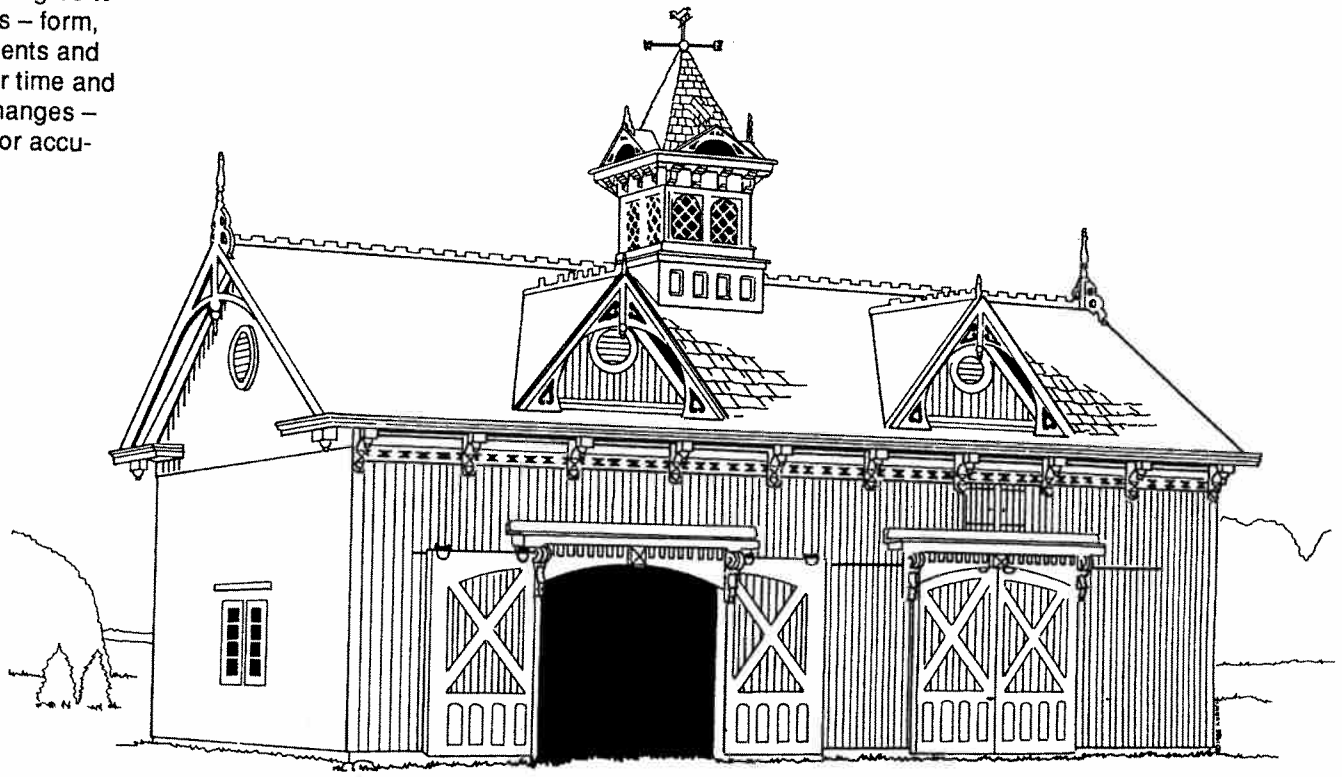
The degree to which an historic building retains its early appearance is described in terms of 'integrity.' This is not the same as 'condition'; often places are "fixed up" so that they look better now than they ever did, but their integrity is lost. Integrity is measured only by the degree to which exterior features – form, style, decorative elements and building materials over time and through successive changes – have been preserved or accurately restored.

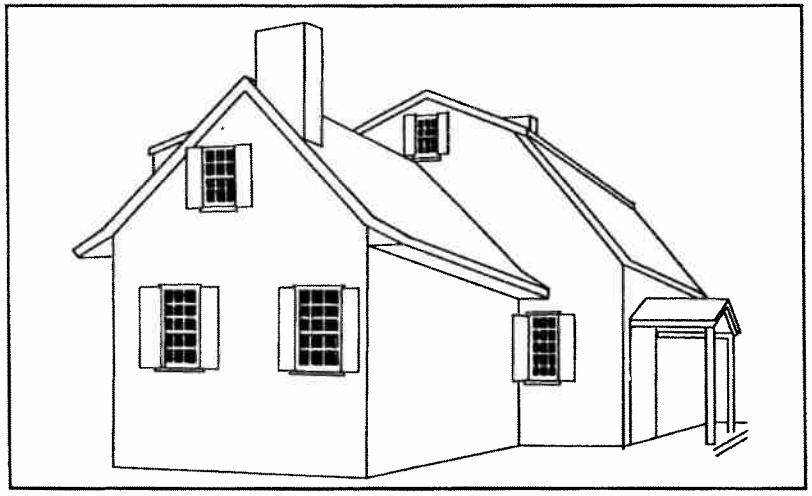


Integrity is measured by the degree to which architectural features and building materials have been preserved or accurately restored.

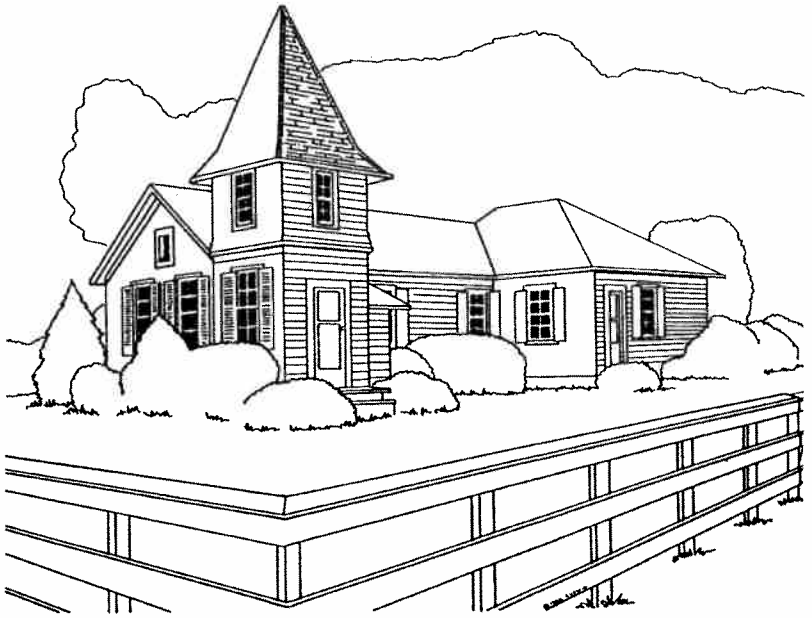
Most houses have been remodeled and added to. It is wise to understand this evolution before attempting restoration.

With slow population growth, structures were altered (for functional or stylistic reasons) whereas in a period of rapid growth they might have been replaced. Therefore we find the typical house has been remodeled many times. Today the thoughtful owner will take the time to unravel the intrinsic and fascinating testimony of the structure before deciding on a remodeling plan or restoration date. It's seldom advisable for a house to be restored to its earliest date. Later additions can be of historical or architectural value. In fact, they might be more interesting than the original design. At the very least, all previous changes to a home tell a tale and thus enrich it. Efforts should be made to retain them.

The goal of *restoration with integrity* means preserving as much as possible of what is already there. Building modification will occasionally be called for but changes of detail, mass, roof line, windows, porch, and so forth, should be harmonious. This is no easy task and requires time and effort in understanding the building and its progress through time. Many aids exist. The review committee serves as one of the resources available, and welcomes anyone interested in a restoration project.



When an historic building is enlarged, changes of mass, roofline, windows, porches, and details should be harmonious.



As a house is expanded through the years, later additions add historic interest and historical value. Each part has a story to tell.

MT. SINAI HISTORIC DISTRICT

Sucessful restoration depends on how well the style, age, evolution and integrity of the structure is understood and respected.

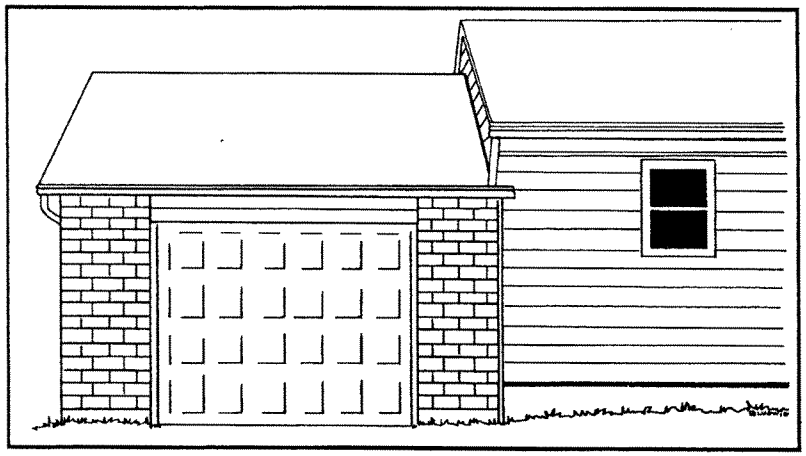
It is usually an error to attempt to change the style of a building while renovating or enlarging it. The most common mistake is the effort to make nineteenth or twentieth century buildings appear colonial. The result will be disappointing. Successful restoration depends on how well the style, age, evolution and integrity of the structure is understood. While the removal of an obviously modern element (a picture window, for example) may be appropriate, caution should be exercised if the feature is more than fifty years old because it has become a part of the evolution of the building.

MATERIALS. With regard to appropriate treatments of foundations, wall surfaces, entries, roofs, windows and decorative details, as well as the site, an overriding principle prevails: do not introduce construction materials that were not available when the building achieved its present appearance. There are two major exceptions. First, modern materials and construction techniques are acceptable in structural work and in areas not visible (e.g. steel supports, modern 2 by 4 framing) and second, the use of current materials to preserve original work (e.g. paints, water-resistant epoxy, plastic restoration treatments) are encouraged.

