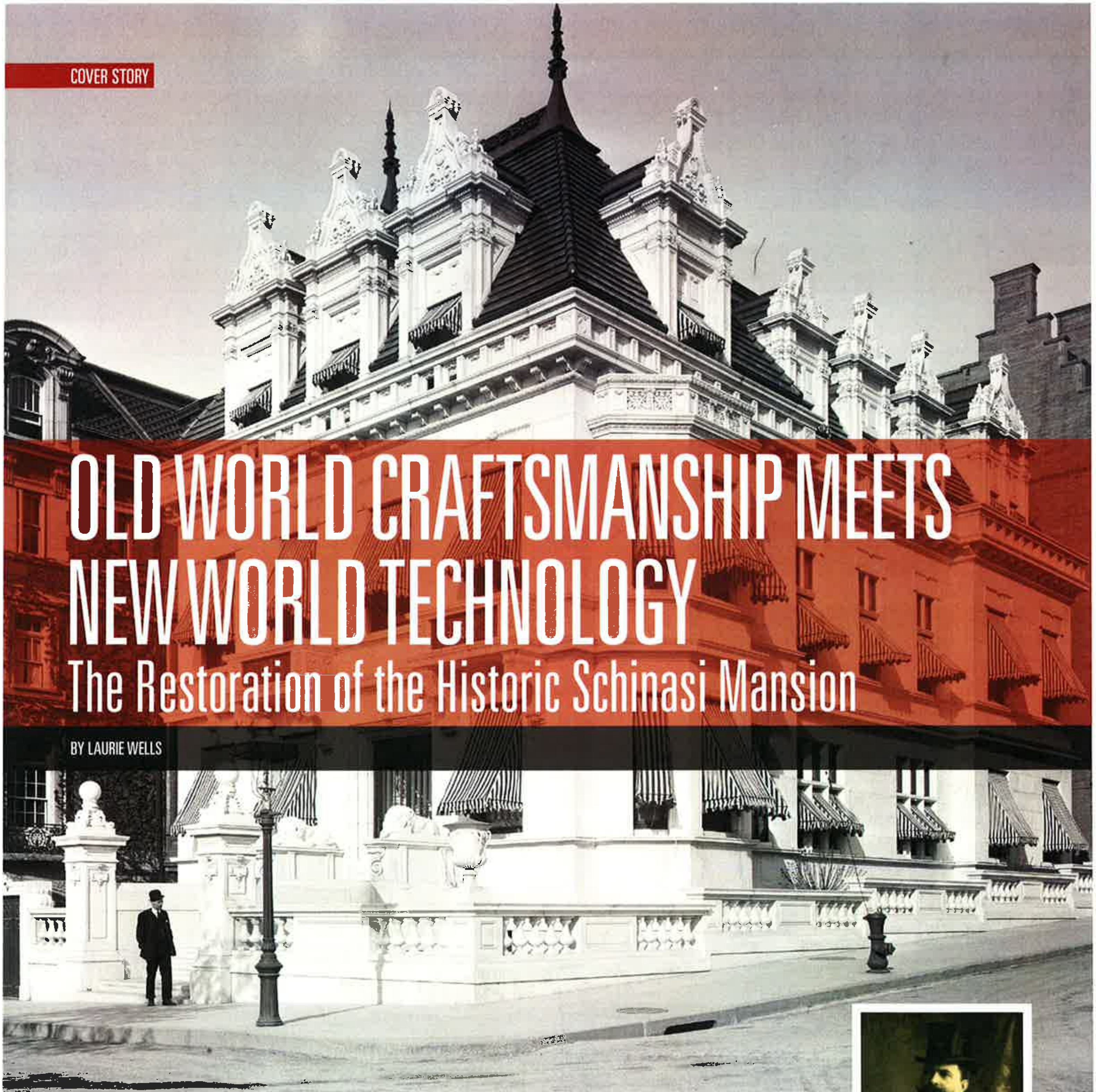


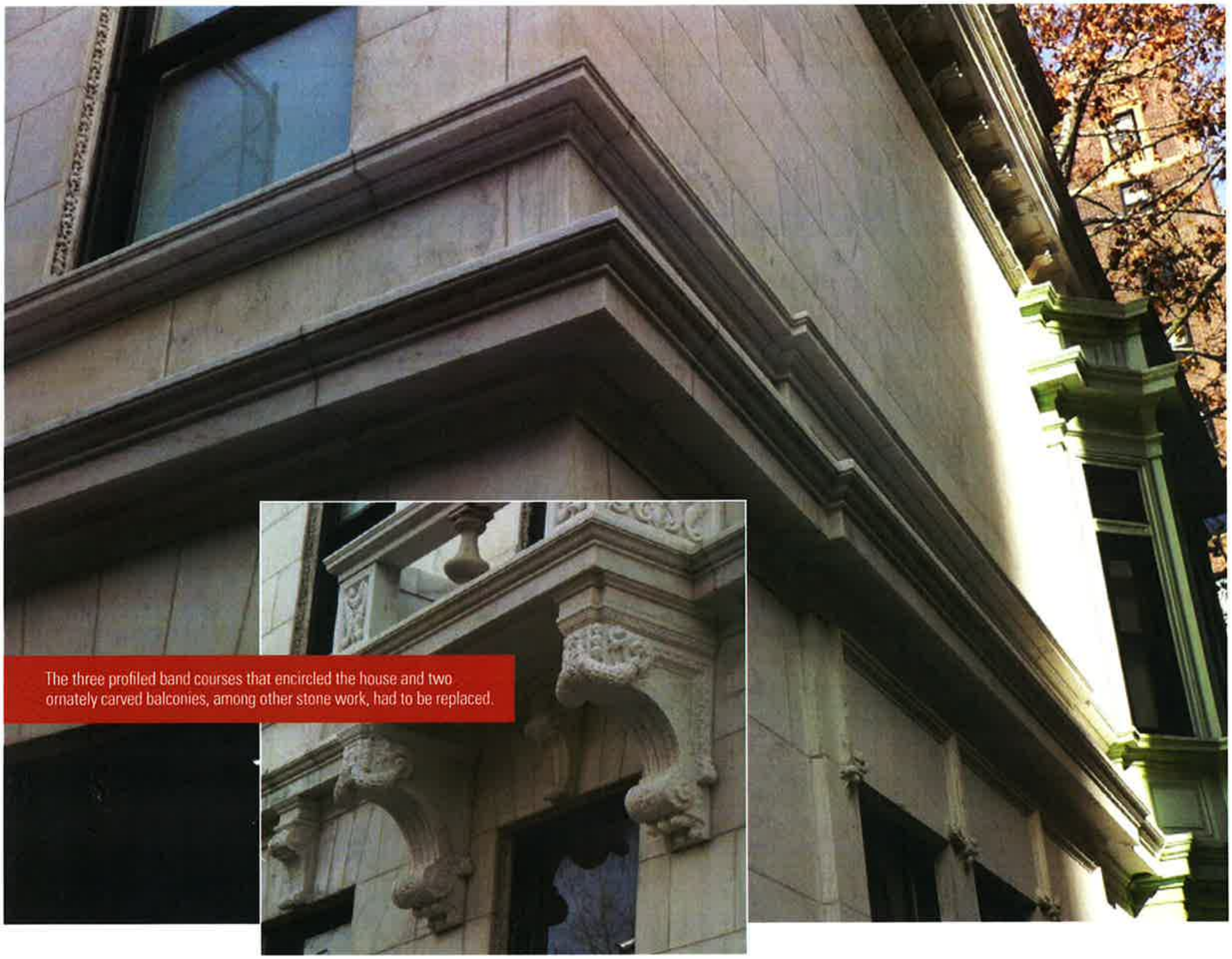
OLD WORLD CRAFTSMANSHIP MEETS NEW WORLD TECHNOLOGY

The Restoration of the Historic Schinasi Mansion

BY LAURIE WELLS

Morris Schinasi, a young Turkish immigrant, arrived in America in 1892. His brother Solomon followed soon after. Using a US$25,000 start-up loan from a friend, they established the Schinasi Brothers Cigarette Company, specializing in the use of imported Turkish tobacco. The following year they exhibited their cigarette rolling machine at the Chicago World's Fair. Up until this time, every cigarette had been hand-rolled.

