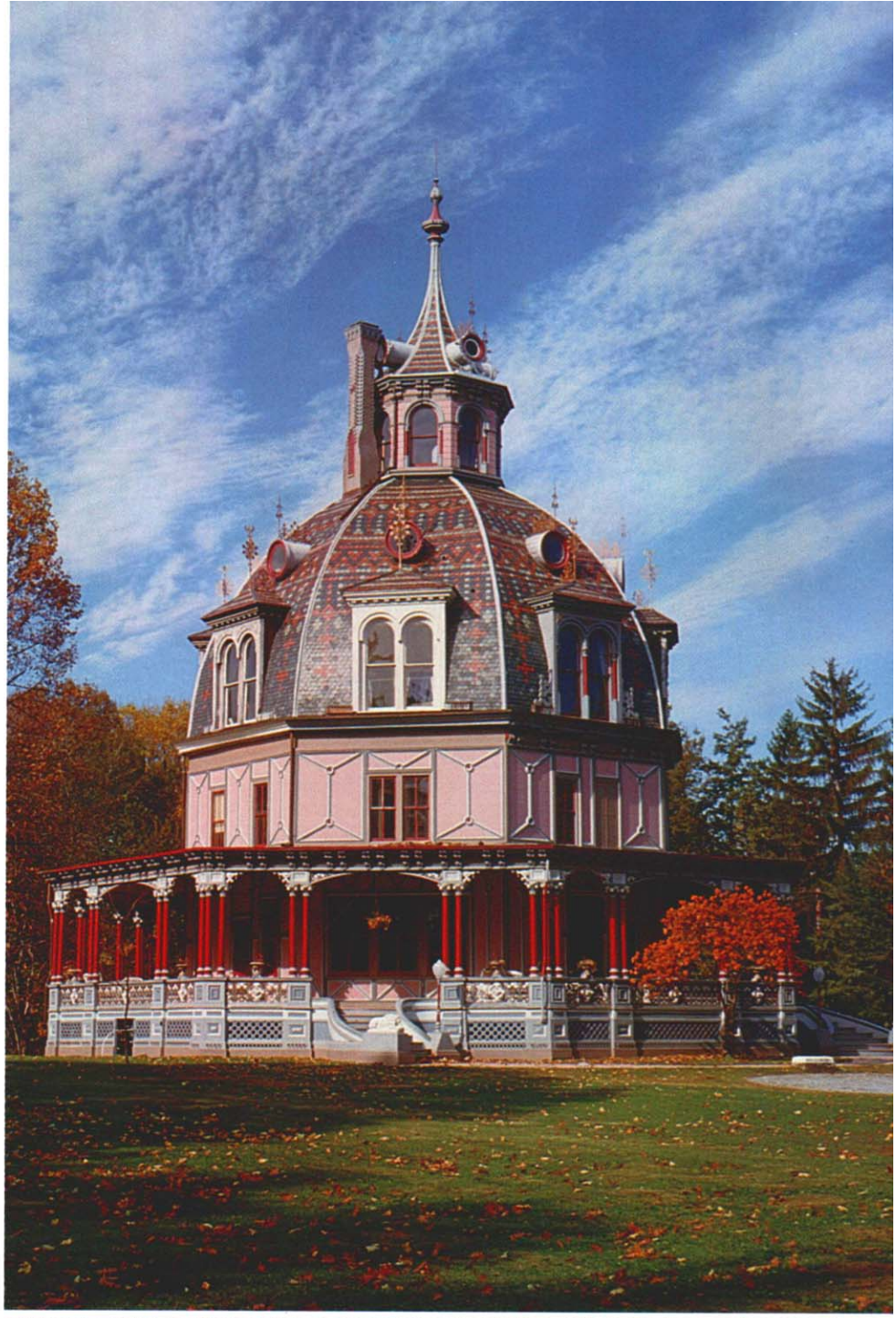
Singular Details

Rebuilding the cornice of the Octagon house

by Scott McBride

The Old Croton Aqueduct, which skirts the eastern bank of the lower Hudson River, is used nowadays as a footpath. Those who walk the path are lulled by a progression of dignified 19th-century Federal and Georgian manor houses lining the river—until they reach the Octagon house (photo right). The walls of this house are clad with triangular and trapezoidal panels painted a light rose color, and the domed roof is a mosaic of blue, grey and maroon slates. Dormers, finials and portholes encrust the roof like jewels in a mogul's turban. A pair of elliptical staircases leads up to an ornate wraparound verandah, its columns and balustrades draped with ornaments of Gothic Revival, Second Empire and oriental influence.



