

Lakeport Plantation Restoration

Technical Report No. 4

Windows



The tall, double-hung windows of Lakeport Plantation house are typical of the Greek Revival style in which the house was built. Designed to allow light and air into the house, the six-over-nine sash windows that grace the front and north side of the house extend to the floor, and when raised, allow you to walk through to the porch on the outside of the house. These “walk-through” windows can also be found at the back of the house, where a tall and narrow bay window opens out from the music room onto the ell porch.

The six-over-six windows found throughout the remainder of the main house complete the look of symmetry that is so important to the Greek Revival style. Even the master bedroom on the second floor, which does not have a window on the interior wall, has a false window on the exterior in keeping with the look of symmetry. The kitchen and plantation office in the one story wing at the back of the house also have the six-over-six windows, though smaller in size.

Windows are one of the most important architectural features of a house. Not only do they help to define the style of the house, but they also help to date the house. It is very important that the original windows in a historic structure be preserved.

The earliest American windows, built before the 1700's, were wooden casement or stationary windows.



The tall, symmetrical windows of Lakeport Plantation house help to define the Greek Revival architectural style of the house.

This photo shows the false window on the second floor exterior of Lakeport Plantation house. The interior wall, in the master bedroom, does not have a window. This provides additional wall space in the master bedroom while maintaining the architectural symmetry on the exterior of the house. The shutters will always be kept closed to hide the obvious fact that it is a false window.



Casement windows are hinged on one side and swing in or out. Stationary windows do not open at all. Both windows contained small, diamond shaped panes of glass held in by a latticework of lead. By the early eighteenth century, these windows were being replaced with sliding sash windows, either single-hung or double-hung. The top sash for a single-hung window remains in place and the bottom sash slides up and down. Both top and bottom sash move up and down in a double-hung sash window. Sash windows are often referred to by the number of

panes that the window contains. For example, a six-over-nine sash window will have six panes at the top and nine panes at the bottom.

Early window sash contains several panes of glass which are held in place by narrow, molded strips of wood called muntins. The thickness and shape of the muntins helps to identify the age of the window. The earliest window muntins were wide with a thick molding profile, built to hold small panes of glass, allowing for the small size and limited availability of early window glass or glazing. As architectural styles



changed and the manufacture of glass improved, window muntins became thinner and more narrow, allowing for larger panes of glass until it became common for window sash to contain only one large piece of glass.

Sash windows were first held in place with a peg or notched stick. Later, these were replaced with counterbalanced weights and pulleys used to raise and lower the window sash. Early window weights were made from lead and were usually rectangular in shape. Later window weights were made from cast iron and were cylinder

This interior view of the window sash at Lakeport shows the detailing of the window muntins. By the time the Lakeport Plantation house was being built, circa 1859, window sash were being manufactured at specialized mill shops. The window sash are believed to have been built in Madison, Indiana, and shipped downriver to Lakeport Plantation.



Early American window muntins were made by skilled craftsmen using hand held molding planes. This photo shows a demonstration of decorative molding being cut on the interior side of a window muntin using a sash molding plane. This molding profile is called a sash ovolo.

shaped. Windows that are operated with window weights have a cord or metal chain attached to each side of the window sash. From there the cord or chain runs to the pulley near the top of the window frame and attaches to the window weight. The window weight is hidden inside a window pocket built on each side of the window to house the weights. Single-hung sash windows have window weights attached to the bottom sash only. Double-hung sash windows have window weights attached to both the bottom and top sash. The Lakeport Plantation house windows are built in this style using sash cords and cast iron weights. Only the smaller windows in the servery, kitchen and plantation office are not weighted.

At the beginning of the eighteenth century, window sash was being imported from England with the window glass installed. American craftsmen did not know how to install the glass at the time. Once this skill was learned, Americans began making their own window sash but continued to import the window glass. Attempts were being made at window glassmaking in America but imported glass was cheaper and of better quality. At the end of the century, however, most Americans were less willing to buy imported goods from England. Boston Crown Glass Company became the first successful window glassmakers in America when they began producing window glass in 1792.