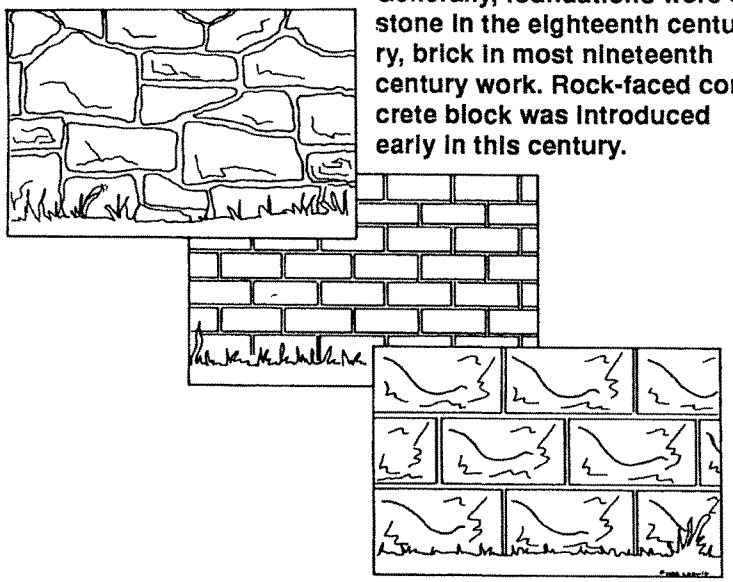
FOUNDATIONS. It is best to duplicate existing materials where visible. In Brookhaven, the rule of thumb is that stone was used in the eighteenth century, brick in most nineteenth century foundations. Rock-faced concrete block was introduced in the twentieth century. One good source of material is other parts of the masonry–that which is to be removed or obscured by new construction–providing it is no longer bearing weight.

A four inch brick veneer surface over block is preferable to the exposure of new materials. Do not lay stone or old brick in modern concretes for its strength will destroy them. A suitable mortar mix can be made and can be tinted to match the original.

Avoid plantings along the foundation because they hold water and insects close to the house and prevent adequate drainage and drying. Climbing vines loosen mortar and cement, thereby allowing water penetration.

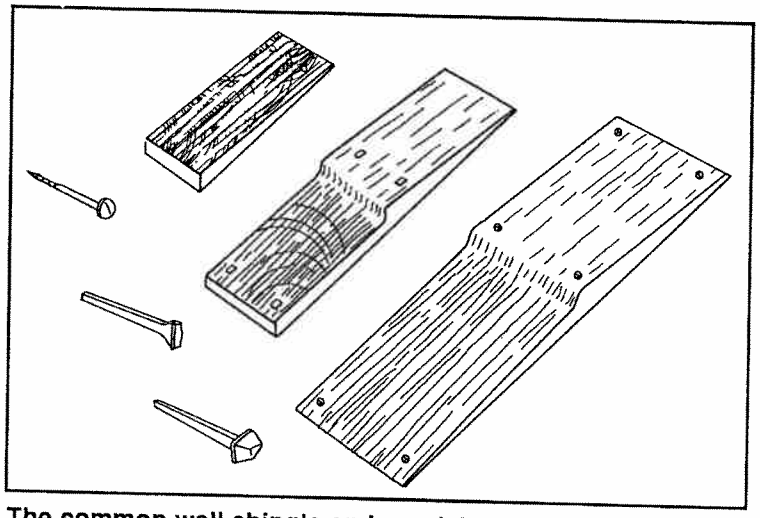


Do not introduce construction materials that were not available when the building achieved its present appearance. In this example, the subordinate part, the garage, is faced with brick, which draws attention to its plainness and away from the house.

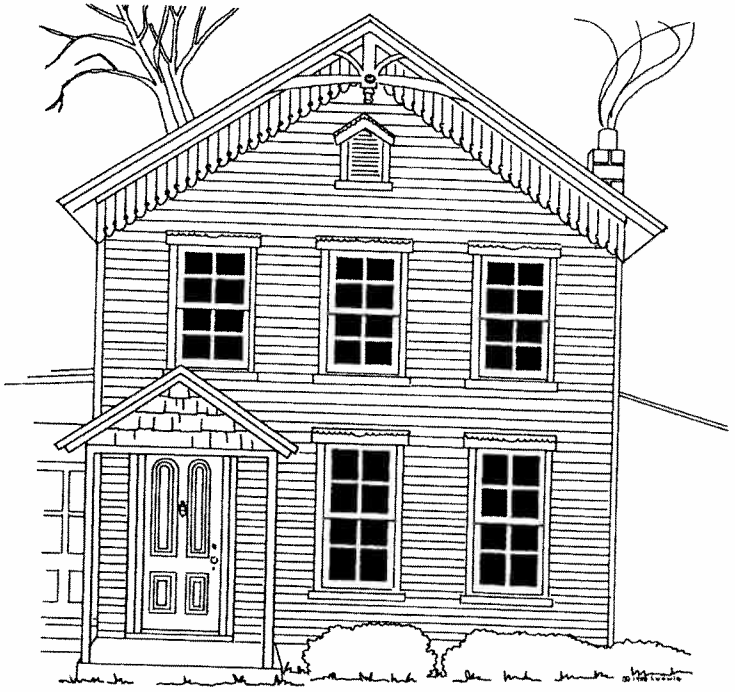


Generally, foundations were of stone in the eighteenth century, brick in most nineteenth century work. Rock-faced concrete block was introduced early in this century.

EXTERIOR WALL SURFACES. The most common wall surface on Long Island, the wooden shingle, is usually a native red or white cedar with its length varied through time. The rule of thumb is that in the eighteenth century they were hand cut and smoothed with a draw-knife, about 15" to 13" exposed to the weather and secured with rose-headed (handmade) nails 1" above the lower edge. Nineteenth century shingles were of similar size, secured with square nails (machine made), about 11" exposed. Late nineteenth and twentieth century shingles have no face nailing and have a sawn surface. The exposure may be as little as 6". Try to reuse as many of the original shingles as possible, especially in visible areas. Keep a consistent weather exposure. Shakes, which are thicker than shingles, and have a rough split-wood surface, are not a suitable substitute for the look of weathered shingles. Do not stagger the bottom edge (butts) of shingles because the resulting coarse texture does not look good on smaller-scaled buildings.



The common wall shingle on Long Island has changed through the centuries. In the eighteenth century (right), they were hand-cut and smoothed with a draw-knife, about 13" to 15" exposed to the weather and secured with handmade nails. Nineteenth century shingles (center) were of similar size, secured with machine-made nails, and about 11" was exposed. Late nineteenth and twentieth century shingles (left) have no face nailing and have a sawn surface, with about 6" exposure.



Clapboard siding became popular in the mid-nineteenth century and was used for larger homes.

Clapboards (horizontal strip siding with approximately 4-1/2" exposure) became commonly used on Long Island in the mid-nineteenth century and were used on more prominent structures, although the shingle retained its popularity. Early siding is rabbeted on its top edge to make a secure lap and is nailed with square nails. Later clapboards are tapered (thinner at the top) and held with wire (round) nails. Clapboards are to be painted, not left natural. They may or may not be treated with a vertical corner board. Aluminum or vinyl siding presents a synthetic appearance and is not a satisfactory substitute for wood. Its use almost always necessitates the removal or covering of original decorative features, especially around windows and doors and at rooflines. It may well cause deterioration and rot in the underlying wood structure. For these reasons, we recommend the maintenance and restoration of original wood on exterior walls.

Aluminum or vinyl siding (on the building on the left) alters a building's appearance: the synthetic texture never looks like the original wood and original decorative features are obscured. It is discouraged as a preservation technique.

Siding composed of vertical planking alternating with thin molding strips covering the seams is known as board and batten siding. It was popular between c. 1860 and 1900.

Frequently, exterior walls are found to be covered with asbestos shingles nailed over the original siding or wood shingling. This treatment was popular especially in the 1950's. While its removal may reveal original appearance and decoration, the owner should be aware that the underlying material may need repair, scraping and painting.

The use of any blasting technique for surface cleaning removes the surface of wood, masonry or stone and promotes water penetration. The best way to remove excess paint build-up is with hand scraping or a gentle water wash.

FIREPLACE HISTORIC DISTRICT

Siding composed of vertical planking alternating with thin molding strips covering the seams is known as board and batten siding. It was popular between c. 1860 and 1900.

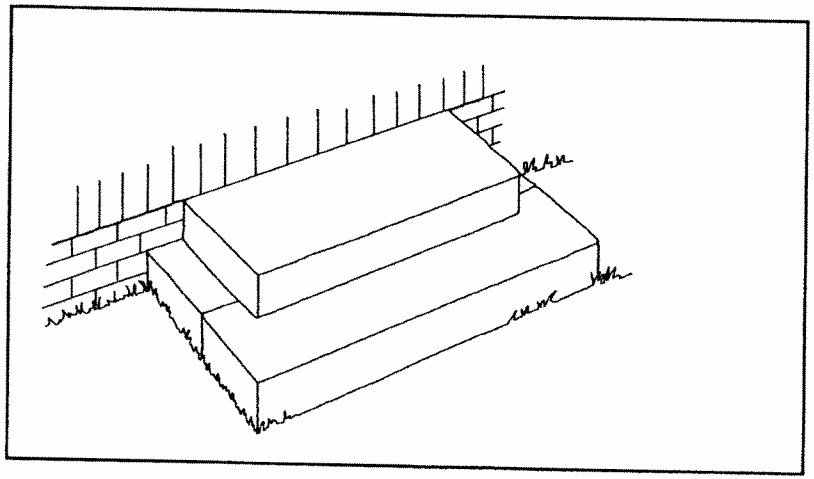
DYER'S NECK HISTORIC DISTRICT

It is usually a mistake to introduce another exterior material when planning an addition. For example, it is inappropriate to add a brick wing on a clapboard house, or a vinyl sided garage on a shingle house.

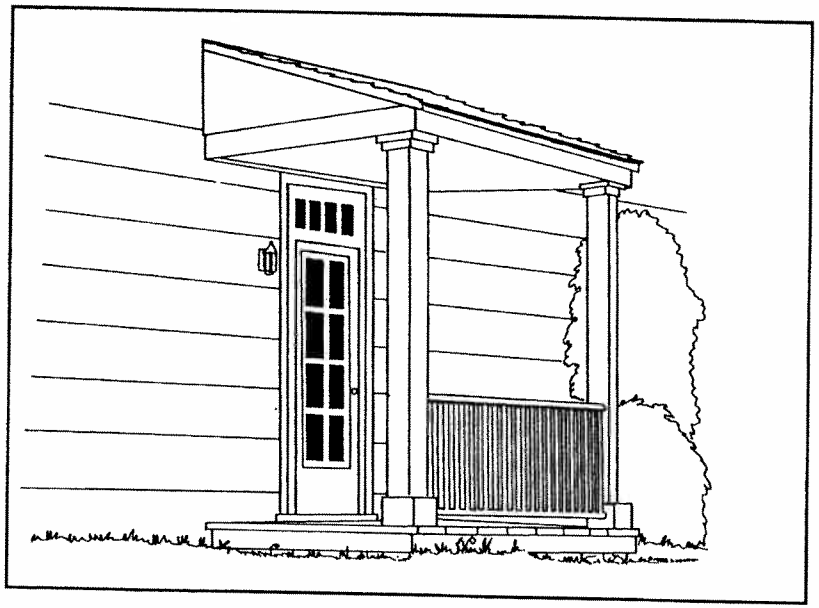
The HDAC will be happy to discuss with a homeowner appropriate treatments for covered siding. The decision to preserve or remove an existing covering is an individual one, governed by its condition and appearance and by the resources and desires of the owner.