Built in the 1860s, the Octagon house was remodeled in 1872 to include the dome and ornaments. As part of its overall restoration, the author completely rebuilt the cornice and built-in gutter.

The Octagon house—The present owners of the structure, architect Joseph Pell Lombardi and his wife Nan, began the restoration of the Octagon house when they acquired it from the National Trust for Historic Preservation in 1978. The house was built as a two-story residence in the early 1860s by Paul J. Armour, a banker and broker in New York City. In the 1870s, Joseph Steiner, a prominent New York tea merchant, added the dome and the lavish ornamentation. The Lombardis planned to restore the house to this remodeled appearance.

The problems with the house were formidable. For one thing, the dome had begun to split apart from its own weight along each of the eight curved hips. This called for months of gradually tightening heavy turnbuckles in order to draw up the inch-thick steel cables which had been stretched across and around the base of the dome. That done, restoration of the exterior proceeded more or less from the top down. To reproduce the intricate patterns and colors of the slate roof, many of the octagonal slates were custom-cut from the original quarries. Staircases were rebuilt, railings were welded and new columns were carved.

As one of the final phases of the exterior restoration, I was asked to rebuild the cornice, which surrounds the verandah roof. The cornice, which includes a built-in gutter, measures more than 250 ft. around and is composed of more than 20 separate rough and finish elements.

Preparing for takeoff—The first order of business was to draw a full-scale vertical cross section of the cornice from which I would prepare a detailed takeoff of the materials for the job. Earlier demolition work had opened up the cornice near the front entry of the house, allowing me to inspect and measure its anatomy. Although water damage and paint buildup yielded inconsistent measurements from one location to the next, I was able to adjust the sizes of the various components in the drawing so they would fit within the whole.

The inspection revealed the lintel soffit and the trim beneath the porch ceiling to be generally intact. The rest of the cornice, though, was rotted and split to various degrees, and thick flakes of paint were peeling off. The worst damage had occurred where the copper leaders, located at alternate corners of the house, extended through the cornice at the low points of the gutter. Though the high corners were in better shape, the trouble involved in splicing new work to old didn't seem justified. I decided to tear down the whole cornice on the exterior side of the lintel and start anew.

Teamwork—To assist me in the project I had the help of resident craftsman Serge Dupin and the caretaker of the house, Drew Faulk-

Photo by staff

ner. Dupin's job was to cook up most of the architectural gingerbread in his shop, which was located in the basement of the house. Faulkner was project coordinator, which included tracking down and buying the materials. Some of the larger moldings, such as the two-piece crown molding, were fabricated by a custom millworks (Dimension Lumber, 517 Stagg St., Brooklyn, N. Y. 11237). They had to grind custom knives for the job, tracing the patterns off the original moldings. Stock items, such as the fascia and the soffit material, were purchased at the local lumber yards. Faulkner also supervised the crew of painters who had the staggering job of painting the finished ornaments in a dozen different pastel colors.

Tearing down and shoring up—It was up to me and my stepson Ryan to do the actual rebuilding. Our first project was to rig the job. We used a combination of pump jacks outside the porch and pipe scaffolding on the porch itself. This arrangement gave us convenient access to both sides of the porch lintel, as well as ample working room on the pipe scaffolding for tools such as a portable bandsaw and power miter box.

Removing the old cornice proved to be relatively painless. We used a circular saw fitted with a carbide blade to cut through the asphalt roofing and tin flashing where the gutter met the porch roof. Next, one of us diced the cornice into manageable chunks from above with a reciprocating saw while the other supported the pieces from below. Somehow we managed to avoid damaging any of the previously restored work below us.

Our worst fear was that we'd find the lintels and the rafter ends bearing upon them to be thoroughly rotten. That would require a complete rebuild of the elaborate coffered ceiling of the porch. Fortunately, damage to these elements turned out to be minimal and—thanks to the design of the lintel—relatively easy to fix. In order to give the finished lintel an appearance of greater depth, the original builders had dropped the lintel soffit nearly a foot below the 6x8 lintel itself and framed in the resulting dead space with 2x6 cripple studs. That allowed us to yank out the cripple studs beneath damaged sections and to replace them with 6x8 beams, positioning the beams to bear on two adjacent porch columns (photo above right).

