

Conservation vs. Disasters

The Restoration of Kathrineberg

The restoration of Kathrineberg, the historic residence of the governor of the U.S. Virgin Islands, has been described by specialists as the most advanced project of its kind in the Caribbean.

Kathrineberg, built in 1830 in Charlotte Amalie on the island of St. Thomas as a grand residence for a Danish plantation owner Hans Henrik Berg, is one of the earliest and most important private residences in the Virgin Islands. Berg subsequently became governor of the Danish Virgin Islands in 1862. The house has a long and checkered history and was the residence of the Carpenter, Bregaro, and Delinois families between 1864 and 1913. In 1918 the house was substantially repaired and restored after a long period of neglect. The house was the official residence of the Danish consul general in 1958.

Inside the house in the central corridor immediately beneath the cracked and leaking gutter (see next photo) the wallpaper over a doorway was found to be peeling off the wall, with a massive fungal attack growing on the soaking wet wall paper paste and animal protein glues of early distemper paints.



Kathrineberg was subsequently damaged in hurricanes in 1979 and 1981, and was extensively redecorated in 1981 following water damage and associated termite attacks. Further water damage occurred from hurricanes Hugo in 1989 and Marilyn in 1995. By the mid-1990s, it was becoming increasingly apparent that there were many problems literally within the walls and that there was no easy solution to them. Typical warning signs included a strong smell of mold, extensive wallpaper failures, and paint failures inside and outside the building.

Early in 1998, the Virgin Islands historic preservation office (HPO) approached the owner, the West Indian Company Limited, concerning the possibility of making a preliminary condition assessment of Kathrineberg. The HPO recognized that if the historic mansion was going to serve as the governor's official residence it would need to be properly restored. The West Indian Company accepted the HPO's offer and the preliminary report was prepared by Claudette C. Lewis, now the assistant commissioner of the Department of Planning and Natural Resources; Myron D. Jackson, now the director and then senior planner; and Sean L. Krigger, architectural historian. This initial report contained a brief history of the site, a description of the building, an identification of some major problem areas, and offered recommendations for action.

After the HPO's assessment was made it was realized that the condition of Kathrineberg was so bad and so complex that a conservation specialist would be needed to prepare a conservation study on the mansion before it could be restored. HPO staff recommended the author, who was working with the Puerto Rico HPO on the conservation of the governor's residence in Old San Juan and who had also worked on the conservation and restoration of the governor's mansion in Antigua.

Accordingly, late in 1998, the West Indian Company commissioned the author to carry out preliminary studies on Kathrineberg to establish precisely the condition of the building with a



Painted many times, the corroded galvanized steel roof had many leaks. Here a gutter is cracked and leaking badly next to a critical rainwater outlet. The outlet was one half the size that it should have been. This causes overflowing and even worse leaks during tropical down-pours.

New stainless steel sheet roofing with complete cap flashings on all parapets and roof ornaments. Note new lighting protection system. All rainwater drains have been doubled in size.

view to developing a master plan for the preservation of this valuable historical resource.

The initial studies immediately confirmed that the officials of the West Indian Company had been correct in their suspicions that there was something seriously wrong at Kathrineberg. The author brought in forensic toxicologist Dr. Edward Montz from Pennsylvania, one of the leading specialists in toxic fungi and bacteria that can be found in buildings.

Scientific air and surface contamination studies, carried out early in 1999, identified a number of pathogenic species of bacteria and toxic fungi in the interior of Kathrineberg and in the water cistern under the house. Indications of a serious contamination problem included:

- The total indoor concentrations of organisms exceeded those outdoors (when concentrations indoors should be no greater than 50% of outdoor concentrations).
- Samples were predominated by hydrophilic species.
- Many of the species found are known toxic-forming species.
- Species were present indoors which were not found in outdoor samples (indicating that these species were reproducing in the building).

Having discovered that the new governor in residence was showing symptoms that could indicate reactions to these dangerous species, the experts immediately recommended that the building should be vacated. Governor Turnbull moved out in February 1999.

The process of conservation and restoration first involved the total replacement of a highly corroded and leaking galvanized steel sheet roofing of recent origin. It was replaced with a carefully detailed malleable stainless steel sheet roofing, a substitute material designed to last in this harsh maritime environment with its frequent tropical storms and hurricanes. Before the interior restoration had been finished, the new roof had already withstood Hurricane Floyd (1999) and a major tropical storm with torrential rains. Concurrently with the work on the roof, the project continued with the sealing-off of room after room of the interior and removal of damaged modern drywall so that the thick masses of fungal organisms could be sprayed with carefully selected chemicals by operatives working in hermetically-sealed protective suits and respirators. Infected material was carefully removed as bio-hazardous waste. Guidelines for removal of the waste generally followed those established by the New York City Department of Health and the American Industrial Hygiene Association.

The treated and now safe interior was then turned over to the author and his investigative team to carry out what turned out to be a major piece of detective work. Using microscopic evidence all of the original interior and exterior colors and finishes were rediscovered. The interior walls were originally finished by first stretching cotton canvas across the wall, then pasting on a lining paper and then finally applying a water-based distemper paint finish.