Some houses are covered with asbestos shingles. While the original shingles or clapboard is beneath, removal can be hazardous, and can reveal a surface in need of repair.

DYER'S NECK HISTORIC DISTRICT



On the older homes on Long Island, front steps were made of wood or occasionally heavy stone. They are still frequently seen.



WM. SIDNEY MOUNT HOUSE

STONY BROOK DISTRICT

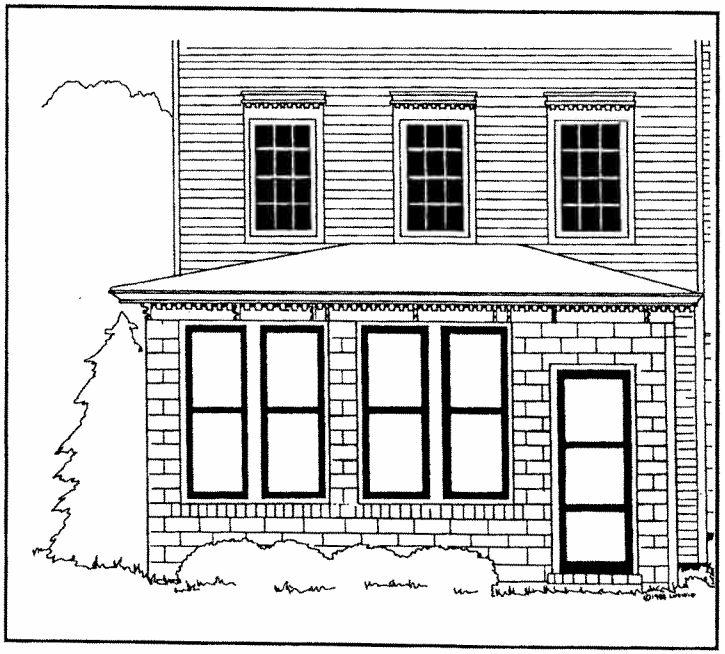
ENTRIES. The most frequently changed part of buildings is and has been the entrance, front steps, door and porch. On older homes on Long Island, front steps were made of wood or occasionally heavy stones. Replacement in brick or flagstone is appropriate only on twentieth century buildings. Thin wrought iron handrails should be rejected in favor of wood. Because porches require continued maintenance, they are seldom wholly original, particularly the floors and supports. The typical Long Island entry is still frequently seen because of its initial popularity and its revival in the early 20th century.

The verandah, a porch running the full width of the house, was introduced in the Victorian era (c. 1850) and continued into the 1920's. It was wood, set on masonry or locust supports, having six to eight (or more) turned posts and a nearly flat roof. These porches were frequently added to earlier buildings and some have been removed or enclosed in the last forty years. Porches of any type should be maintained. Enclosure, which substantially alters the appearance of the house, particularly on the front elevation, should be avoided.

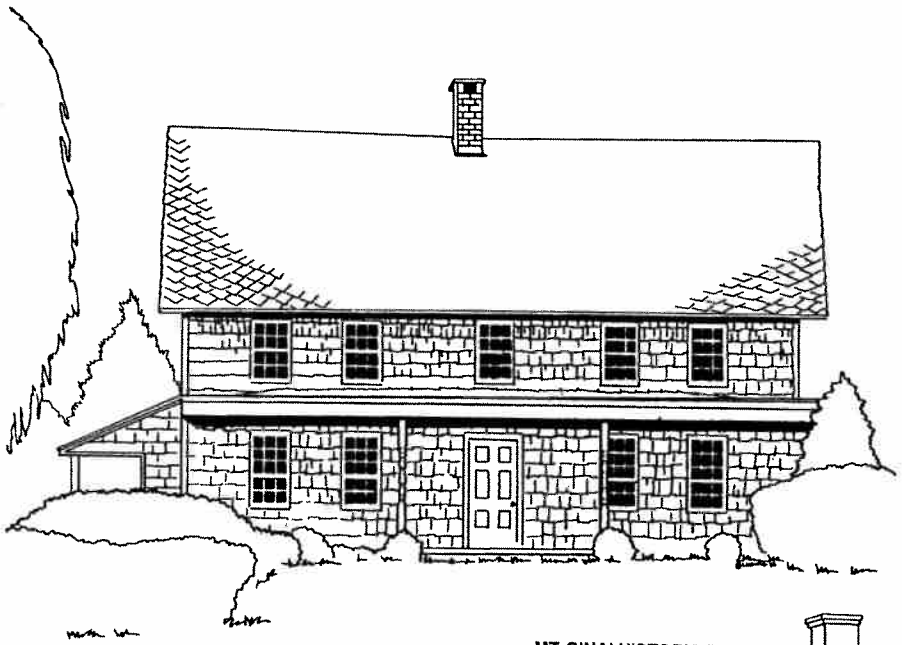
AVERY HOUSE

YAPHANK HISTORIC DISTRICT

The verandah, a porch running the full width of the house, was introduced in the Victorian era and continued into the 1920's. Often these were added to earlier buildings.



This porch enclosure has removed interesting original decoration, and introduced brick in an incompatible way. The porch window pattern and proportion bears no relationship to that of the house.



MT. SINAI HISTORIC DISTRICT

Roof shapes change in subtle ways. On this farmhouse of the mid-1700s, the roof has been widened. The asphalt shingles date from the early 20th century.

ROOFS. Roof shapes are good indicators of early appearance because changing them is such a major undertaking that it is seldom found. The extension of eave width was sometimes done to 18th century structures in the 19th century. In the 20th century, dormers were often added. In the course of general maintenance, roof materials must be renewed. Eighteenth and early nineteenth century buildings were given wood shingle roofs. After the Civil War, slat shingles for roofs or squares of metal with folded seams were intro-

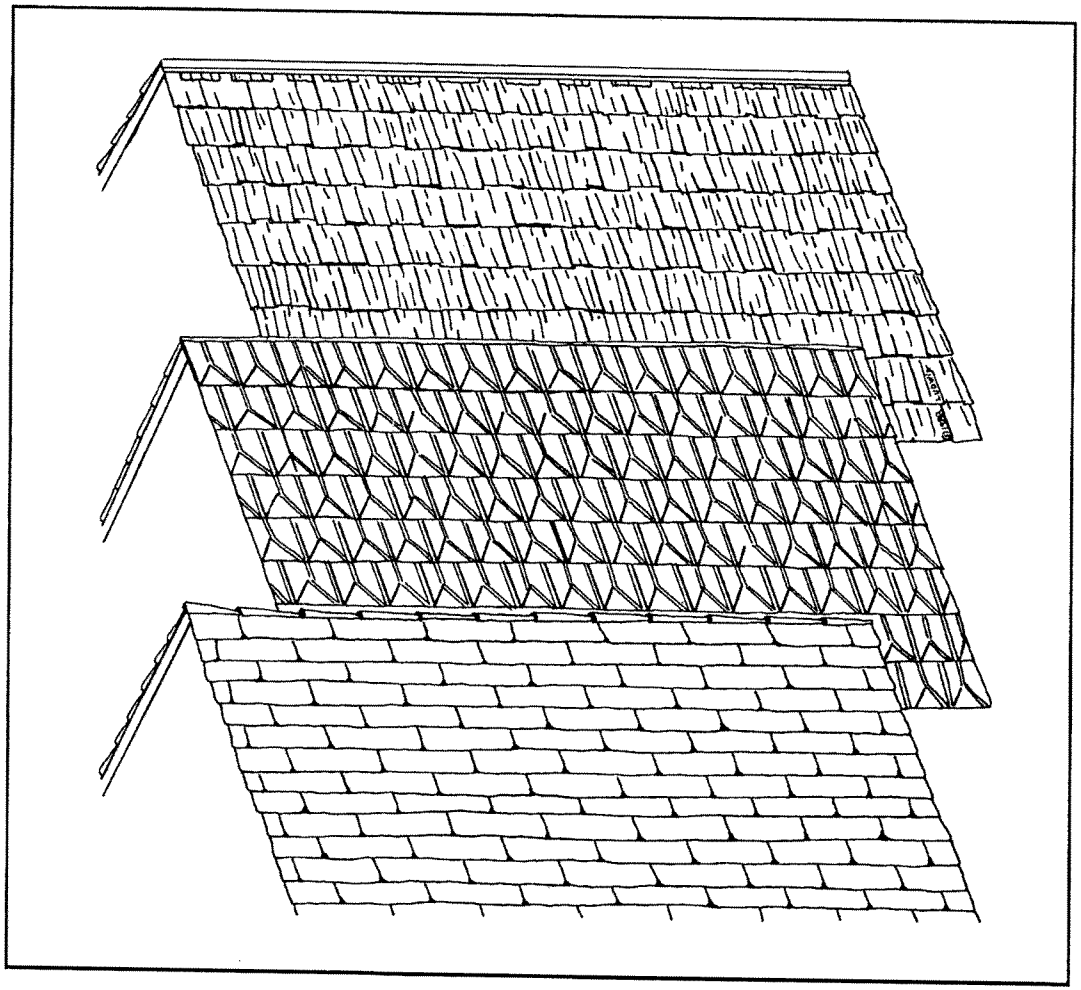
YAPHANK HISTORIC DISTRICT

An early nineteenth century house with a Victorian porch and early twentieth century dormers added.

duced. However, more humble houses and most barns and outbuildings still have wood shingle roofs. In the twentieth century, asphalt shingles were universally used for new and replacement roofing. Homeowners have a wide choice of roofing materials available today. However, we suggest that the color of new roofing resemble as closely as possible the original and that bright colors and patterns be avoided. Metal or slate roofs should be repaired rather than replaced with contemporary material.

FIREPLACE HISTORIC DISTRICT

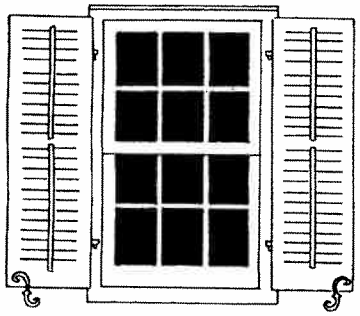
A bungalow style house c. 1920 with an unusually patterned asphalt shingle roof.