Also, instead of splicing the lintels over the intermediate columns, the original builders had used one continuous lintel for each side of the house, each a whopping 32 ft. long. That made it possible for us to prop up each damaged lintel section with temporary posts which were offset from the porch columns and out of our way while we slipped the new 6x8s into place. Once the beams were home, we added blocking to transfer loads from the old lintels to the new beams.

The original builders must have been nervous about the aerodynamic possibilities of their eight-sided creation. The lintels are half-lapped at the corners, and at each corner a hand-forged iron anchor rod extends from the top of the lap joint down through the porch column and is bolted to the floor framing below.

To make the lintels look beefier than they are, the original builders dropped the lintel soffit nearly a foot below the lintel and framed in the space between the lintel and the soffit with 2x6 cripple studs. The author replaced the studs beneath each damaged section of the lintel with a 6x8 beam (at right in photo), adding blocks to transfer the load.

Assembling the cornice—The first new trim piece to go up was the outboard lintel casing, or frieze (drawing next page). Because the rest of the cornice would build upon the frieze, we carefully scribed shims to the lintel face to guarantee that the frieze would run dead-straight and plumb.

Our next step was to fasten the brackets (18 on each side of the house) to the frieze board, using a string to align their top edges. The brackets are built up of three layers of 4/4 sugar pine, with two layers of 8/4 sugar pine sandwiched between. The 4/4 layers (we called them scrolls) stick out beyond the 8/4 layers in front, while the 8/4 core layers extend back to butt against the frieze in the rear and extend up to support the cornice soffit on top. This configuration allows a cluster of small moldings between the brackets to die against the core.

The 8/4 layers of the brackets have a deep flute cut into their curved edges. Dupin cut them in two passes on a router table, using a self-piloting core bit. The fluting and the offset combine to make the scrolls stand out in bold relief. To complete the brackets, Dupin turned small finials, which were nailed to the brackets.