As is typical with older homes, the windows of Lakeport

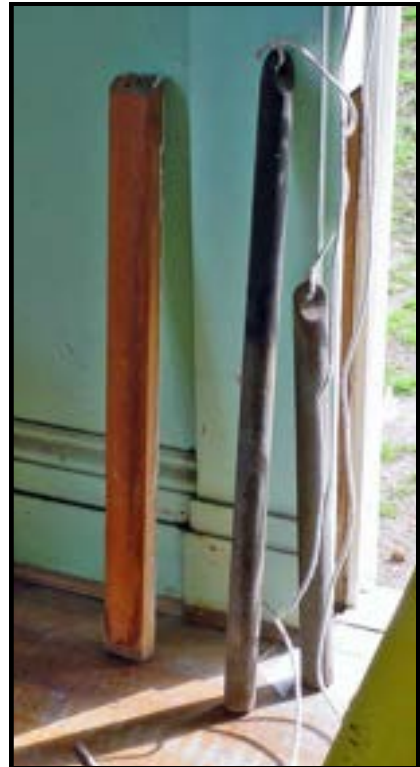


The photo at left shows the window pocket which houses the window weight for the bay window at the back of Lakeport Plantation house. The pocket runs the length of the window to allow the weight to move up and down as the window is raised and lowered. The photo at right shows the pocket door which provides for easy access to the window weight when repairs are necessary.

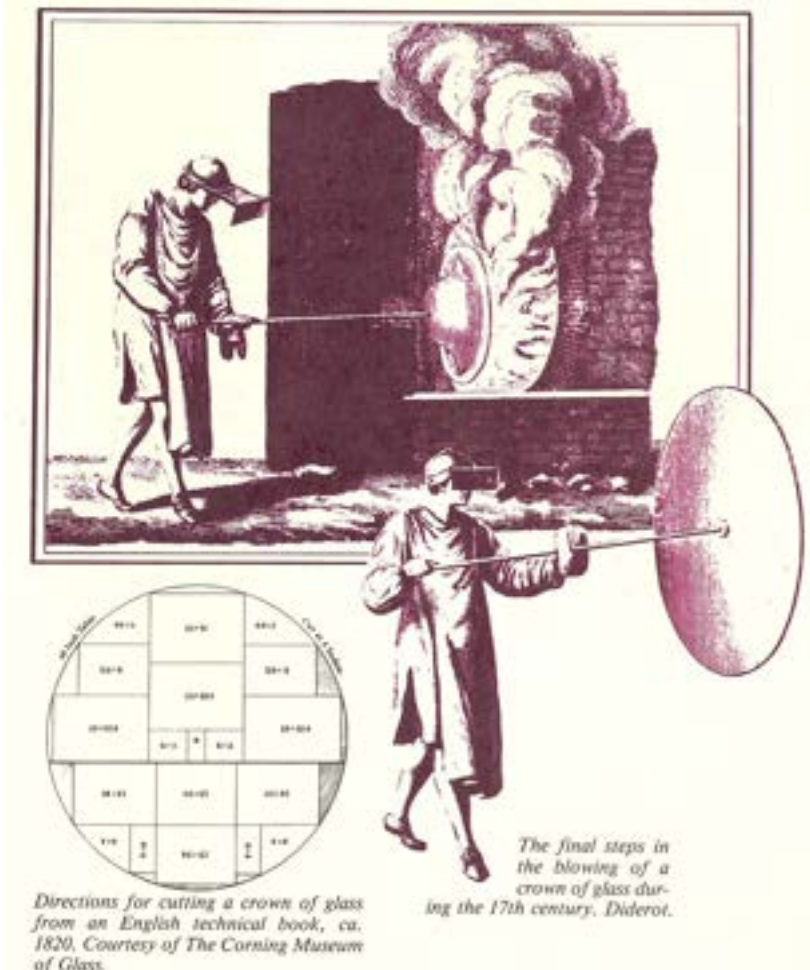


Plantation house contain many old panes of glass, some probably being original to the house. These panes of glass can be identified by the air bubbles and imperfections that are so often seen in early glass. Early window glass was commonly made by using one of two methods, the crown glass method and the cylinder glass method. The crown glass method used a blow pipe to blow a glass bubble. The bubble was then opened at the bottom and the glass was enlarged by twirling it until it formed a flat disk. The disk or "crown" of glass was then cut into rectangular panes. The bump left in the center of the disk gave the appearance of a bull's eye. Bull's eye glass was considered inferior at the time but is highly sought after today because of its historical significance.

Using the cylinder glass method, glass was made by blowing and swinging the glass until it formed a long cylinder shape. The cylinder was cut at both ends and down the sides. The glass was then reheated so that it would lay flat. This produced rectangular pieces of glass. The cylinder glass method eventually led to the manufacture of larger pieces of glass. Cylinder glass can be identified today by ripples in the glass that run in a somewhat



The photo above shows the window weights for one of the walk-through windows in the north parlor of Lakeport Plantation house. Notice the difference in the size of the weights. The taller weight will balance the bottom sash, which is much taller than the top sash. It is a heavier sash, needing more weight to balance it when it is opened and closed. Also shown here standing next to the window weights is the pocket door for the window.