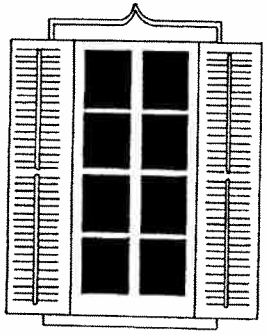
Examples of nineteenth century roofing materials: top, a typical wood shingle roof; middle, a roof covered with stamped metal shingles with interlocking edges, factory-made in the late nineteenth and early twentieth centuries; and, bottom, an example of slate roofing with alternating bonds of colored slate, fashionable in the 1870s and 1880s.

WINDOWS. Preservation of a structure's windows is perhaps the most important factor in maintaining its integrity. With regular attention, an original wood sash will last indefinitely.

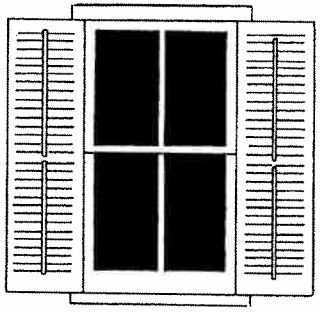
Double-hung sashes with six lights (glass panes) over six is seen in buildings built from the early years to the 18th century. Generally, glass sizes become larger during the nineteenth century: four lights over four are seen in some houses built in the 1860's. By the 1970's and 1980's, two lights over two were the rule in frames measuring up to 60" in height. One over one sashes appeared toward the end of the century as did the use of colored 'stained' glass. In the twentieth century, under the influence of the colonial revival style, domestic windows became smaller and the six over six was reintroduced.



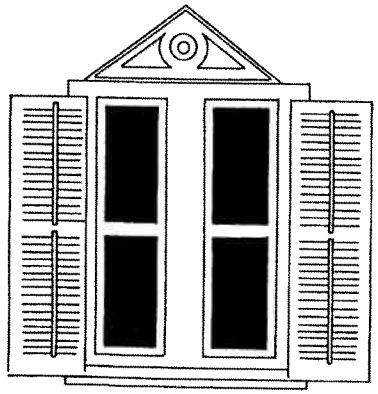
a. Double-hung sash with six lights (glass panes) over six is seen in buildings built from the early years to the 18th century.



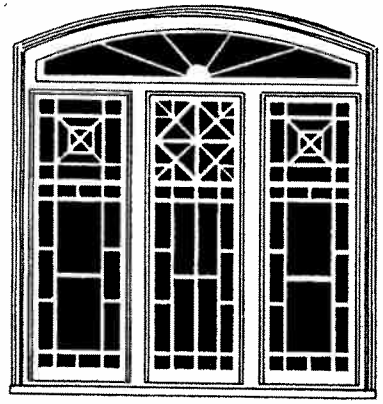
b. Four lights over four are seen in some houses built in the 1860's.



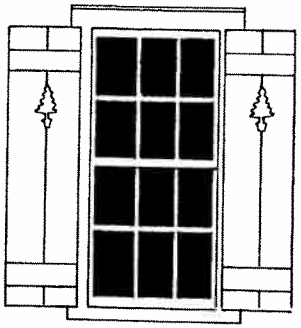
c. By the 1870's and 1880's, two lights over two were the rule in frames measuring up to 60" in height.



d. One over one sashes appeared toward the end of the century...



e. ...as did the use of colored 'stained glass'.

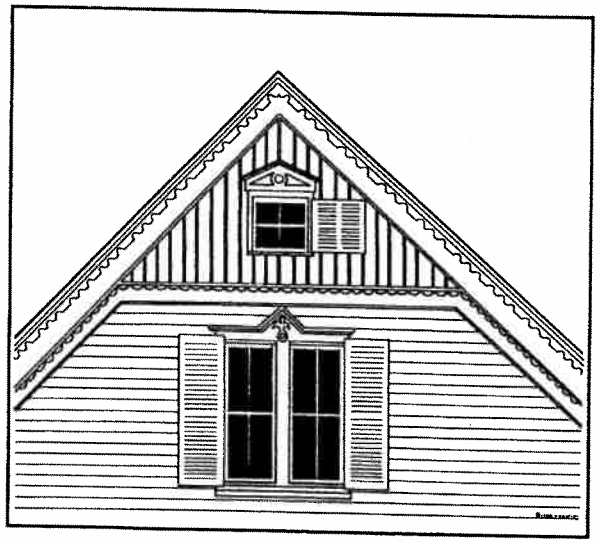


f. In the twentieth century, under the influence of the colonial revival style, domestic windows became smaller and the six over six sash was reintroduced.

Older homes were sometimes refitted with newer windows in the nineteenth century to 'keep up appearances'. It is not advisable to replace these for they are important in the evolution of the structure.

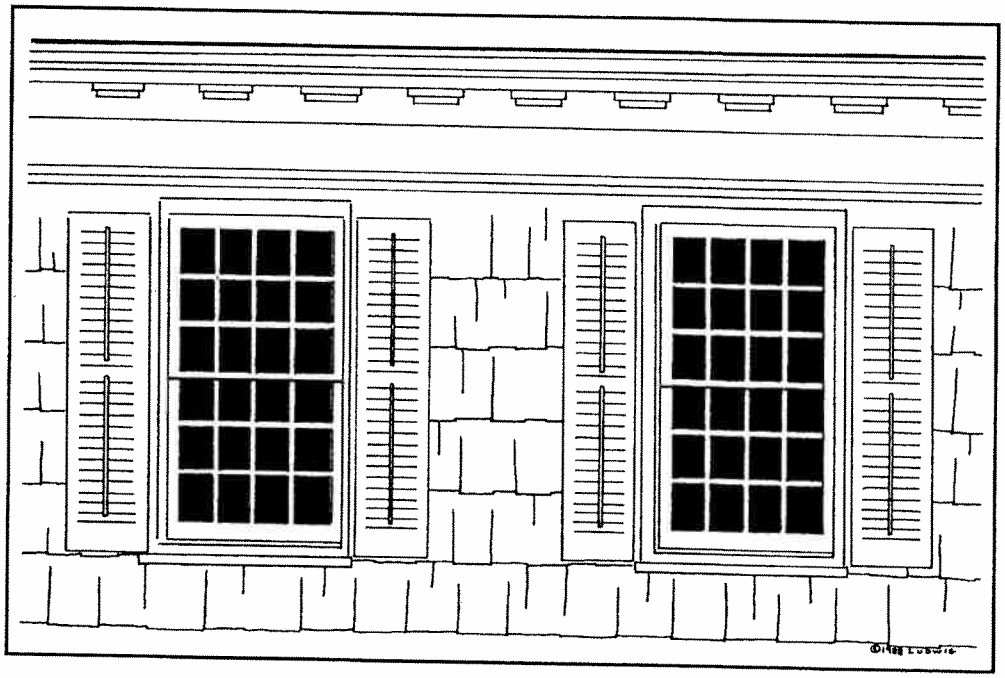
It is important to retain the original spacing of windows.

Proportion is central to design. Spacing, the wall space between windows, was equal to or greater than the width of the windows until the mid-nineteenth century. After about 1860, windows may be doubled-up (set side by side). Symmetry was not necessarily observed in the Victorian period.



STONY BROOK HISTORIC DISTRICT

After about 1860, windows were often set side-by-side.

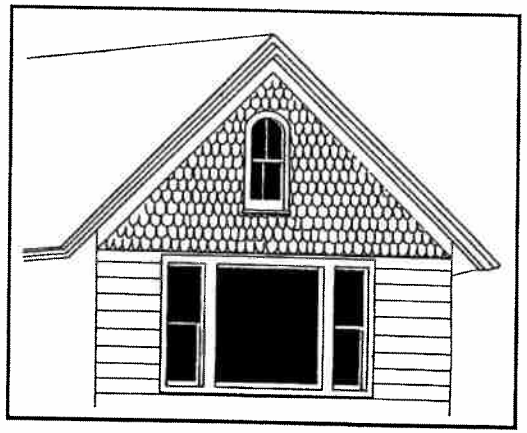


Before the Civil War, windows were placed apart by a distance at least equal to their width. It is important to retain the original spacing of windows.

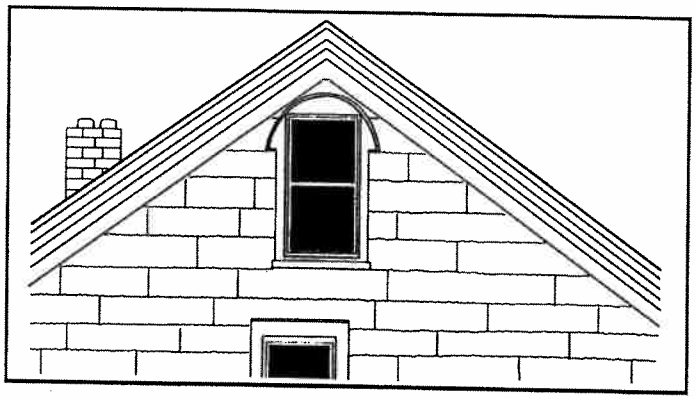
The replacement of windows, all the rage in the 19th century, is no longer in vogue and is strongly discouraged. It is recommended that additional windows be of the same size and proportion as those existing, (including the width and coloring of the frame). Modern replacement windows with 'snap-in' muntins (the bars between the panes) do not look like wood sash and the plastic removable inserts have too often been removed permanently, rendering the window different in design than intended.

MILLER PLACE HISTORIC DISTRICT

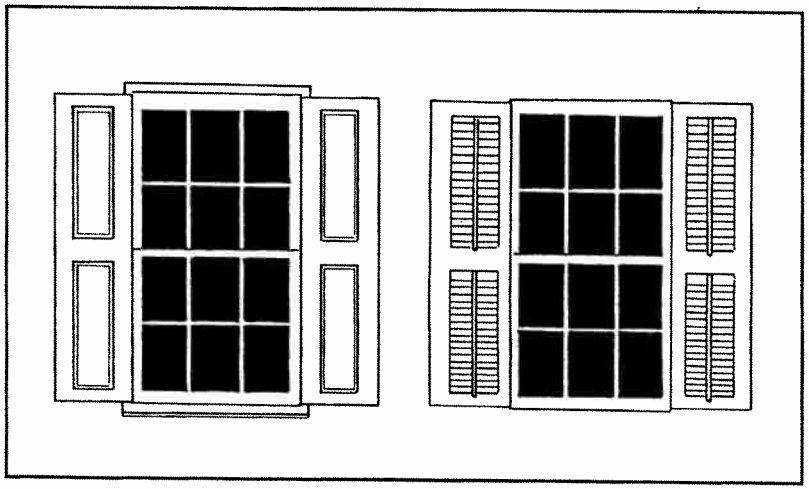
When snap-in muntins are removed, the intended design is significantly altered. We've changed the windows in this structure to illustrate the point.