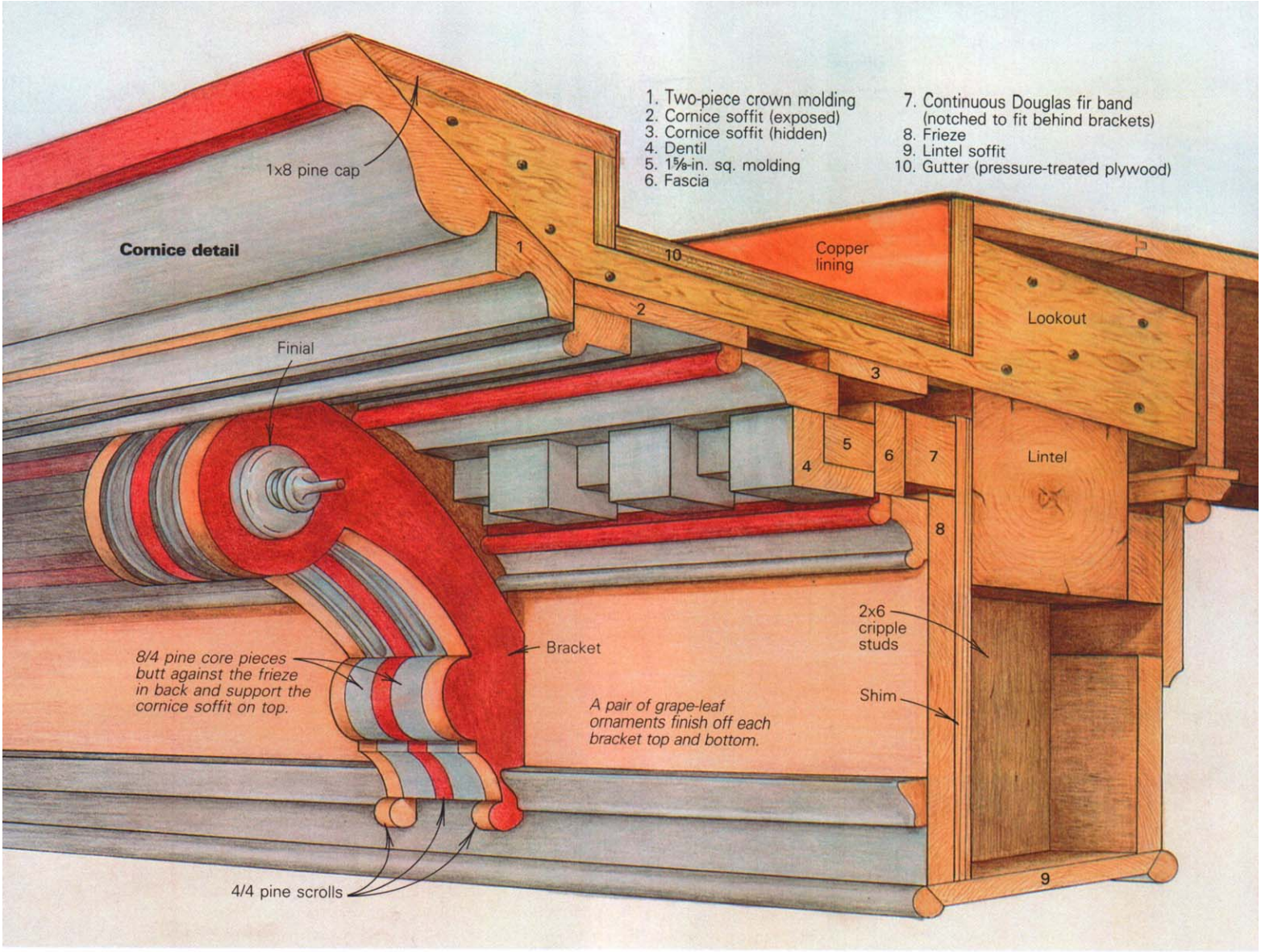
We used galvanized drywall screws to fasten the brackets to the frieze. The screws pulled the brackets against the frieze board much tighter than any type of nail could have. As we installed the brackets, we left the outside scrolls off every other one in order to make installation of the moldings between the brackets possible.

Support for most of the moldings between the brackets was originally provided by spaced vertical shims built up as two layers of ⅞-in. stock nailed to the lintel. Many of these short pieces had split. To avoid splitting and to add flexibility in nailing the trim, I substituted a continuous Douglas fir band for the shims, dimensioning my stock on the tablesaw and notching it on the bandsaw to fit behind the brackets. Although restoration purists might disagree, I feel obliged to make such substitutions whenever a building's underpinnings can be improved by the use of modern tools and materials. I think it's the integrity of the finished product that counts.

Next, we nailed down two pieces of the cornice soffit to the tops of the brackets. Duplicating the original design, we used clear pine for the exposed outboard-half of the split soffit and common spruce for the hidden inboard half (photo next page, bottom right). A split soffit was less likely to cup than a solid soffit and it saved on material.

The cornice soffit provides a solid underpinning for the lookouts, which are sistered in pairs to the porch rafters for added strength. The lookouts provide a dual function: their tops house the gutter, and their ends support the crown molding at the top of the cornice. The original lookouts were made of solid lumber, and many of them had split along the grain. To prevent a recurrence of this problem, we made ours out of pressure-treated plywood.

Laying out the gutter—Because we had to notch each lookout to a different depth in order to accommodate the slope of the gutter, we decided to attach the lookouts to the rafters temporarily with drywall screws so we could lay them out in place. Laying out the cutouts seemed like a tricky job, but our solution was actually quite simple. I began by stretching a pair of strings above the lookouts, anchoring the strings to a temporary



To lay out the lookouts for the gutters, workers stretched a pair of strings between temporary supports on opposite ends of the cornice so that the strings paralleled the desired slope of the gutter. The depths of the cutouts were then established by touching a measuring stick against the string and marking the lookouts at the bottom of the stick (photo below left). Cut lines for the sides were squared down from chalklines snapped across the tops of the lookouts. Once the lookouts were removed, cut out with a bandsaw and reinstalled, they formed a perfectly straight inclined trough to house the gutter (photo below center). The brackets support a split soffit (photo below right), which serves as a level foundation for the built-in gutter on top. The new copper lining for the gutter was cut into small square sheets and soldered at the seams, typical of the 19th century.