This illustration, taken from the August, 1979, issue of *Early American Life* magazine article, "The Eyes of the House", demonstrates the crown glass method of glass making.



The photo at left shows the original window framing as it was being removed from the west wall of the kitchen. Below is a close-up of the window construction. Notice the mitered corners of the window framing. This type of construction is used to protect the end grain of the wood from absorbing moisture.



straight pattern. Crown glass may be identified by ripples in the glass that are somewhat circular. The original Lakeport glass was made using the cylinder glass method.

By the 1830's, a third method of glass making was being used in America. With this method the glass was cast onto a sheet of iron and could be polished to improve its quality. This type of glass is called plate glass.

Before restoration began, the windows of Lakeport Plantation house were believed to be constructed of cypress material, local to the area and plentiful at the time. Once restoration began, however, it was discovered that the windows were built of northeastern white pine, a material that would have come from the northeastern part of the United States. The doors, the mantels, the trim boards, and the flooring as well, were all built of this same material. This discovery helps to tell some of the building history of the house. At the time that Lakeport house was built, specialized mill shops had already begun manufacturing structural components for houses. When the Lakeport mantels were being removed during restoration, behind one of the mantels was discovered the name of the mantel builder, along with the name and location of the mill shop and the date that the mantel was built. The mantels were built at a mill shop by the name of Innskeep and Company located in Madison, Indiana. This is a strong indication that all of these interior components of the house were built in Madison, and shipped downriver to



This window lock was found on one of the windows of Lakeport Plantation house and is believed to be original to the house. Very little of the original hardware remained on the windows. Reproduction hardware was made to replace the original.

Shown in this photo, the exterior window casings and head jamb of Lakeport Plantation house are narrow and plain, the least ornate of Greek Revival architecture.



Lakeport Plantation.

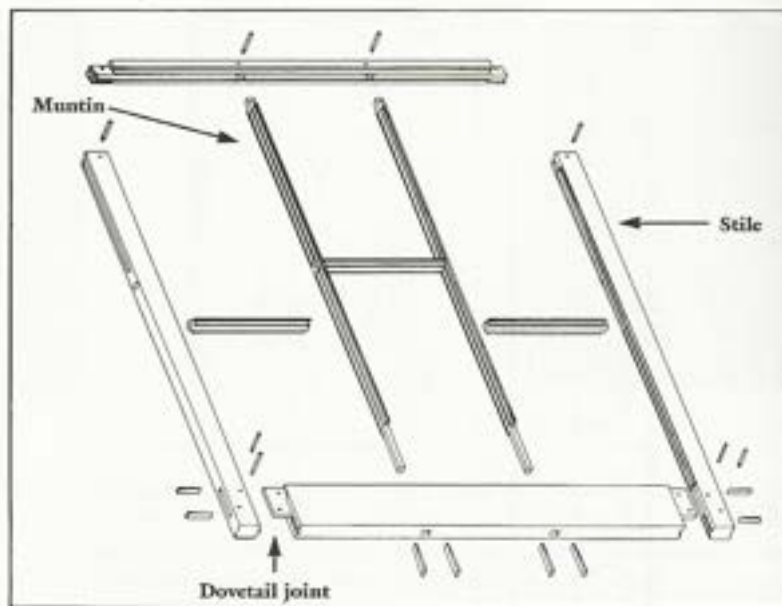
The Lakeport window sash were constructed using a mortise and tenon joinery and pegged together with wooden pegs. With mortise and tenon joinery, an opening, or mortise, is cut into the end of one piece of sash to accept the connecting piece which is cut to fit the shape of the mortise. The shaped end is called a tenon. The two pieces fit together to form a joint and wooden pegs are used to hold the joint together. Mortise and tenon joinery is very strong and will keep the window

sturdy for many years. The muntin profile is typical Greek Revival and was first used between 1835 and 1860. Called a bevel and fillet, the window muntin has a simple beveled shape on both sides that tapers off to form a boxed shape in the center.

