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### **REPORT ON THE WEEKS ESTATE LANCASTER, NEW HAMPSHIRE**

**James L. Garvin  
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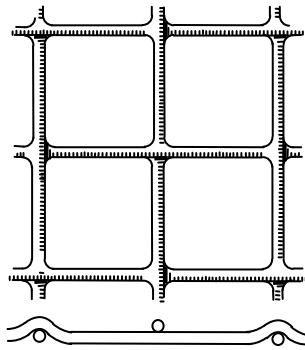
The following report is based on a brief inspection of the dwelling house and garage of the John W. Weeks Estate, made on July 16, 1992, at the request of Harry L. Reid of the New Hampshire Division of Parks and Recreation. The report addresses water-related problems at the estate, mention by both Mr. Reid and by Michael M. Pelchat, regional manager in charge of the Weeks Estate.

Both the house and garage were built in 1912 by Congressman John Wingate Weeks on the summit of Mount Prospect, overlooking Weeks' ancestral lands. Both buildings are important in the history of Weeks' development of the site. The summit had formerly been reached by a carriage road leading to a short-lived hotel. After purchasing the summit about 1911, Weeks took advantage of the rapid development of the automobile, constructing an auto road to supplant the old carriage way, and providing a four-stall garage, with chauffeur's quarters above, for the powerful Cadillac cars his family used to gain access to the summit. For his summer home, Weeks inverted the usual plan, placing the utilitarian rooms, including bedrooms, on the first floor, and throwing the entire second floor into a ninety-foot-long hall with dramatic mountain views in every direction. As an exterior wall covering for both house and garage, Weeks chose the then-popular material of lime stucco.

After acquiring the property in 1941 as a gift from members of the Weeks family, the State of New Hampshire embarked on a major campaign of remodeling and repair in 1964 under the supervision of Malcolm Chase, special projects engineer for the New Hampshire Department of Public Works and Highways, and architect Guy Wilson. Since that time, the property has benefited from routine maintenance, but both house and garage are now showing the results of moisture problems that are affecting both buildings to some extent.

## Stucco:

Both house and garage are covered with lime stucco applied in three coats. The walls of the house, except for the cobblestone masonry chimneys at the east and west ends, are constructed of terra cotta tiles. The stucco is applied to the grooved exterior faces of these tiles. By contrast, the garage is a framed building, and its walls are framed with two-by-four studs covered by one-inch sheathing, laid horizontally. In keeping with standard practice in stuccoing framed buildings, the sheathing is covered with tarred felt, which in turn has wooden furring strips applied to receive the lath for the stucco. The lath used here is wire mesh (hardware cloth) rather than expanded metal lath.



Woven wire lath for exterior stucco  
(not to scale)

The wire mesh of the garage, and the terra cotta blocks of the house, have received the standard three-coat covering of lime stucco. Tests made with acid on the garage stucco indicate that a small amount of Portland cement was added to the mix. A similar formula should be used in repairing the stucco.

The first or scratch coat and the second or brown coat have relatively coarse sand used as an aggregate, with a large amount of animal hair for a binder. The standard specification for this work is one part hydrated lime putty to three parts sand, by volume. Since the original formula seems to have included a small admixture of Portland cement to speed setting, one-third of the lime could be replaced by white Portland cement, giving the mix two parts hydrated lime, one part white Portland cement, and nine parts sand, by volume. Hair should be added to the mortar in the proportion of one bushel per cubic yard of sand, or one pound of hair per 100 pounds of cement.

The third or finish coat is also a lime-sand mixture, but here the sand is of a finer texture and little or no hair is used. Again, the standard specification for this coat is one part lime putty to three parts sand, by volume.

In the application, the scratch coat is scratched, when sufficiently stiff, to provide adhesion for the brown coat. The brown coat is used to bring the wall nearly to its final level, and on the Weeks garage is about 1/2" in thickness. The final coat is thrown or dashed against the wall using a whisk broom or similar tool, producing the pebbly surface seen on both house and garage.