This picture window is a replacement that is inappropriate: it is disproportionately large for this Victorian gable.

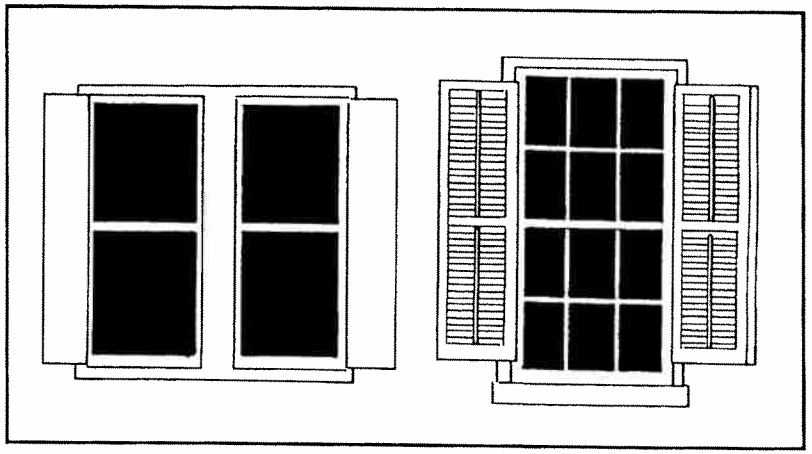


Replacement windows should be of the same size and proportion as the originals. This modern in-fill disfigures its surroundings.



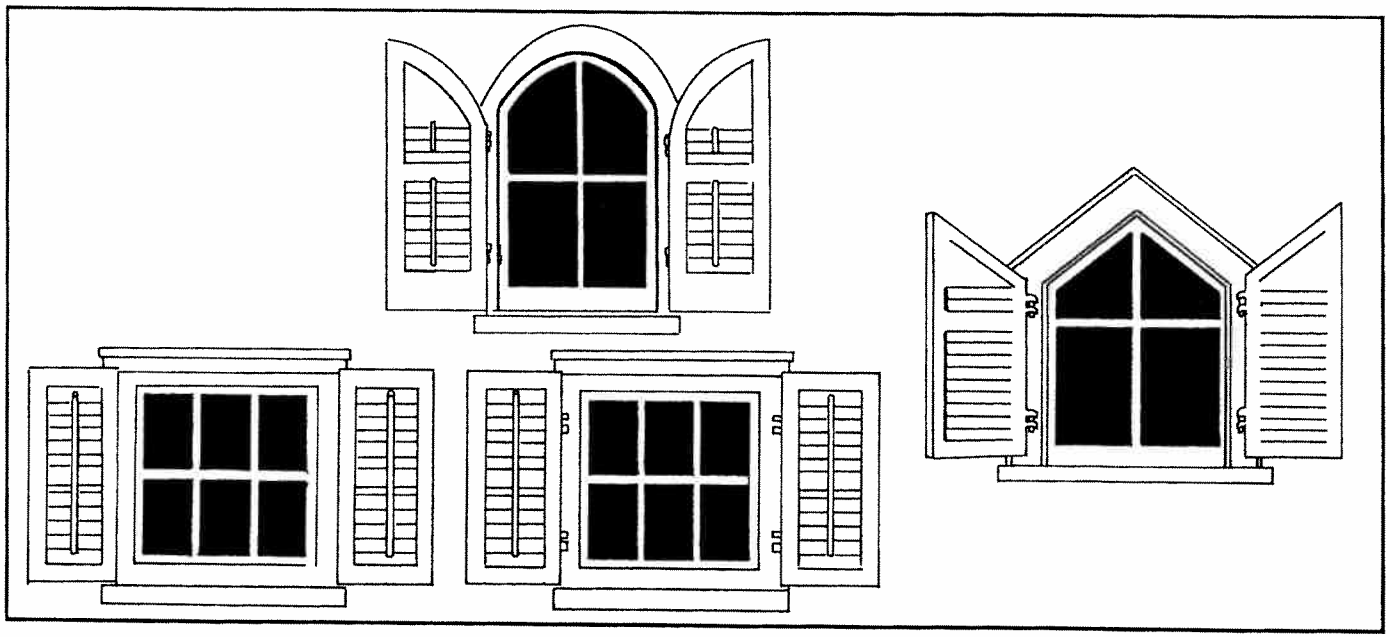
The panel and louver shutters illustrated here are properly proportioned and "functional" – each panel could cover half of the window.

Shutters were first used in the eighteenth century. Both the panel type and those with louvers have been found on buildings of every age. But not all homes had them, and they are not essential to a restoration. Better, in fact, to have none than to install ones of improper size.



These illustrations show shutters that cannot function. The shutters on the left are too narrow, the shutters on the right are too short.

Shutters were functional and therefore the size is important. The height should equal the distance measured from the top of the frame (inside the frame) to the top of the sill. The width of each shutter is equal to half the inside measurement of the frame. Shutters are hinged over the vertical jamb, not nailed on outside of it



Examples of correctly fitted shutters: The height equals the distance from the top inside of the frame to the top side of the sill. The width of each shutter is equal to half the inside measurement of the frame. Shutters are hinged over the vertical jamb, not nailed on the wall beside the window.

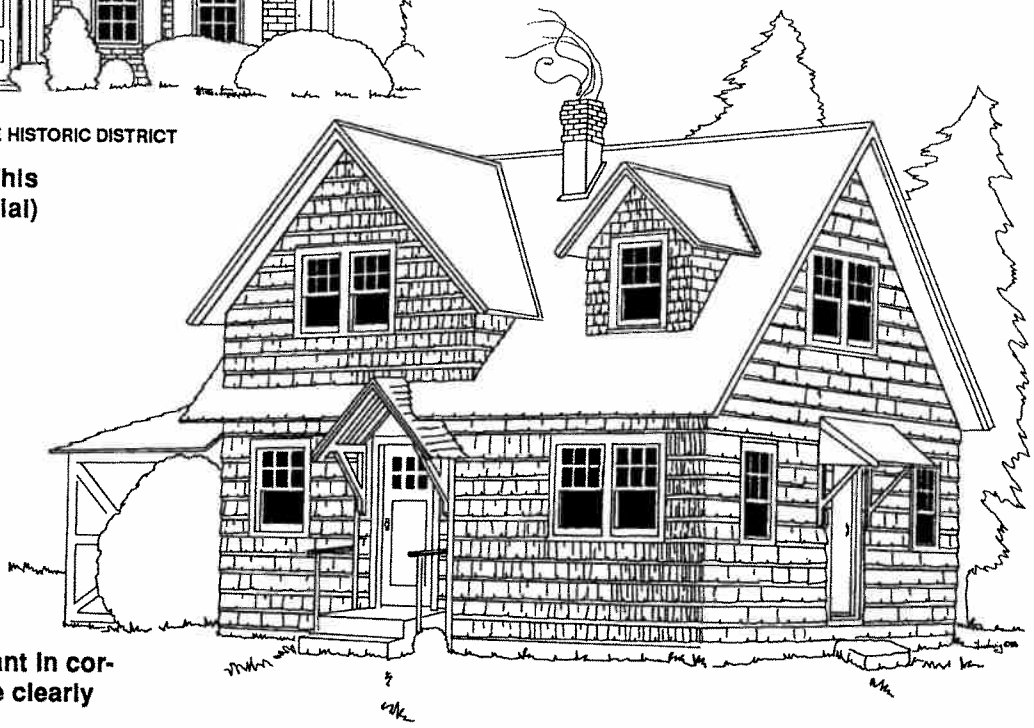
DECORATIVE DETAILS. The degree of decorative detail varies greatly from building to building–early and modern buildings tend to have less, while those of the Victorian period almost always have more. Entrances and cornices on the primary facades received the most decoration. Care to the preservation of these details, wherever they exist, is important, as is replacement of missing elements whenever possible. However, it is not recommended to add detail where it never existed.

OLD MASTIC HISTORIC DISTRICT

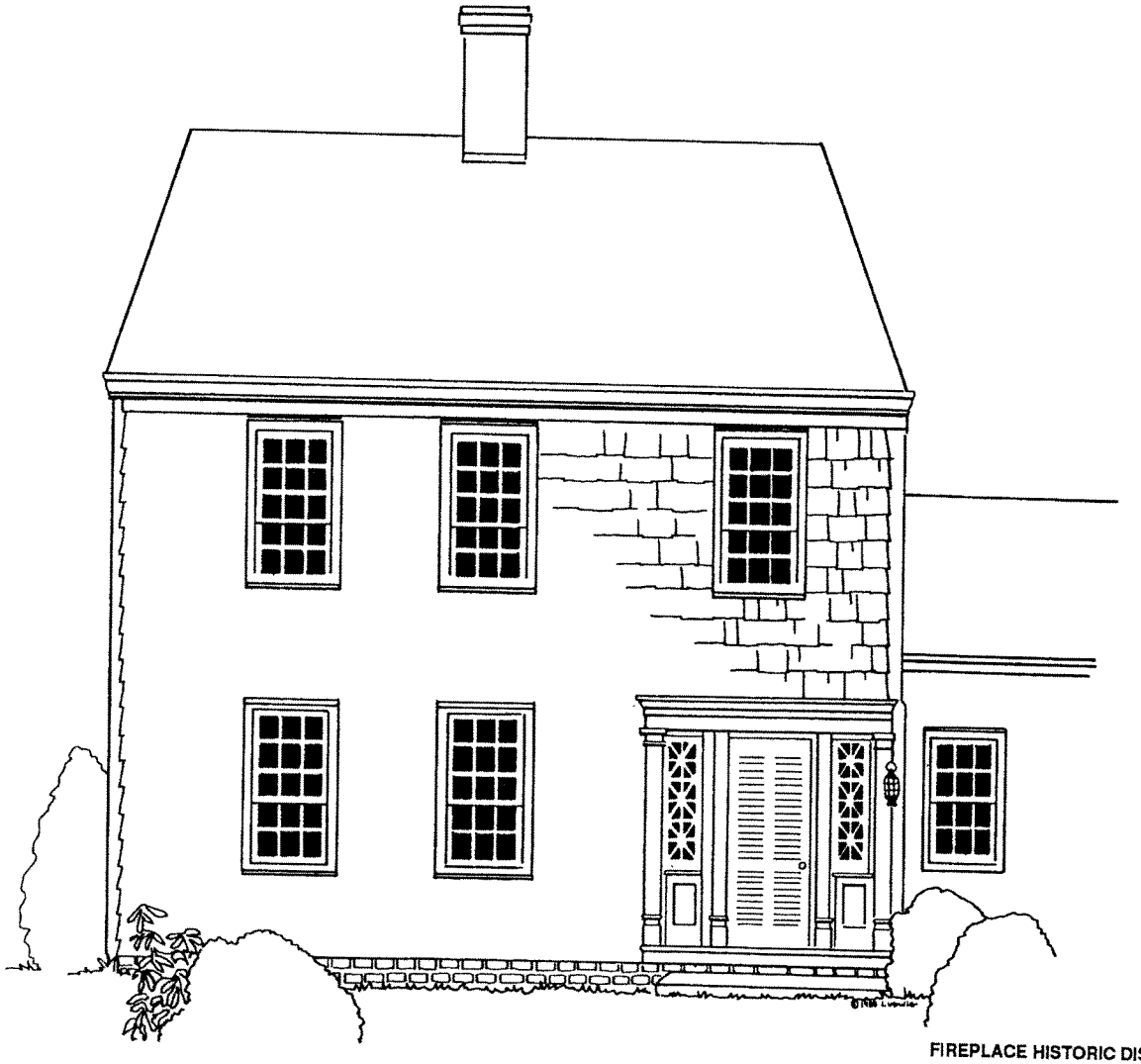
In this structure from the late nineteenth century, decorative elements are essential to the design.