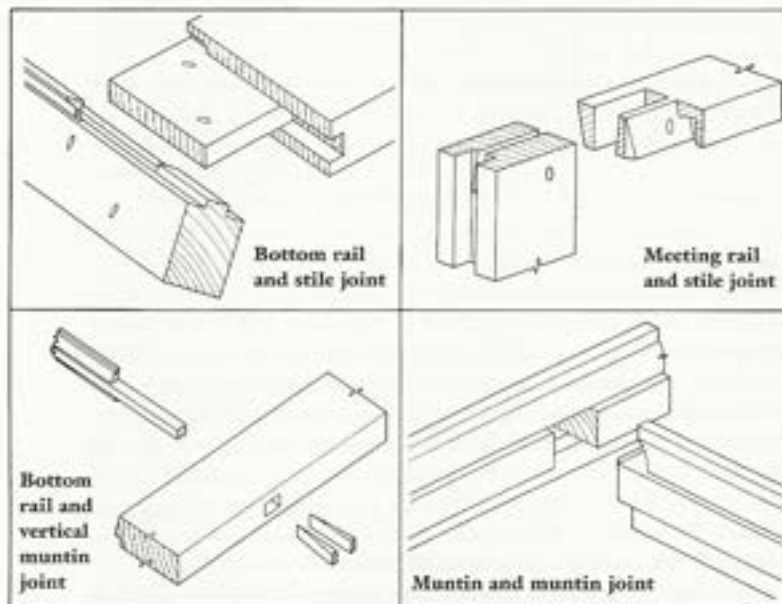
The window frame is the part of the window that holds the sash. It surrounds the window opening and has several parts. The window jambs run along each side of the window frame and hold the stops that keep the sash in place. The window sill sets at the bottom of the window and is designed to prevent moisture damage. The sill slopes slightly downward and is grooved to prevent moisture from collecting between the sash and the sill. The window casings on each side of the window and the head jamb at the top of the window finish out the window framing and are built on the interior as well as the exterior of the house. The window casings cover the window jambs and, along with the head jamb, often have features that help define the architectural style of the house. The exterior window casings on the Lakeport house



The interior window casings and head jamb, shown here in the north parlor, are simple but elegant.



Early 19th-century, double-hung sash construction: meeting rails join stiles with a dovetail joint, and vertical muntins pass through the lower rail. (Michael J. Devonshire)



Details of joinery of an early 19th-century sash. (Michael J. Devonshire)

The above illustration shows the construction of an early 19th century, double-hung sash window. This illustration was taken from the book *Repairing Old and Historic Windows*, published by John Wiley & Sons, Inc., 1992. The Lakeport Plantation window sash were constructed using this same type of joinery.

This photo shows the exterior window casing being removed from a window of the house. When restoration of Lakeport Plantation house began the windows were in poor condition. Window glazing was loose or missing. Paint was peeling and the wood was cracked and deteriorated.



are the least ornate in the Greek Revival architecture, narrow and plain. The interior window casings, although wider, are plain as well.

Lakeport Plantation house had been unoccupied for thirty years at the time that restoration began. Although many of the windows had been covered with sheets of corrugated fiberglass roofing material, years without maintenance had left them in need of repair. Some windows were in worse condition than others. All of the

windows had cracked, peeling or missing paint, cracked or missing window glazing, and weather deteriorated wood. Many of the windows had parts that had deteriorated to the extent that they would need to be replaced.

All of the window sash were removed and taken to a mill shop to be restored by a craftsman skilled in window restoration. The window glazing and glass were all removed, the paint was stripped and the wood was sanded where there was minor deterioration. Where there was more extensive wood deterioration, dutchmen, or small pieces of wood used as fillers, and epoxy patching methods were used. The window components that were beyond repair were replaced using old growth sinker cypress. The window sash were then primed, re-glazed using the original window glass, and reinstalled. The balance weights were reinstalled and attached to the window sash using new sash rope. Some of the original sash locks still



This is a photo of Lakeport Plantation house after all of the window sash were removed and taken to a window restoration expert for restoration.



This photo shows the front entry door of Lakeport Plantation house with the decorative glass sidelights. Three of the original glass panes remain. Reproduction glass panes were made and installed where the original were missing.

remained on the Lakeport windows and these were removed and used to reproduce new ones. There was no evidence of original sash pulls to grasp when raising and lowering the window sash.

Besides the sash windows, there are other types of windows on Lakeport Plantation house. The front entry doors on the first and second floor of the house are graced with decorative patterned glass sidelights, five on each side, separated with the same muntin profile as the sash windows. Three of the original decorative glass

panes remain on the main floor and one remains on the second floor. Reproduction glass panes were made in the same manner as the original and installed where the original were missing. The bay window was also filled with decorative patterned glass, though of a different pattern than the sidelights. Many original panes remain in the bay window and reproduction glass panes were made to replace these missing panes as well.

Decorative glass of this type was traditionally made using the cylinder glass method. The glass was acid etched to give it an opaque appearance. The patterned design was then applied using a template and is a baked on enamel paint. The reproduction glass



Before and after photos of the bay window at Lakeport. Many panes of decorative glass are original. Reproduction glass replaces any missing or broken panes.