With lime stucco, slow curing is important, and each coat should be kept damp by misting until it is cured. The scratch coat must harden sufficiently to withstand troweling pressure before the brown coat is applied; normally, this requires from a week to ten days, but the addition of a small amount of Portland cement, as mentioned above, will considerably speed setting time. Once the brown coat has stiffened (usually within a day), the finish coat is applied without further delay to ensure good bonding between the two upper coats. Because the finish coat is thrown onto the brown coat, the latter need not withstand troweling pressure.

Once the finish coat has hardened and dried, it can be painted. While the stucco on the Weeks Estate may originally have been painted with an oil-based paint, it would be acceptable nowadays to paint repaired sections of stucco with a latex paint, which would not be affected by residual moisture in the underlying mortar.

Stucco formulas have been developed during the twentieth century using a high proportion of Portland cement and other hydraulic cements. Because the stucco on the Weeks Estate is a high-lime mixture, however, it would be prudent to retain the traditional formulation in order to prevent any differential cracking between old sections of stuccoed wall and new patches.

I would recommend removing loose stucco from the main house only in those limited areas where it has been damaged by running or splashing water, or where it has been softened by rising damp along the front patio. The underlying terra cotta blocks should be carefully cleaned, and should be dampened before the application of the new scratch coat to prevent their drawing too much water from the mortar too quickly and thereby preventing proper curing.

On the garage, damage appears to be confined to the two side walls near both front corners of the building. Stucco in these areas should be carefully pulled off, probably only as far back as the windows, which offer a natural limit to the new work. The lower edge of the wire mesh can be temporarily unstapled from the underlying furring to permit cleaning out the crumbled remnants of the old scratch coat.

The underlying bases (terra cotta and wood-frame wall) for the stucco on both house and garage appear sound, except for one loose foundation stone on the southeast corner of the garage, which should be re-mortared. (The stone can be re-mortared using the one-to-three lime-sand mortar prepared for the scratch coat, before the hair is added.) Preparation for re-stuccoing need only consist of thorough removal of old, deteriorated mortar and cleaning of terra cotta or wire mesh to accept new material.

Animal hair is not widely available today, but one reliable supplier is:

Brooklyn Animal Hair Manufacturing Company  
175-185 Beard Street  
Brooklyn, New York, 11231  
(718) 852-3592

Because stuccoing is no longer a widely-practiced trade, repairs to the stucco at the Weeks Estate should be carried out by an experienced plasterer. The Division of Historical Resources presently does not know of anyone in the Lancaster area who could do this work, but will make inquiries with the Preservation Institute for the Building Crafts and elsewhere, unless the DD&M crew includes someone with plastering experience. One plasterer who specializes in traditional techniques is Rory Brennan of Putney, Vermont.

A plasterer should also be employed to repair the walls in the room at the northeast corner of the house (see below, "Water Problems").

Supplements to this report are two references on architectural stucco:

1. Preservation Briefs #22: Anne Grimmer, "The Preservation and Repair of Historic Stucco" (available on-line at: <http://www.nps.gov/history/hps/tps/briefs/brief22.htm>)
2. Walter Jowers, "How to Repair Stucco," *The Old-House Journal*, May 1985.

### **Water Problems:**

Water is the cause of the stucco deterioration and other problems at the Weeks Estate. The softening of stucco at the front corners of the garage has probably been caused by splashback of roof water, although there is a possibility of former leaks in the roof over these two corners. The loss of stucco in the lower zone of the front (south) wall of the house has been caused by the combination of splashback from roof water and rising damp from the terrace in front of the house. Problems with the projecting one-story room off the kitchen (at the northeast corner of the house) have been caused by roof leaks, roof water running over the wall surfaces, and water penetration around the fieldstone chimney. Softening and loss of fireplace mortar and interior wall plaster around the eastern chimney are caused by the penetration of water through the mortar joints of the chimney stack.

According to Malcolm Chase, who superintended the renovations of the house in 1964, a great deal of water-related deterioration was evident at that time, and repairs to the house were largely devoted to overcoming water problems. Many of these have since recurred.