In 1907, the success of their entrepreneurship enabled Morris Schinasi to engage the services of American architect William B. Tuthhill, renowned architect of New York City's Carnegie Hall. The commission was a 35-room residence on Riverside Drive in Manhattan's upper west side. The exterior was designed in the French Renaissance Revival style using


The three profiled band courses that encircled the house and two ornately carved balconies, among other stone work, had to be replaced.

white marble from quarries in Vermont, bronze grills, clay tile roofing, and ornately detailed copper cresting. The interior was elaborately detailed in the Turkish style.

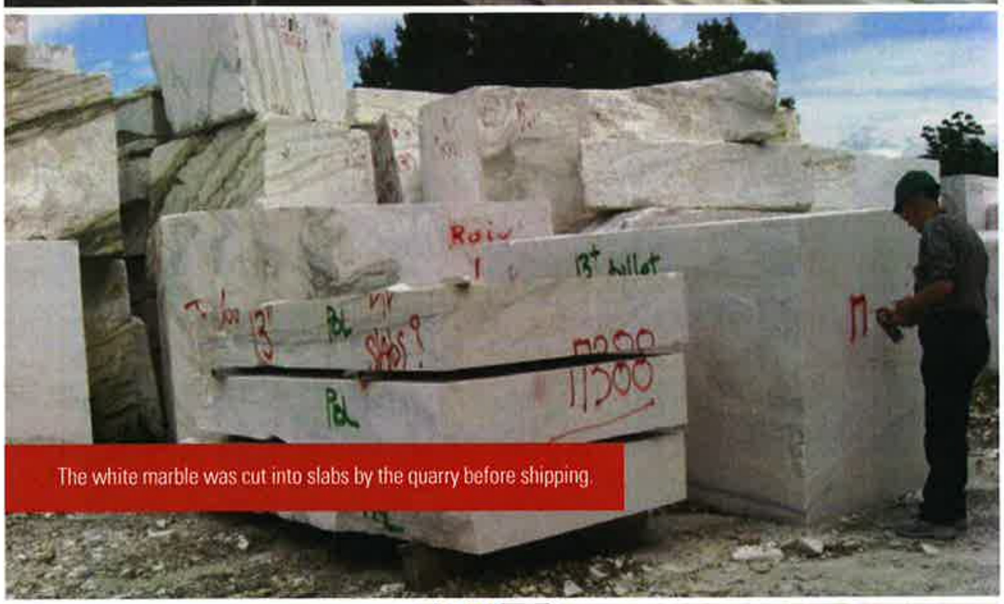
Schinasi and his architect Tuthill had their disagreements, including the accusation that Tuthill had reused the design of a house from another project in 1906. Schinasi refused to pay the architect's bill of $5,655. Schinasi did not approve of the interior work and had parts removed and re-done. Tuthill sued to recover his fees. The 12,000-square-foot mansion was completed in 1910 at a cost of $180,000.

Morris Schinasi and his wife Laurette lived in the house with their three daughters and one son until his death in 1928; after which the house was sold for $200,000 to the Semple School for Girls. Later owners included a publishing company for the Soviet Press and later Columbia University as a day care facility for children. In 1974 Professor Hans Smit, a professor of law at Columbia, and his wife purchased the property for $325,000 and set about a 30-year renovation and restoration project. The property was listed by the New York City Landmarks Commission in 1974 and added to the National Register of Historic places in 1980. The property was listed for sale once again in 2005 with an asking price of $41 million. It languished on the market through the global economic recession. Professor Smit died in 2012, and his widow finally sold at a much reduced price estimated at $13.5 million.