FIREPLACE HISTORIC DISTRICT

Modern design rejects much decorative detail. This twentieth century house copies Georgian (colonial) design.



Decorative elements are most prominant in cornices and entrances. Here, the roofline clearly defines the house shape.



FIREPLACE HISTORIC DISTRICT

This house style, found all over Long Island, was popular in the early 1800s. The decoration of the entrance, however, enhances the whole.

Decoration was often used to establish a continuity among various buildings occupying one site. So, for example, details that appear on the main house may be repeated in a simpler or smaller way on the barn, carriage house or even on the

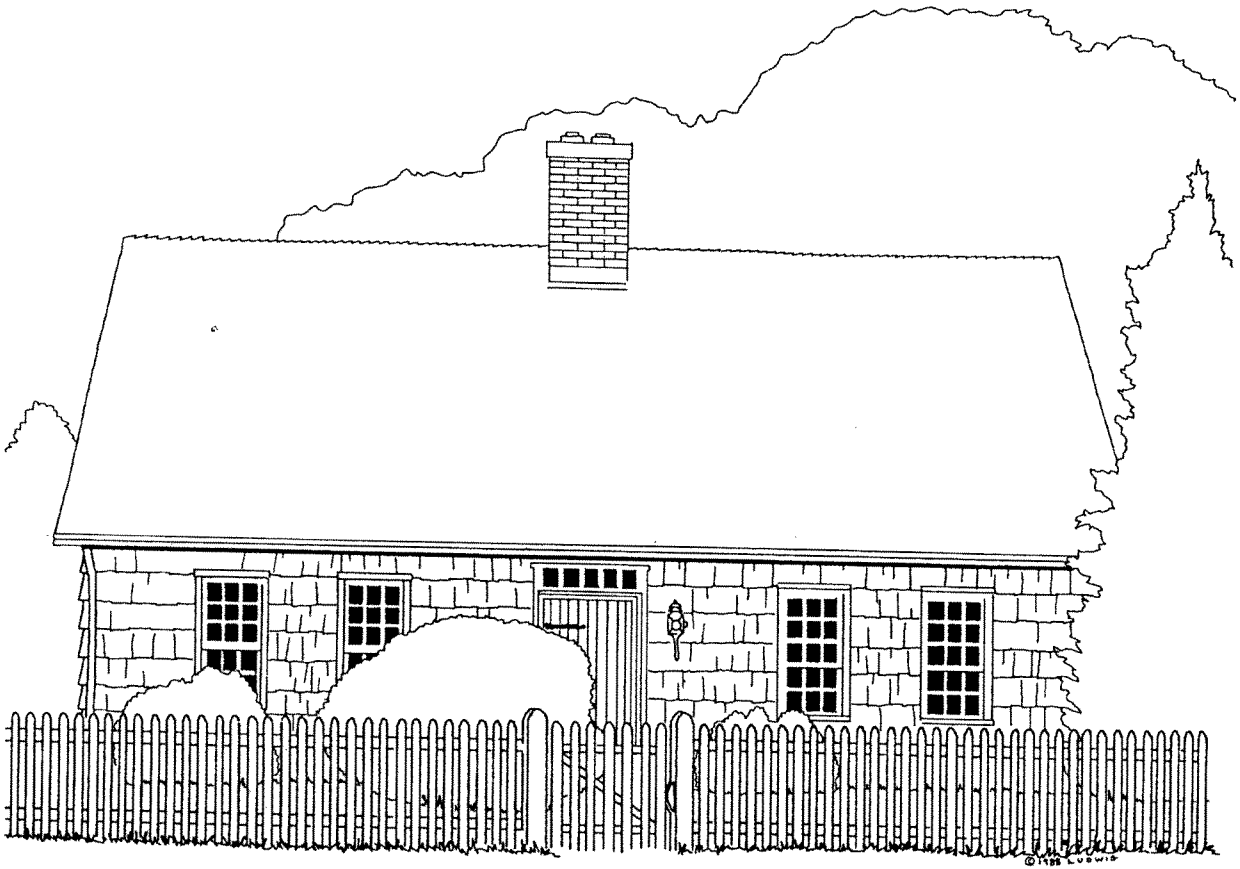
fence posts. These visual embellishments lend continuity and harmony and should be preserved. They may now span more than one property, but this is also an important part of the history and provides all the more reason for their continuation.

Decorative elements are often used to establish a continuity among various buildings on one site. Details of the house, here, are repeated on the garage. Preservation of these intentional linkages is important.

SITE AND SURROUNDINGS. The appearance of a building can be enhanced by sensitive layout and compatible visually adjacent structures. Conversely, it can be seriously compromised by incompatible neighboring uses or inappropriate landscaping treatments.

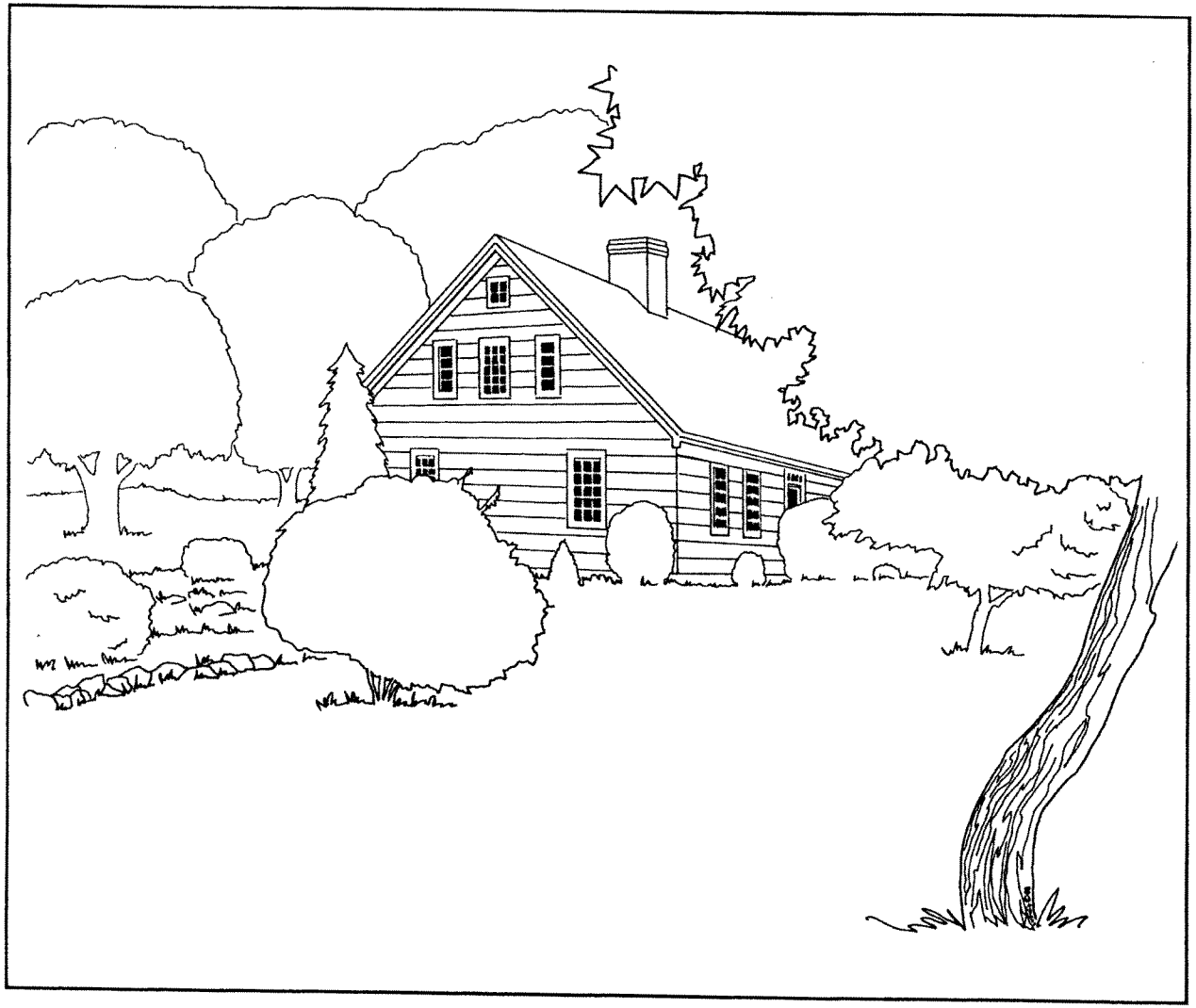
The simpler the house, the simpler the landscaping should be. Small houses are improved by light planting while dwellings large in scale can carry formal lawn, tree and garden layouts.

Appropriate period landscaping ideas can be gathered for 20th century buildings from old sales catalogues issued by real estate firms and lumber companies. Period magazines are also helpful. As with all other aforementioned areas of restoration, the local library and local historical societies are invaluable sources of information and assistance.