The beauty of this system was that it allowed water vapor to pass through it and thus allowed the thick masonry walls to dry out in the likely event that they got wet. In later re-decorations, contemporary newspapers were used



instead of plain lining paper; and traces of these papers survived. Small fragments of newspaper from London, Göteborg in Sweden, Paris, Copenhagen, and the United States made it possible to date various restorations and re-decorations as far back as 1851.

Later in the 19th century, a pale-blue wallpaper with a fine gold pattern was used in the dining room. One tiny fragment actually had a tax stamp on the back from Paris. Subsequent research revealed that this same paper was used and still exists in the interior of the historic residence of the great French scientist Louis Pasteur in France.

In this century, unfortunately, multiple layers of impermeable plastic-based paints on both interior and exterior faces of the walls ensured that the interior walls never properly dried out. This eventually created an environment that caused and supported the growth of dangerous microorganisms hidden behind the painted finishes.

Having been able to ascertain the original decorative finishes and colors of the interior, the writer asked Robert Kelly, the leading North

American wallpaper specialist, to join the Kathrineberg team.

The original colors and the vapor permeable canvas and paper wall covering system have been carefully and accurately restored. Quite apart from the fact that such an important historic building should be seen in its former beauty, the restoration makes excellent sense for the very good scientific reason that when the roof was sound the original system worked and did not support the growth of microorganisms.

All modern air-conditioning units, which were contributing large quantities of condensation to the walls, were carefully and totally removed. The complete original system of through-ventilation with louvered shutters was then restored. Kathrineberg is well sited on top of Denmark Hill and here the constant breezes are ideal for this traditional ventilation system. This restoration also makes excellent sense because it does away with the need and expense of constant air-conditioning.

Various specialists in the field have noted that Kathrineberg is extremely rare, if not unique, in the Caribbean for the accurate restoration of its original interior while at the same time it continues in its original function as an actual residence. It is also a rare example of the restoration of historic and traditional energy-conserving ventilation and cooling systems.

New ground has also been broken by the treatment of the dangerous microorganisms and termite infestations with the latest safe, environmentally-friendly pesticidal and preservative treatments. "Clearance samples" designed to verify that the abatement was successful showed that the contamination problems noted above were corrected. Total species concentrations were reduced to less than 50% of outdoor concentrations. Hydrophilic species were either eliminated or substantially reduced. Toxic species were substantially eliminated. Species profiles indoors were nearly identical to those outdoors at completion of the project. Based on these data, the team determined that it was acceptable to re-occupy the building and that the project was a success from a decontamination perspective.

The team was concerned about bacteria concentrations initially measured in water samples collected from the cistern system. Because most buildings in the Caribbean use rainwater from roof run-off and stored in cisterns, there is a distinct possibility of contamination by animals

Less than a year later, after the installation of new roofing, the interior is fully restored. The fine timber beams and flooring were restored using the same pitch pine that was originally used. The colors and distemper paint finishes are precise reproductions of the originals from the 1830s.



Typical, accurately restored historic jalousie doors that provide natural cross ventilation.



and soil-borne microorganisms. The data showed that the cleanup of the cistern improved bacteria concentrations in the water, but the cleanup alone was not sufficient to render the water bacteria-free. Therefore, a permanent ultraviolet treatment system was recommended to improve the water quality in the cistern following chlorination of the cistern.

Taking another lesson from the building, the writer has restored the fine timber beams and flooring using the same top quality pitch pine that was used originally. It was noted that wherever the high quality pitch pine had not been used, the wood had usually been consumed by termites and hence the need for restorations.

All wood used in the restoration of both the structure and the fine joinery of the doors and jalousies has been carefully selected to match the original species, to be durable, and to come from renewable forest resources. Including accurate reproductions of missing original doors, paneling, trim, and jalousies, the fine joinery restorations have been superbly carried out by Eduardo Padron's firm from Charlotte Amalie.

As the careful removal of deteriorated modern finishes proceeded throughout the building it

was found that in a hidden world concealed behind the surface, structural timbers had often been severely damaged or even totally destroyed by termites and fungal attacks. Hidden within the walls and floors, generations of electrical circuits were found to be corroded and in such poor condition that it was a miracle that there had been no fire. The entire electrical system has been tested and has largely been replaced by the expert firm of Kline Electrical Co. Inc. from Charlotte Amalie. The new installations have been carefully designed so that they do not disturb the historical appearance of the interior.

The restoration work has often involved extremely difficult repairs and replacements of parts of structural timbers in position in the building. The final products have often been so carefully and accurately made that even historic tool-marks have been accurately reproduced and only close examination would reveal that any work had in fact been done at all. Some of the restoration work has been rather like doing Chinese puzzles because of the need to keep as much as possible of the original timbers and working in very tight areas which are difficult to get at. This work has been carried out by Antillean Contractors and Developers Inc. under the site management of Mr. John Harding, PE.

The author has pointed out that Kathrineberg was incredibly well built. If it had not been, nothing would have survived its 169-year history of hurricanes, tropical storms, termites, and dangerous electrical circuits. With this intervention just in the nick of time, 1999-2000 has turned out to be a very appropriate year for the restoration of Kathrineberg extending its life for another hundred years. The U.S. Virgin Islands have regained one of their least known treasures and preserved it for future generations at a fraction of the cost of providing a new building of anything like the same quality.

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