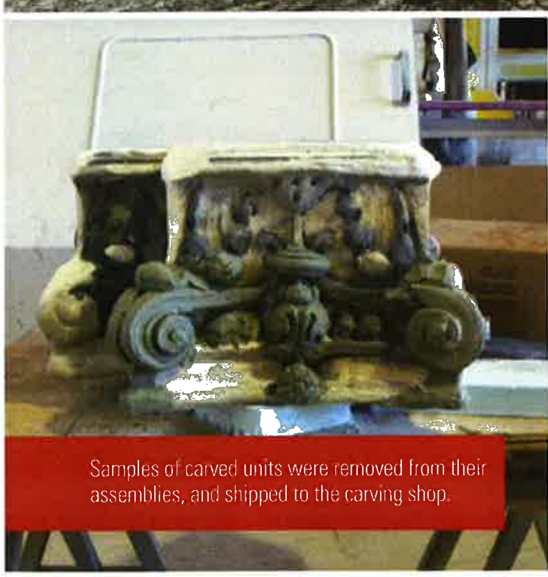
The Restoration

The new owners immediately set about restoring the exterior and renovating the interior. They chose Walter B. Melvin Architects and Uberto Construction, as General Contractor, both from New York City, for the restoration. Competitive bidding for the various exterior trades was completed in April of 2014 with the award of specialty stone cutting to our firm, Old World Stone. The scope of replacement stone work included three profiled band courses that encircled the house, two ornately carved balconies, carved pilaster caps and pilasters for all of the

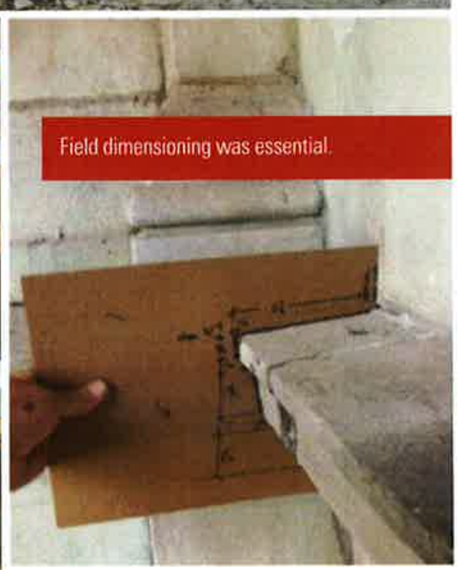
The perimeter balustrading needed to be replaced.



The white marble was cut into slabs by the quarry before shipping.



Samples of carved units were removed from their assemblies, and shipped to the carving shop.



Field dimensioning was essential.