These photos show the rose window before and after restoration. Before restoration the window was in poor condition. It had been painted over and was unnoticeable. After restoration the rose window once again decorates the front porch pediment of Lakeport Plantation house.



was made in Germany in the same manner as the original. The lower replacement panes for the sidelights and bay window were made of safety glass following safety standard guidelines.

The rose window on the front porch pediment is one of the most decorative features of the house. When restoration began the rose window had been painted over and was unnoticeable. The original glass, exterior trim and scalloped window sash remained, although deteriorated and in need of repair. One original window muntin remained. The rose window was removed and the exterior trim and wood sash were restored. Window muntins were reproduced to match the original. A decorative center piece was also reproduced and new window glass replaced the old. Once the restoration was complete the rose window was reinstalled on the front porch pediment.

Transom windows are found above many of the doors inside of Lakeport Plantation house, upstairs and down, and above the exterior doors on the ell porch. Used in what is considered to be the informal part of the house, the transom windows allowed light and ventilation into the rooms at Lakeport without giving up the privacy that a closed door would provide. The transom windows are hinged on the side and swing outward to open. They are built in the same manner as the sash windows, with mortise and tenon joinery, pegged at the corners, with the same muntin profile.

Modern windows are built in all shapes and sizes and are made of many different materials. Steel casement windows became popular in the early 20th century, followed by aluminum windows after World War II and vinyl windows in the mid to late 20th century. Often seen as irreparable, wooden windows are one of the most often replaced parts of a house. Vinyl windows are the most popular type of replacement window used today and generally have a lifetime of 10 to 30 years depending on the quality of the window. This means that they will have to be replaced eventually. Older wood windows, made of slow

In this photo the restored window sashes have been installed and a member of the restoration crew is preparing the windows to receive a final coat of paint.

growth materials using mortise and tenon joinery, can last 75 to 100 years. These windows, with proper care and maintenance, should never have to be replaced.

The most common problems with wood windows are excess paint, broken sash cords, deteriorated window glazing and broken window glass. A more serious problem is wood deterioration. Any of these problems can mislead a person into believing that the window needs to be replaced. However, historic wood windows were built to be repaired rather than replaced. Early

sash windows were built with dovetail or mortise and tenon joinery and held together with wooden pegs and wedges. This made disassembly easy if a part needed to be repaired or replaced.

Painting is the most important maintenance practice for window upkeep. A good coat of paint can protect the wood and other window parts for years. Before painting, it is important that the window be prepared properly. Strip the wood if necessary, otherwise scrape and sand loose paint. If the paint needs to be stripped, do not use propane torches or sandblasting as these techniques will destroy the wood. Using a heat gun will soften the paint and make it easy to remove and chemical solutions will dissolve the paint. Raw wood should be primed first and then painted. Before painting, replace any deteriorated caulk or window glazing and broken window glass. Examine the wood for any signs of deterioration and make repairs where necessary. It is important to use a good quality paint and proper painting techniques.



This photo shows the south side of Lakeport Plantation house after window restoration is complete and the shutters have been hung. Often referred to as the "eyes" of the house, windows are one of the most important architectural features of a house.



This photo shows the damage done to a Lakeport window sash during restoration when a sharp object was used to loosen the window sash after it had been painted shut. There are painting techniques that can be used to prevent windows from sticking when painted. The window sash was removed, sanded and repainted to repair the damage that was done.

There are special painting techniques to use to keep the window from sticking when painted. When painting the window sash, the most important painting technique is to let the paint flow approximately 1/32 of an inch over the window glazing and onto the glass. This seals the new putty and protects it from the weather.

One of the most common problems in historic preservation today is the use of qualified craftsmen. Although skilled in modern construction, the restoration crew did not have the

knowledge and skills necessary to properly restore the window casings and sills of Lakeport Plantation house. Deteriorated wood was left in place and painted over. Wood consolidants and epoxy fillers were used improperly. Window glazing was damaged by the use of razor blades when cleaning excess paint. Improper restoration has resulted in leaking window sills, curling window glazing and continuing wood deterioration. With the growing number of historic preservation projects, it is becoming extremely important that the building industry make a place for historic preservation by using skilled and knowledgeable restoration specialists.

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Lakeport Plantation is an Arkansas State University Heritage Site located in Chicot County, Arkansas. The *Lakeport Plantation Restoration Technical Reports* were compiled by Ronnie and Sonya Walker to document the restoration of Lakeport Plantation.