Among other approaches, an effort was made in 1964 to combat water vapor and condensation within the house. Although the building sits on a hilltop and has some ledge beneath it, some water does work its way back into the dirt-floored partial basement and crawl space beneath the building. This dampness, in turn, migrates into the upper floors as water vapor, and there condenses on all surfaces in cold weather.

This dampness has been noticed within the past few years, resulting, for example, in condensation behind the glass of framed pictures. The situation must have been judged to be extreme in 1964, because the renovations of the time called for the installation of a central dehumidifier in the house. According to Mrs. Nelson, the present attendant at the house, the dehumidifier has not been run in recent years.

In order to reduce dampness from within the house, it would be advisable to keep the building closed on cool and damp days in spring and fall and to activate the dehumidifier on such days. This will draw moisture out of the fabric of the building before the house is shut for the winter and after it is opened in the spring. To further reduce internal dampness, the earth floors of the basement and crawl space ought to be covered with 6 mil black polyethylene. This will seal down the dampness of the soil and will prevent the earth beneath the house from acting as a source of water vapor during the winter.

Water penetration from outside is a far greater threat to the house than condensation from within. Direct leakage has apparently occurred through the flat decks over the front portico and the northeast corner room. The present program of replacing the deteriorated roll roofing of these decks with bituthene and slate-coated roll roofing, caulked with silicone, should go far to remedy direct leaks that have occurred in these roofs.

Both of these flat roofs are bordered by wooden gutters. These gutters appear to be in good condition. Their downspouts, however, have been removed. Thus, all the water that falls on these roofs is caught and channeled to the locations where the leaders were connected. Instead of being conducted to the ground, this water cascades down the face of the stucco walls, saturating the covering, penetrating to the cavities of the terra cotta blocks, and eventually emerging, in part, through the inner wall plaster of the building.

To remedy this situation, these downspouts or leaders should be replaced. If they were formerly connected to dry wells, this should be done again; if not, steps should be taken to conduct the water well away from the walls of the house, using splash blocks or horizontal runs of pipe.

Replacement of leaders will directly benefit the stucco on the front of the house, which has failed where water from the center of the main roof and the front portico is concentrated at the discharge points of the gutters. Replacement of leaders will also benefit the stucco and interior plaster of the northeastern room, where the walls have become saturated by water running down their surfaces on both the north and south sides.

At the same time that the leaders are replaced, the gutters themselves should be thoroughly cleaned of accumulated tar and roofing grit, and their joints should be repaired. Once the gutters have been cleaned down to the wood, they should be painted with several applications of a preservative like Cabot's gutter paint, and this treatment should be repeated once a year as part of the routine maintenance of the house.

At the same time that the gutters are treated, care should be taken to examine, and replace if necessary, the wooden strips that have been applied at their backs, below the roll roofing. This would be a good opportunity to use silicone caulking compound to seal the edge joints of the bituthene and roll roofing in order to ensure that water cannot find its way beneath this membrane by capillary action.

Once the walls of the northeast room are dried out, the interior plaster will need repair. It should be possible to scrape off the accumulated paint and the deteriorated skim coat and to get down to sound plaster without having to disturb the brown coat to any degree. If this can be done, a new

skim coat can be applied to the room at the same time that the exterior stucco is being repaired. While the tendency today is to use gypsum plaster for skim coating, it should be possible to prepare lime putty for these interior walls at the same time that the skim coat is being prepared for the exterior stucco. If the scratch or brown coats prove to need repair in parts of this room, the same materials prepared for the exterior stucco can be used in this room as well. It would be advisable to use lime plaster in this room instead of gypsum in case there is residual dampness in the walls. Lime will withstand this dampness better than gypsum. It would also be advisable not to repair the interior of the room until next year, thus giving the new plaster and the damp terra cotta wall blocks a good chance to dry.

