in the back of the statue and

In addition to repairs to the dome and statues, workers also installed a new gutter at the base of the dome, and made fascia, cornice and dental repairs where necessary.

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installed new copper structural supports, securing the exterior skin to the frame. Then, new 20-ounce copper sheeting was soldered onto areas of the statue that were worn and weakened by stress.

Repair work was also performed on two larger cast-zinc statues mounted at the balustrade level. These statues, which depicted the arts and education, were refurbished in place in the same manner as those lowered to the ground.

Other work performed as well

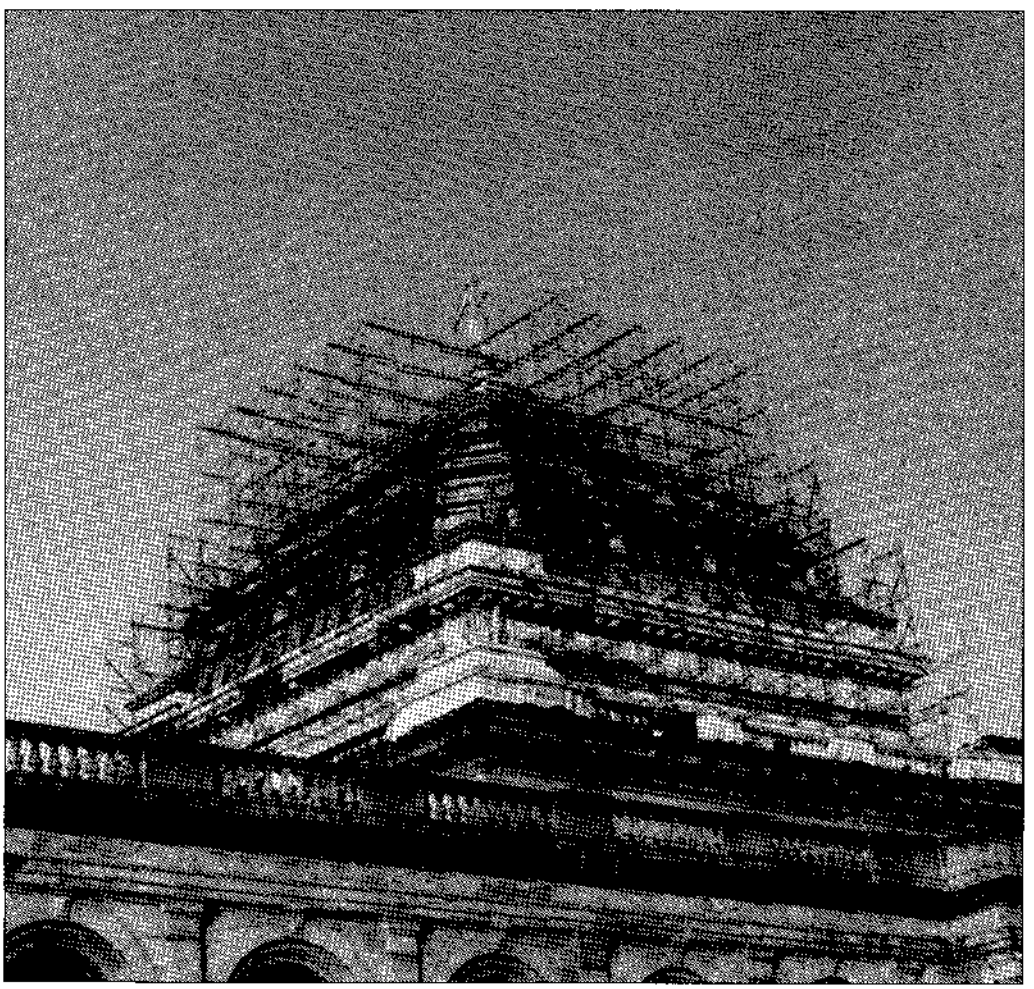
While repairs were being made to the statues on the ground, the flashings on the statues' bases were completed. Additional work included the installation of a new 32-ounce, lead-coated copper gutter at the base of the dome, and fascia, cornice and dental repairs where necessary. Once this work was completed, the statues were hoisted to their original locations and secured.

With the statues back in place, the crews could erect a scaffold from the balustrade level to the top of the dome. This allowed workers to replace the dome's broken and cracked glass, install new flashings at the top of the dome, and repair or replace girter and mullion covers. The workers also cut out and replaced all the weathered sealant installed around the existing glass. The dome was finished with a ply-lastic vinyl coating.

While the statue and dome work were in progress, the water table was completed and work on the balustrade was started. The entire balustrade was stripped and rebuilt. This required the fabrication of three different ogee moldings and cornice sections, and 208 balusters. Because the Hall was built more than 100 years ago, its construction was less than precise. This made it necessary to fit the 182 miters fabricated for each section at the jobsite to compensate for the building's varying dimensions.

Work on the Hall continued through the fall. The last scaffolding was removed in December 1985, marking the completion of this phase of the restoration of Memorial Hall.

Hamada is particularly proud of its contributions to this project. Using the almost-forgotten skills of the 19th century, our sheet metal craftsmen helped save a Philadelphia landmark. The satisfaction that comes from knowing that a part of the city's past has been preserved more than compensates for the headaches inevitably experienced with this type of work.



The dome peeks out through a thicket of scaffolding, erected to give workers access to the dome's broken glass.