Drawing: Michael Mandarano

support at each end of the cornice so that the strings were on an incline parallel to the desired incline of the gutter (photo facing page, bottom left). The incline was calculated so that the lookout at the high end of the gutter would be cut only slightly and the lookout at the low end would be cut to within an inch of its bottom.

Next, I made a measuring stick equal in length to the desired distance from the strings to the bottom of the cutouts. The stick was beveled at one end and left square at the other. By just touching the strings with the beveled top of the stick and marking the lookouts across the bottom of the stick, we were quickly able to establish the elevation of the bottom of each cutout. The sides of the cutouts were simply squared down from parallel chalklines snapped across the top edges of the lookouts. Once the lookouts were removed, cut out with a bandsaw and reinstalled, they formed a perfectly straight inclined trough ready for plywood (middle photo, facing page). The cutouts for the splayed lookouts at the corners of the house were extrapolated from the common lookouts with a straightedge after the commons were installed.

In order to provide a good nailing base at the ends of the lookouts for the crown molding, I screwed a solid 2x block between each pair of lookouts. Finally, we lined the gutter troughs with pressure-treated plywood (and a little scrap lumber) and capped the tops of the lookouts with 1x8 pine.

Finish work—With a sound substructure in place, we had little trouble installing the moldings. To cut the two-piece crown molding accurately, I attached triangular blocks to the fence of my power miter box. This tilted the molding forward to the same angle at which it would be installed. The arm of the saw was swung to 22½°, the standard miter angle for the corners of an octagonal structure.

Fitting all the pieces between the brackets amounted to a real miter-box marathon. Rather than take an inside numerical measurement for each piece, we extended a pair of sticks between brackets and clasped the sticks firmly between the thumb and fingers. The length of the desired piece was then transferred directly from the overlapping sticks to the stock. For the dentils, we rabbeted the stock on a table saw, then cut the stock into individual dentils that fit over a 1⅝-in. sq. molding.

As if the cornice wasn't fancy enough after the moldings were finished, each bracket required grape leaves both above and below it. The originals had been carved from white pine, probably roughed out on the carving machines that were just starting to appear at that time. For the restoration, Dupin carved an initial batch of 21 of the ornaments by hand, but the prospect of making almost 300 was daunting. We hired Tradition 3 Thousand in New York City to cast the rest of the leaves out of a mixture of two parts Hydrostone to one part Hydrocal (U. S. Gypsum Co., 101 South Wacker Dr., Chicago, Il. 60606-4385). All the ornaments except for the brackets were hung with galvanized finish nails.

The finished cornice reflects the Victorian passion for ornament and vibrant color schemes.

A copper lining—When Dupin wasn't busy making trim, he was up on the roof forming and soldering the copper lining for the new gutter. Although Dupin could have handled 8-ft. lengths of copper in his portable brake, the Lombardis insisted that he cut the copper into the small square sheets used by roofers in the 19th century. Dupin used traditional soldering irons for the job as well, although he heated his irons with a roaring propane brazier instead of with the traditional charcoal pot.

The trickiest joints to solder were the vertical seams in the sidewalls of the gutters. As the soldering iron was moved downward over these joints, a small pool of molten solder was allowed to ride on top of it. Moving the iron back and forth horizontally as it descended helped to coax some of the solder into the heated joint.

When the work began in April, the weather was cold and windy—miserable conditions for soldering. But by the time Dupin finished in late summer, solder disappeared into the sun-baked joints like a snake down a rat hole.

Analyzing the paint—As a prominent preservation architect himself, Joe Lombardi had access to state-of-the-art techniques in the restoration of his own home. To determine the colors used at the time of the 1870s remodeling, paint chips were sliced on the bias so that successive layers of paint were exposed. The sample was then placed under a microscope to make its history clear. Results indicated that the Octagon house was a stunning example of the Victorian passion for vibrant color schemes (photo above).

In case even better methods of paint analysis are discovered in the future, I was asked to rebuild a small section of the cornice entirely from original painted elements salvaged from the debris. Aside from giving future restorers a source of research samples, the recycled section stands as verification that our work was faithful to the original. There was also something pleasantly mischievous about doing this—it was sort of like putting a note in a brightly colored bottle. □

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