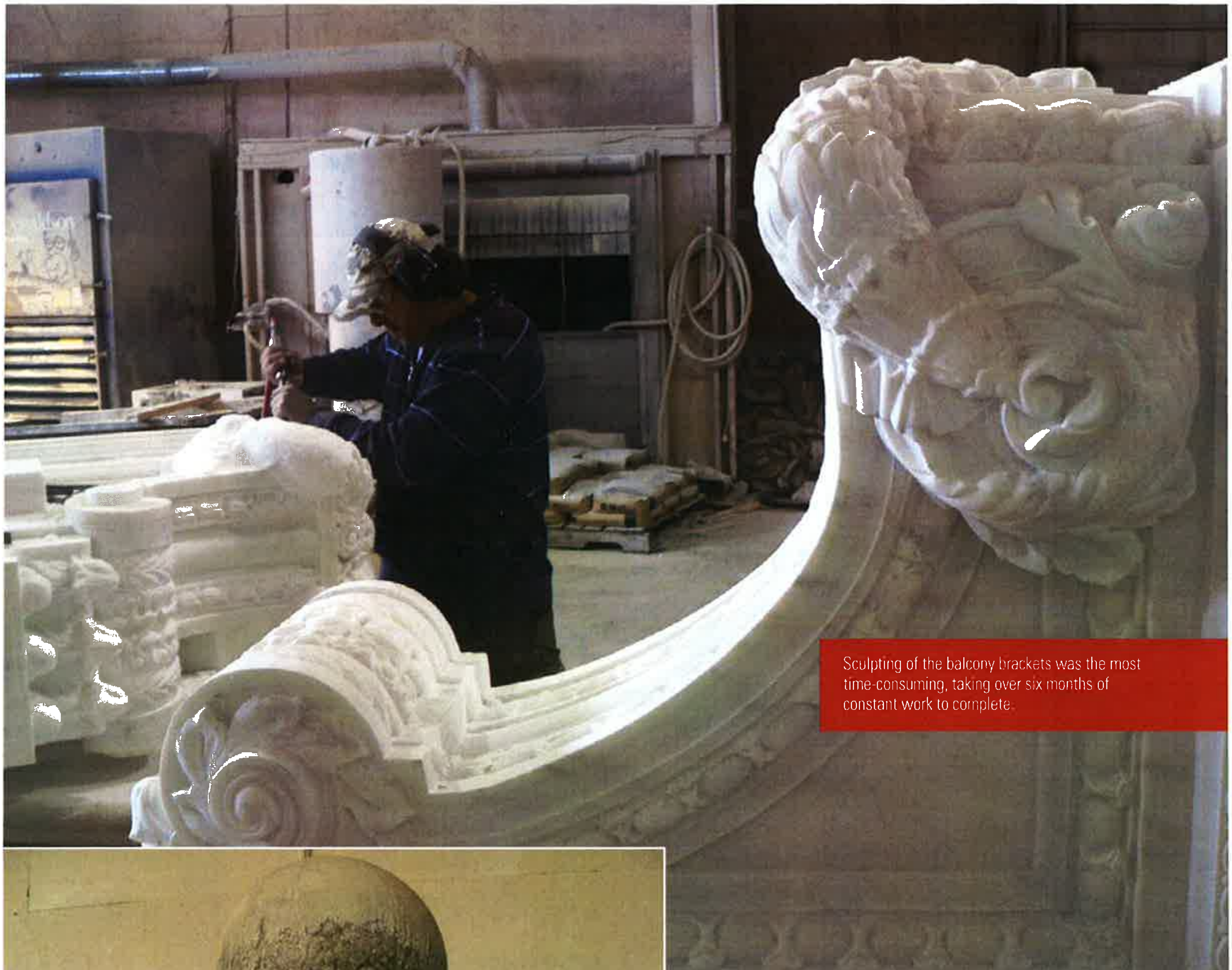
It is essential that a supported scaffold be erected so that it is plumb and straight up and down.

dormers, perimeter balustrading, and gatepost finials, as well as an assortment of scrolls, lintels, sills, jambs, mullions, and transoms.

The first step in the marble restoration was a trip to the Danby Quarry in Vermont for the matching Olympian white marble. It is the world's largest underground quarry. This particular vein of marble was used at Arlington National Cemetery and many other notable historic projects. The owner selected blocks of near pure white marble from those available. In total over 2,500 cubic feet, weighing 212 tons was cut into slabs, at pre-determined thickness, by the quarry. This reduced shipping waste and helped to ensure the quality and appearance of the exposed marble. Ten tractor-trailer loads of material were shipped over a 12-month period.

Field Dimensioning

Field dimensioning was critical in accurately replicating the lost detail. Drawings, dimensions, and photographs were constantly communicated between the masonry site foreman and the drafting and production office. Shop drawings were revised and re-submitted until all parties could agree on the configuration. Cut sheets were then prepared for every replacement stone. Before the marble was put into production, these were reviewed once again with meticulous detail to ensure accuracy. Dimensional tolerances were extremely tight. Mortar joints were 1/4 inch and on site were often much smaller. Wash slopes were almost



Sculpting of the balcony brackets was the most time-consuming, taking over six months of constant work to complete.

Where needed, plasticine was used to model the missing details.

imperceptible to the eye, but could be felt by running your hand over the surface. This was the standard by which the stone fabrication was judged.