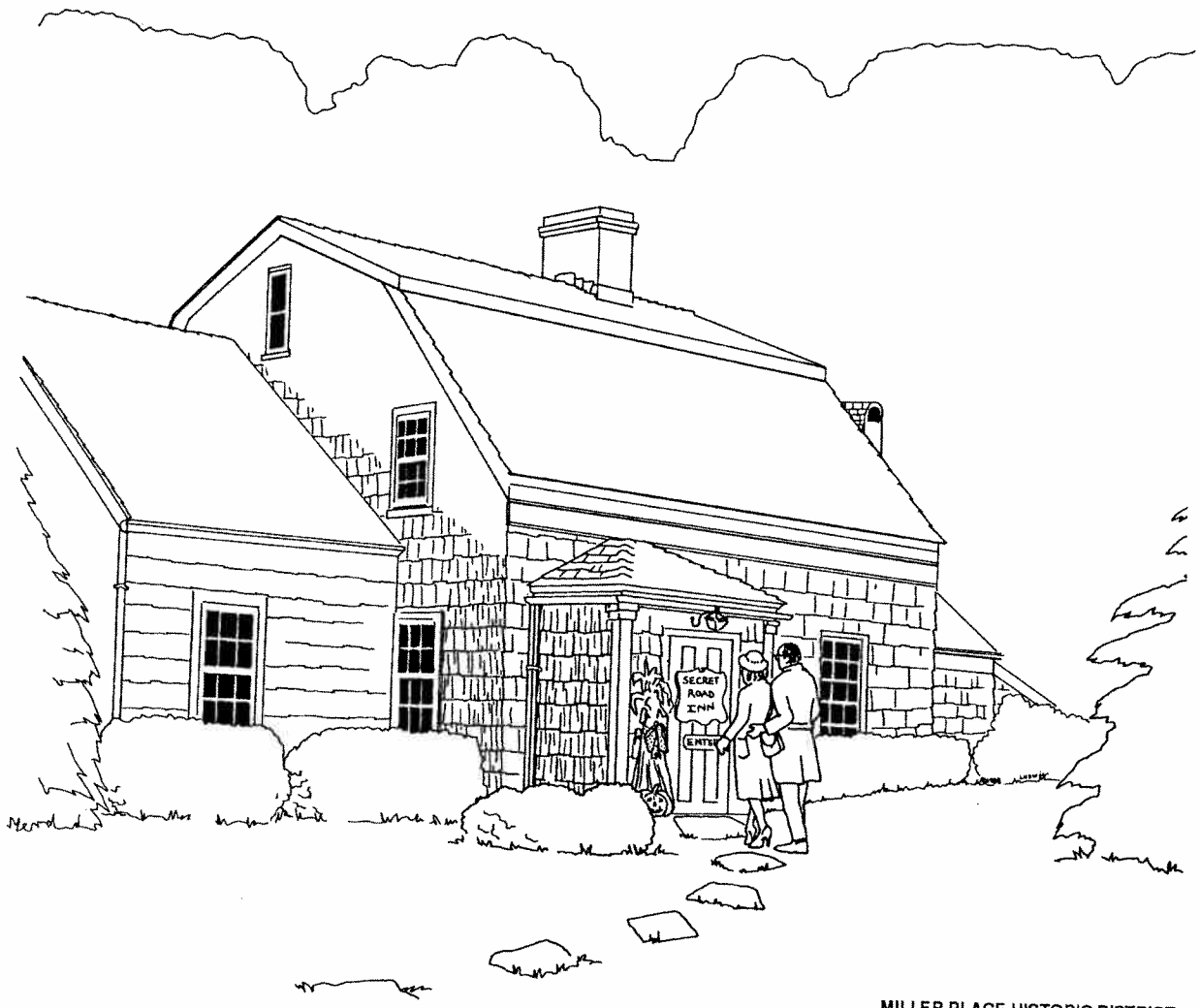
MILLER PLACE HISTORIC DISTRICT

Small houses do not need elaborate landscaping. This house, close to the road, is given privacy by the fence and plantings.



MILLER PLACE HISTORIC DISTRICT

This pleasant, informal landscape shows the house to best advantage.



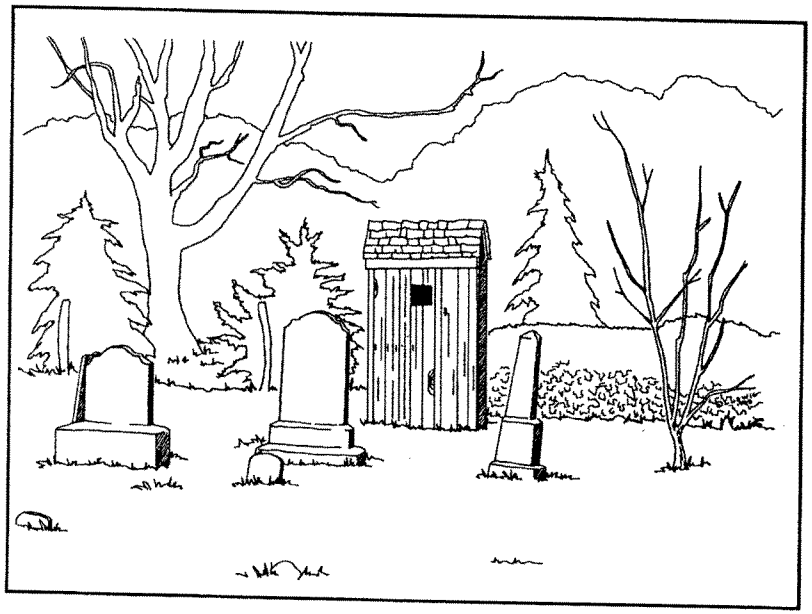
MILLER PLACE HISTORIC DISTRICT

Older buildings, now on busy roads, can be modified to accomodate new commerical or professional uses without compromising their integrity.

ADAPTIVE REUSE. Important older buildings that were at one time part of a thriving village crossroads can become isolated in the midst of modern commercial strips and therefore are more suitable for professional or commercial use than as the residences they once were. Changes in use over time lead to changes in local zoning. Historic houses in commercial areas can be modified to accommodate new uses without compromising their integrity. This is called adaptive reuse.

The HDAC encourages sympathetic proposals that preserve historic integrity in modifying a building to suit its current circumstances. Exterior changes should be minimal, with care given to increased parking needs, landscaping, buffers, unobtrusive exterior lighting and appropriate signage. Successful examples can be found throughout the Town and serve as models for future projects.

LONGWOOD ESTATE, TOWN OF BROOKHAVEN



LIMITATIONS ON DEMOLITION. The Building Department will not issue a permit for demolition of all or part of a building or structure within a historic district or landmark area until the Planning Board has reviewed the application and its potential effect upon the district or landmark area.

If the Planning Board finds that preservation is physically or economically infeasible, it may permit demolition. But the Planning Board is charged to take (or encourage others to take) whatever steps appear most likely to lead to a building's preservation either on the original site, or on another site to which it might be moved.

Unless the owner of the property agrees to an extension, the Planning Board will decide upon an application for demolition within six months, rather than the usual 45 days, to allow time for alternative solutions to be found. An appeal from the Planning Board's decision may be filed with the Board of Appeals.

In order to prevent property owners from allowing structures to deteriorate to the point where they have to be demolished because of unsafe or dangerous conditions, the building inspector, after conferring with the Planning Board, may require that the defects be corrected at the earliest possible time.

These provisions of the Town Code do not supersede the obligations of the building inspector, with the Planning Board, to order the modification of any physical condition determined to be dangerous to the life, health or property of any person.

THE EIGHT MOST COMMON MISTAKES IN RESTORING HISTORIC HOUSES (...AND HOW TO AVOID THEM)

by Morgan W. Phillips

As more and more people turn to restoring old houses, it is becoming apparent that certain serious mistakes are being made over and over again. This article outlines these most common mistakes and tells you, at least in general terms, how to avoid them.

1 DON'T DESTROY THE EVIDENCE. MAKE TRACKS.

Old buildings almost invariably consist of material from a number of periods. When a decision is made to remove some recent material and reproduce what had existed at some earlier time, the problem arises of how to find out exactly what the earlier material looked like. Very often a detailed answer can be found in evidence actually on the site. Telltale fragments of missing woodwork may have been reused as a part of later woodwork, or may have fallen into some crevice during the remodeling. A ridge in the paint layers, when illuminated with a light held at an angle, may give the profile of a key piece of woodwork which has been removed.

A common mistake is to proceed with restoration work before gathering all such evidence. The evidence is then lost–removed by carpenters, obliterated by sanding, or thrown away during overambitious cleanup.

For the same reason that architectural evidence is valuable to use, we should leave a record of our work for the future. New wood should be marked, and a thorough record kept, with text, photos, and drawings or sketches. Measured drawings of the building are the ideal place on which to note all the evidence discovered.

2 DON'T OVERRESTORE.

Over-restoration usually takes two forms. First, there is the replacement of old material just because it shows the signs of age and thus looks a little too rough to suit the tastes of a perfectionist. Old bumpy plaster is replaced with a perfect new job; old fireplace bricks showing some minor heat damage are replaced. A building thus restored loses the patina of age which made it appealing in the first place, and loses the actual materials which make it genuinely old.

A second form of over-restoration is to return the building to its original appearance by stripping away later additions of historical or architectural value. Virtually every old building is a collection of material of different dates. This is true not only of American houses but also of the famous ancient buildings of Europe and elsewhere. Sometimes the additions are of more interest than the original parts. A typical example of a valuable later addition is a fine Federal period mantel built in front of an earlier, larger fireplace. All too often such fine work is destroyed to expose what remains of the original fireplace.

Clearly there is usually a lot

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of material of no value, which can be removed. But the decision about what goes and what stays should be made very carefully, on the basis of a study of the building, and after consultation with others who are familiar with American architectural history.

In general, the best policy is to retain later material: as a real part of the building's past it has more value than "fake" material put in now. If you don't have time to carry out a study of the building, then the safest policy is certainly to keep later features in place.

3 DON'T MAKE A BUILDING THAT NEVER WAS.

This is a very common mistake, and a subtle one. It most often happens in one of two ways.

First, it is quite common to see one part of a building restored to one date and another part to another date. As an example, suppose a house of 1810 was heavily remodeled in 1860–roof raised, new front doorway, new window sash. If today we tear out the 1860 sash and put in 1810-type sash, while retaining the other 1860 features, we have created an appearance which the building never had at any time. Usually this mistake occurs through lack of study of the building, or through the owner's selective dislike for some part of the later remodeling.

A second example of restoring to a condition which never existed is to restore a building to an appearance which is earlier in character than the building itself–and more primitive. Many old buildings were better-finished than we realize. For example, the best 18th-century floorboards were not 18" wide and knotting, but 6" to 10" wide, free of knots, and cut across the growth rings so as not to splinter or warp. The use of typically wide, poor-quality attic floorboards in the restoration of formal rooms is a classic mistake.

Probably the most common example of "earlying it up" is the removal of plaster from ceilings so as to expose bare beams, when these beams were never meant to be exposed. Only the earliest or most primitive houses had exposed beams: in most areas, from the early 18th century onwards, plaster, paneling, and moldings–not beams–were considered beautiful.