Another water problem, one that is hard to diagnose and remedy, is leakage around and through the fieldstone chimneys of the house. This is especially pronounced on the eastern chimney, where water penetration is evident from water stains in the kitchen, near the stove flue; water stains in the butler's pantry between the kitchen and dining room; efflorescence and loss of mortar in the fireplace bricks at the back of the large second-floor fireplace; and loose, powdery plaster on the exterior wall beneath the seat at the southeast corner of the second-floor hall. There is less of this kind of evidence at the opposite end of the house, probably because most driving rains come from the northeast, because the prevailing fair-weather northwest winds tend to dry the western chimney, and because the added second floor of the western porch shelters much of this chimney stack.

Water penetration through cobblestone masonry is a general problem in New England. Such masonry (including the two chimneys at the Weeks Estate) is commonly laid in high-Portland cement mortar. This tends to develop hairline cracks around each stone, permitting water to seep into the chimney mass. In addition, fieldstone chimneys are difficult to flash, compounding the difficulty of keeping water under control.

The Division of Historical Resources seldom recommends masonry waterproofing coatings for brick masonry, because such coatings can trap water in the soft bricks and create spalling during cold weather. In the case of fieldstone masonry, however, the masonry units are hard igneous stones, and the mortar is a hard, cement-based mixture. Under these conditions, it may be worthwhile to try to paint each mortar joint with a waterproofing compound to see if this reduces water penetration. It is probably best not to apply such a waterproofing compound to the entire exterior of the chimney stack in a flowing coat, since it is beneficial for any damp masonry structure to be able to breathe to the greatest extent possible.

Another water-related problem at the estate is the decay of the feet of the wooden columns that support the second floor of the western porch. These large, solid wooden posts have been placed with their bottoms resting directly on the roll roofing that covers the roof of the original one-story porch. Hence, water settles around the feet of the columns, works its way by capillary action up into the wood through the longitudinal vessels, and causes decay. Several of these columns show signs of deterioration, and one needs immediate replacement.

In telephone discussions with Michael Pelchat, I have already approved the idea of replacing this column with one sawn from a native softwood. It has been suggested that the foot of the new column could be placed on a pad of pressure-treated wood or decay-resistant cedar. This is an

excellent idea, since it would keep standing roof water away from the end grain of the post and would provide a barrier to water that otherwise would work its way up into the new column. The same treatment could be applied to other columns that have decayed only at their bottoms. If the porch roof can be supported, the softened wood can be cut off and wooden pads can be inserted under the posts.

Another preservation method that could be used on both old and new posts would be the insertion of boron rods in small holes drilled near the bottoms of the columns. This technique introduces solid dowels of borax or boric acid into the wooden structural member. As water migrates up the longitudinal vessels of the wood, it dissolves the boron, which is an effective fungicide. The boron leaches throughout the fibers of the wood whenever water is present, thereby inhibiting the growth of wood-destroying fungi.

The Division of Historical Resources will forward information on boron rod treatment (and product information, if available) as soon as we can locate the literature.

### **Other Maintenance Concerns:**

Most of the windows in the house with small lights of glass and six-over-six sashes need re-puttying on the exterior. This should be followed by repainting of the sashes.

A structural post has been removed at the back of the original portion of the garage, adjacent to a former back door in this wall, in order to open up wide access to the shed-roofed addition on the rear of the garage. This post, like others along the front and rear walls of the garage, supported an important front-to-back girder overhead, as well as an oversized rafter with a steel tie that helped support the floor girder. The end result of the removal of this post has been a slumping of both the second floor and the roof of the garage in this area. The settled portion of the building should be carefully and slowly jacked up, and a new post should be spliced into the frame at this location.

Mr. Pelchat inquired whether the red paint currently used on the house, Kyanize Barn Red #2320, is acceptable for continued use. While the Division of Historical Resources normally recommends alkyd (oil-based) paints for use on historic buildings, a good quality latex like #2320 is acceptable and causes much less trouble to non-professional painters. Our only precaution would be that in large expanses of new wood (such as new porch columns), most paint manufacturers recommend that latex exterior house paints be applied over an *alkyd* primer. The recommendations of the Kyanize Paint Company, as given on the paint can for #2320, should be followed in priming the wood before applying #2320.