Samples of carved units were selected on site, removed from their assemblies and shipped to the carving shop. French Renaissance Revival architectural detail is not in everyone's vocabulary, and the architect was first to admit that he was not that familiar with the shapes and profiles of the highly ornate features. He relied on the expertise of others to interpret the existing remains and used plasticine to modeling the missing details. The entourage, including representatives from the architect, project manager, and masonry contractor, arrived to review the modelling work and approve the concept. Progress photos submitted via the Internet and return visits ensured that the work was being completed and met with the expectations of the client. Sculpting of the four balcony brackets was the most time-consuming, taking over six months of constant work to complete. Rough shaping of the slap to remove excess material was accomplished with the saws; however, the detail carving was all done by hand.

Cost and Time Savings through Robotics

Sculptors and carvers capable of producing such work in marble are few and far between in North America. When it came to producing 23 carved pilaster capitals, there was not sufficient time in the schedule and talent in the carving shop to meet the demand. Modeling of the first capital was approved in plasticine, and the saws set about profiling the blanks to minimize the amount of hand carving to be done. The master marble pilaster capital was sculpted, and six carvers set about copying the new master sample. Progress was slow, and the deadline for dismantling the scaffold from the site loomed. "Delay of contract" was a constant reminder. In a brief moment of inspiration and desperation, contact was made with a local robotics repair company. They had experimented with replicating a carved sandstone panel from the Houses of Parliament in Ottawa. Using a 3-D scanner, they created a digital map and used an articulating robotic arm, fitted with router bits and cooled with water, to simulate the carved details. The marble pilaster caps were more of a challenge in terms of their detail and wrap-around configuration. They were able to use a variety of bit sizes to reduce the profiled blocks to within 2 mm of the finished surface.

Optimizing the robotics time and cost against the available hand skills of the carvers was based on time and dollars. The carvers needed enough excess material left on the piece to be able to dig the carving

Modeling of the first capital was approved in plasticine, and the saws were used to profile the blanks (below) to minimize the amount of hand carving to be done.

The use of robotics provided a cost-saving solution to staying on schedule.

Master sculptors proved their worth.

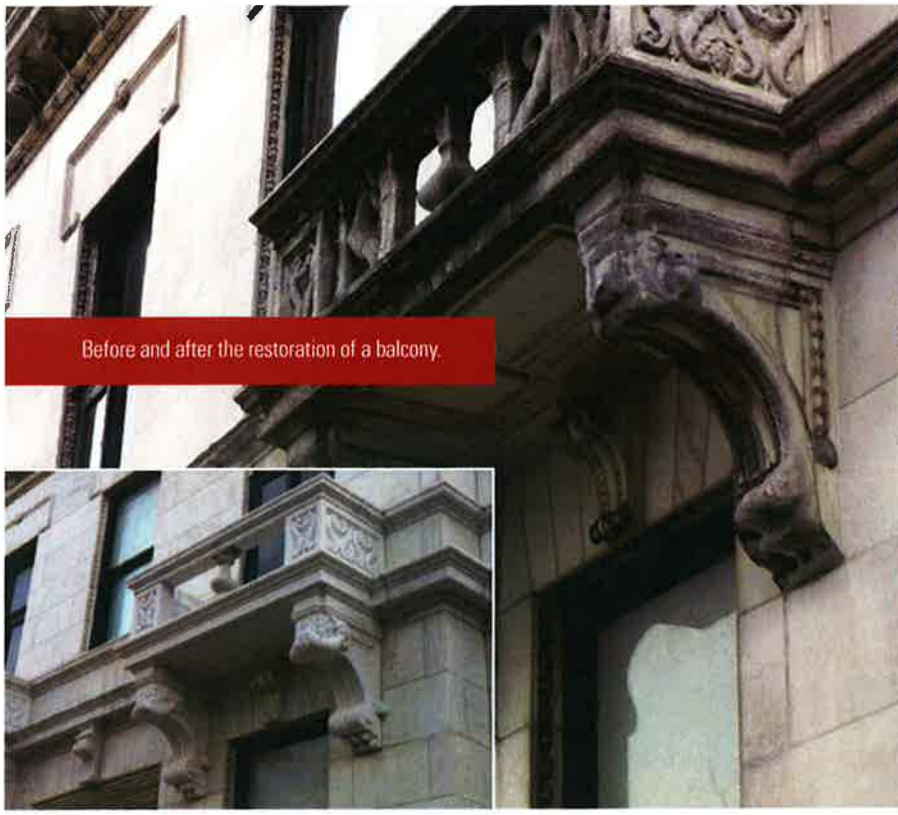
chisels into the stone and effectively recreate the undercut detail. There was a considerable savings in time and money using this approach. The schedule for delivery of the pilaster capitals was met.