In order to avoid making a building look earlier than it ever possibly could have, it is important to have in mind the actual date of the building. Quite often one sees a fine formal house of, say, the Greek Revival period (c. 1825-1860) marked with a date of perhaps 1750, and sometimes "restored" accordingly. This is apt to happen when the owner has searched the deeds and discovered that a house was built on the site in 1750, but has failed to consider what might have happened to that house in 1750. Did it burn in 1790? Was it taken down or moved across the street? Or was the land divided in 1839 so that the 1750 house is really the one next door? The construction of the present house may not be recorded in any documents.

The importance of researching and analyzing a building as a guide for restoration and repair cannot be overemphasized. Documents and the building itself must be studied together. If one trusts only the documents, one can make the kind of mistake just described. If one examines only the building, much information contained in deeds, wills, inventories, old maps, old drawings, and many other sources will never be found. Such information is invaluable in piecing together the whole story of the building and in making the decisions required during the restoration process.

4 DON'T SCRAPE.

The most common procedure in reproducing old paint colors is to scrape clean a sample of the old paint and then match its color with new paint. In many cases the color thus achieved is incorrect, since the old sample has discolored with time. Many unstable pigments were used in early paints, and have faded. The oil in many old paints has yellowed, often after the paint was covered by later layers, since oil yellows fastest in the dark. Thus many old colors were brighter than we realize.

The analysis of old paints to determine their original colors is very difficult. Short of hiring a professional, the best that a homeowner can do is just to avoid unnecessary stripping of old paint, since this destroys the old samples and means that the research can never be done. And it's not good enough to strip a whole room and leave just one area as a sample: a future researcher will want to look all around the room with a microscope to find one or two well-preserved samples. These are very apt to be little thick lumps of paint near hardware or in crevices, and there may be only a few good ones in a whole room.

Thus paint-stripping should be undertaken only when absolutely necessary, and as much of the old paint left on as possible. Since most old woodwork was painted from the start, the bare knotty-pine look is apt to be incorrect, anyway. An exception is some types of Victorian houses where interior woodwork was varnished.

Old wallpapers should be preserved when possible for the same reasons as old paints: they are evidence of changing taste in the building through the years. Many old papers date back as far as the late 18th century and have real value. If the paper has to be removed, you should keep samples at least large enough to show a full repeat of the pattern. Some wallpapers are important enough to deserve being kept intact on the wall at all costs.

5 DON'T SANDBLAST: AVOID DESTRUCTIVE REPOINTING.

The cleaning and repointing of old brickwork is seldom done properly.

Old brickwork is often sandblasted to remove paint. Unfortunately, in most cases this also removes the hard skin of the bricks, exposing the much more porous and weaker interior, which often cannot stand up to the weather. Since the skin was formed in the brick kiln, it can never be reformed once it is removed. After being sandblasted, old bricks absorb much more rain water and, with freezing temperatures, often start to spall and crumble in a few years or even months.

Having removed the bricks' natural barrier to excessive water penetration, building owners are apt to be sold a silicone treatment to help keep water out. This treatment has something of a bad reputation: it is said that it can trap in water which has got into the bricks in any of a variety of ways, such as through small cracks in mortar joints, from normal interior humidity, or by rising through capillary action from damp soil beneath the building. If this should occur, such trapped water can cause doubly accelerated decay of old brickwork. Silicones are no substitute for the bricks' own skin.

Where old paint is to be removed, one question to ask is whether the paint should be removed at all. Many early brick buildings were originally painted, and the record of the original color is the old paint itself. Once this is removed, the story is lost.

If it is decided to remove the paint, a variety of chemical removers are available. If the right remover is chosen to suit the individual buildings the method, although slow, is usually the least damaging to the bricks.

Repointing with Portland cement mortar is perhaps the most common and most damaging error in masonry restoration. Portland cement mortars are made with Portland cement, some lime, and with sand as a filler. If the proportion of cement versus lime is high, the mortar is extremely strong, thus being well-suited to the best modern bricks, which are also very strong. Together they produce the high-strength masonry needed for modern construction. But old bricks (and many kinds of stone) are much weaker and can be damaged by very strong, hard mortar used in repointing. A basic principle is that mortar should always be weaker than the bricks or stones which are

bedded in it: thus the old lime mortars–made with only lime and sand–worked well with soft bricks and stones. A soft mortar can cushion various movements which occur in masonry: thermal expansion and contraction, expansion and contraction caused by humidity changes, foundation settlements, and so on. Small cracks of no importance may form in the mortar. But where the mortar is stronger than the bricks or stones, the latter give way before the mortar, by serious cracking or spalling.

The formulation of mortar for old buildings requires experience and judgment. Many old limes contained certain impurities which actually made them stronger than today's pure lime. When using modern lime a relatively small amount of Portland cement is often needed to provide the same durability and strength that the old mortar had. The proportion of cement should be chosen on the basis of the strength of the bricks or stones, the severity of weathering action, and other factors.

New mortar should be color-matched to the old. This requires sand of the right color, and usually some masonry pigments. A great many buildings have been defaced by dark gray Portland cement mortar, when originally the mortar joints were the light warm white of lime. Some manufacturers offer a perfectly white Portland cement which is extremely useful in mixing new mortar to match the color of lime.

Perhaps the worst aspect of Portland cement mortar in old masonry is that its strength makes it almost impossible to remove without damaging soft bricks or stones. As for removing old mortar prior to repointing, few people realize the damage usually done even in removing a soft, deteriorated lime mortar. Electric-powered cutting wheels are often used, which almost always damage the corners of fine, closely laid old bricks, thus sometimes noticeably enlarging narrow mortar joints. Only hand tools should be used for removing old mortar, unless in a particular situation a contractor can show that some type of power tool is not damaging in any way.

Old mortar in good condition should not be disturbed. It is normal for old mortar to be weathered back a short way from the face of the bricks; this does not mean that repointing is needed, since having eroded back a little the old mortar may be sheltered by the bricks and may not erode any further.

6 DON'T ASSUME IT CAN'T BE FIXED.

With the advent of all kinds of modern products it has become possible to recondition partly deteriorated woodwork, plasterwork, and other architectural material which, 20 years ago, would have had to be replaced. Thus an old building can retain more of its authentic material, and more of its value. Quite often one sees old features which could be saved being carted off to the dump.

This suggestion that modern products are useful in restoration should not be seen as a contradiction of the preceding part of this article where we pointed out that lime mortar (a traditional material) is generally better than Portland cement mortar (a more modern material) for repointing soft brickwork and stonework. Portland cement IS extremely useful in restoration–for foundation work, for strengthening lime mortars moderately, and for many other purposes. The point is that both modern and traditional materials are useful, and that any material can be used incorrectly.

Some of the most remarkable progress in conservation of old buildings is being made in the area of wood preservation by means of epoxies, polyesters, and other modern synthetic resins. Such resins are the basis of modern waterproof glues, and of many products sold in marine hardware stores for impregnating partially rotted wood or filling holes in wood.

The things that can be done with waterproof glue would have amazed an old-timer accustomed to animal glue, which is water-soluble. For example, a roof balustrade of 1806 can have new wood fitted into each baluster wherever the wood is rotted away–and there need be no fear of the patches coming loose because of rain or dampness. Such a balustrade would have had to be replaced completely prior to the introduction of waterproof glue. Waterproof glue opens the door for the extensive repair of damaged woodwork by skillful piecing-in of new wood.

In the same way, modern resins allow old, partly rotted wood to have permanent strength restored. In some methods, holes are drilled into the wood to expose the end grain, and the resin soaked into the wood through the holes. It then hardens. Not only are such wood-consolidating methods popular in the marine field, but similar methods are used in the conservation of antique wooden art objects. Resin-impregnation is sometimes the only way to conserve a valuable piece of

woodwork in an old house: the capital of a column, the bottom of an original door.

Other modern materials can be used for consolidating weakened plaster, readhering peeling paint in wall painting, and many other purposes. Steel, the modern architectural material, which because of its great strength, can be used to permit an old beam to be reinforced, rather than having to be replaced. Very small amounts of steel can form the backbone of an inconspicuous repair which must carry a heavy load.

7 GET THE DESIGN RIGHT.

Sometimes there is no alternative but to replace something–or a portion of something–which is missing or decayed beyond repair. A basic objective in such work should be to avoid making the new piece a poor parody of the original. Much restoration work stands out like a sore thumb.

The elements of old buildings usually exhibit very specific design characteristics. Although the designs are usually similar to material on other buildings of the same date, there are important regional differences and individual differences which must be respected.

Old moldings–which includes large items such as cornices–were usually designed according to a geometric system, which varied from one period to the next according to whether the designers of the period were looking toward Greece or Rome or the Gothic era for their architectural details. When an old molding must be reproduced, the paint should be removed from a well-preserved section of the old piece, and the design observed and comprehended. Then, if the work of reproduction is given to a shop or mill, very specific instructions (a precise drawing, model, template, etc.) must be provided.

8 GET HELP: DON'T BARGE AHEAD.

How many times have we seen an owner, eager to "restore" a newly acquired house, rush in and tear out large portions of the interior and exterior surfaces, only to discover that the original finishes are long gone and cannot be accurately reconstructed. A professional is then brought in to make sense of a confused jumble of architectural remnants, and the owner sadly discovers, too late, that he has stripped and thrown away valuable portions of his house–the perfectly sensible and aesthetically pleasing Federal remodeling, for example.

All the points we have discussed should make it clear that a restoration or a repair going much beyond ordinary maintenance involves many technical and historical questions. Although elaborate research cannot be done on every old building, old buildings of any quality deserve the best study and care that their owners can give them. In the long run it pays off.

Two simple rules can be followed to improve the quality of repair work at little or no cost. The first is to seek professional advice. At the most basic level this means a visit by someone professionally qualified in the field, and it may save a lot of money from being spent on something which will be damaging or destructive. Even professional people in architectural history and restoration have to consult with each other constantly according to the specialties which each person has, and there is certainly no way to get the proper information just by reading the books or articles which are available. A tremendous amount of study and experience goes into the training of professional people in the field.

A second basic rule is to take the maximum time possible to make decisions. Getting the technical or architectural history information needed is always a slow process. More disconcerting is the fact that different people supposedly qualified in the field will give different opinions and answers. What do you do when the "experts" disagree? To begin with, by taking enough time to talk to different people, you can slowly sort out people who are more expert from people who are less so.

Even then, knowledgeable people may disagree about difficult problems. But usually, if you take enough time to gather information and opinions, you can learn enough about a problem to determine the best course of action.