A Daily Challenge

All of the work depended heavily on the work of the saws. The water tables with their complex profiles and geometry were demanding of the highest accuracy. Profiles were run for the balustrade copings and plinth to within 1/16 inch of the finished surface. Returns and joggles were made to minimize the amount of hand work necessary to finish the work. Keeping ahead of the banker masons was a daily challenge. Maintenance and occasional equipment breakdowns are a normal expectation in the stone cutting business.

A visit from a Canadian Ministry of Labour inspector in August of 2015 effectively shut down nine saws in the midst of marble production for over a month. The issue was safety-related, protecting workers from a moving saw blade and having safeguards and back-ups in place to prevent overriding the system. In the end and over $100,000 later, laser beam motion sensors, gates, partitions, and electronic locks that safeguard employees were in place. Just as that issue was resolved, the newest and most versatile Italian-built 5-axis saw/router in the plant stopped working. The month was September, and the only technically savvy Italian service technicians were at the largest trade show of stone cutting technology in Europe. Nobody was available; so six weeks of production were lost. In the end it was a simple parameter setting that needed to be reset. The human cutters and carvers had taken over the work of the router while it was out of service. Chalk one up for the masons!

There were four pedestals on the two balconies that featured carved detail. The best example was shipped from the site, and the missing detail was modeled in clay for approval. Once approved, one original was carved. The three remaining pedestals were copied using a simple copying router. The master piece was laid on the left-



Before and after the restoration of a balcony.

side table, and a nylon-tipped pointer scanned the surface at a designated speed, depth and width apart. The new blank stone was laid on the right hand table, and the router bit milled the surface in a similar fashion as a pantograph would work. The router bit was cooled by a stream of re-circulating water, and the slurry was carried away to settle in a holding tank. The process was slow but could work overnight without supervision—no breaks for lunch or coffee either! The milled piece was then carved by hand to create the undercut detail and fine profiles to match the master. The process was limited in size and to flat panel shapes. The equipment sat in the shop for several months before it was implemented for this project.

Lessons Learned

Twin finials adorn the monumental entrance gateposts. The originals were badly eroded by a century of pollution, acid rain, and freeze-thaw cycles. Marble is not a durable material when exposed to northern climactic conditions. The replacement finials were modeled in clay, approved via Internet photo submission, and the question of hand carving or milling arose. Carving would take an estimated six weeks per piece. Scanning and milling was out-sourced, and the undercutting and finish carving took two weeks per piece. It was expensive to scan the modeled portion of the finial and mirror the digital images to create all four sides of the finial. It was decided to use the saws to profile the major blocks and have the sculptor carve the units entirely by hand. Fourteen weeks later the end results were spectacular, but the cost was well above the budget. The finials were not part of the base bid and did not fall under the same scheduling pressure. Future work of this nature will have to seriously consider automated computer numerical control (CNC) as part of the process of stone fabrication.

The router process is slow but can work overnight without supervision.

Within the company there was initial dissention among the carvers and sculptor who felt their craft was being reduced to "finishing off" what the robotic arm and the copying router could not replicate. They proved their worth when the saws were shut down. They were protecting their livelihood and rightly so. Seeing the end result and understanding time constraints was a learning curve for all. Additionally, reducing unhealthy dust in the production process, reducing human joint wear and tear, limiting hand/arm vibration, and being able to compete in a world economy that relies more and more on technology are all critical to the ongoing survival of the craft of stone carving.

About the Author

Laurie L Wells, B.E.S.(Arch.), M.A. (Conservation), is vice president of sales and marketing at Old World Stone Ltd., Burlington, Ontario. She will be presenting on this project at the Winter Technical

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