

PARK PRACTICE

Increasing the Odds for Accurate Restoration

Historic preservation is a growing, global business. Wherever undertaken, restoration of historic structures is a difficult and specialized work, requiring a knowledge of architecture, building technology, craftsmanship, and history. As if working a giant jigsaw puzzle, a restorationist must recognize and evaluate various parts of building fabric and piece together many small, seemingly insignificant bits of documentary and physical evidence. As with any puzzle, missing pieces complicate the assembly; if too many are missing the job is impossible. We must, then, avoid destroying or losing these pieces of evidence.

Serious loss of this evidence often occurs during an initial cleaning when a desire for visible progress prevails. Even normal, modern housekeeping measures applicable to a modern structure may cause a loss of evidence that makes accurate restoration impossible. Often a structure is restored after years of neglect. That neglect, or the absence of modernization, though detrimental to the physical condition of a structure's material, may have prevented loss of critical evidence. Here, careful cleaning can be unusually rewarding. In removing underbrush and trash, look for, identify, and save derelict materials that may have been part of the historic building. Don't discard broken hardware, old shutters, window sash, doors, or other abandoned materials until you understand what they are and whether they are significant to your restoration. The provenience of materials may indicate the location of missing features. A concentration of broken glass or hardware pieces near an old foundation may reveal a former window or door location. Take care also to recognize and preserve historic walks, foundation remains, garden plots, and even plant materials.

Small, seemingly insignificant pieces may prove to be of great value. The restoration crew working in the Assembly Room of Independence Hall in Philadelphia found a dentil from the original cornice of the room where it had fallen between a joist and the wall. The cornice had been removed in a

massive remodeling in 1815. This little fragment, about half the size of a cigarette package, gave us, by proportion, the size of the complete cornice and all paint layers from the original construction until 1815. It could have been easily overlooked.

In the attic you may find old roofing materials which fell during original construction, or a reroofing in the past. An early shingle might also be found used as a shim. These keys to early roofing can be quite important as a large percentage of roofs are incorrectly restored. The "split and resawn" shingles so commonly found used in restorations in the United States are a product of the twentieth century. The original shingles may well have been dressed smoother than a modern sawn shingles.

Protect against moisture

A building must be watertight to survive. All too often a candidate for restoration has a leaky roof, missing doors and window sash, and shutters and doors hanging on broken hardware. Less damage or loss will occur if these features can be repaired and left in place. But make only those repairs necessary to prevent further damage. In securing window and door openings with plywood panels, avoid damaging original fabric. Remember also that a building must breathe to prevent condensation.

If doors, shutters, and windows cannot be repaired in place, identify them properly and remove and store them. This requires special care since improper stacking may result in warping, excessive humidity may cause rot, and improper storage may invite fire or vandalism.

If the roof leaks, cover it completely leaving the materials underneath intact. If it must be replaced, determine whether you have the information to restore it correctly. Do you know the historic roofing material? Do you know its exposure to the weather? Nailing patterns on roof boards may indicate exposure, but watch for nailing patterns from several successive roof coverings.

Identifying the pattern for one time period requires knowing the history and technology of nail manufacture as well as that of roofing.

The technology of flashing and sealing joints and angles has changed over the years. Although reproducing early flashing mechanically may be impractical, you must understand it to achieve the appropriate visual effect. Consider also the cornice, missing or surplus dormers, and chimneys. The ridge, hips, and valleys are probably installed in a manner different from today's common practice.

Masonry problems

Water intrusion in masonry walls usually results from disintegrating mortar joints rather than breakdown of the stone or brick itself. Improper materials and techniques used to reverse that disintegration may do permanent damage to the fabric, accelerate deterioration, and destroy the historic appearance. Avoid the common error of assuming that hardness or high strength, such as that of modern cement mortars, is desirable.



This small dentil was found between a floor joist and the wall in Independence Hall where it fell during a remodeling in 1815-16. The 51 mm x 32 mm fragment yielded clues to the size of the original room cornice and contained all paint colors applied to the woodwork.



The Assembly Room in Independence Hall, Philadelphia, as restored. Reused and derelict materials found under later alterations proved vital in the restoration of this room where the Declaration of Independence was signed.

ble in repointing. The opposite is true. Because cement mortars are usually harder than the wall materials, the normal stresses of expansion, contraction, and settlement will cause them to abrade the softer, original wall material, creating spalling and cracks. Cement mortars shrink and fill with hairline cracks that can absorb water. And because these mortars are more waterproof than masonry, their presence forces water to migrate into the stone or brick.

A mortar with a high lime content is generally better suited for repointing a building of any age but, in particular, an important historic structure. There is very little shrinkage in either lime or aggregate and it has a low volume change due to atmospheric conditions. It is relatively soft and does not abrade original fabric. If small cracks do appear, small amounts of the lime dissolve in rain and are precipitated into the void. A small amount of white portland cement may be desirable to improve handling characteristics.

You should match original mortar to color, texture and tooling. If possible obtain your color from the sand or other aggregate used. Do not match a weathered or dirty surface; new pointing will get dirty soon enough. If the pointing is correctly done, waterproofing agents should be unnecessary. Some surface porosity may be desirable. If silicones or similar materials are used, make sure water cannot get behind it from leaking roofs or osmosis. If water does enter, salts could build up behind the penetration and spall off the surface. Freezing of trapped water will have the same effect. In most climates, the wet-dry cycle and the expansion of crystallized salts are the villains in masonry decay.

Ground water must be drained away from foundations. Consider proper grading first, but avoid destroying original grades or evidence of them. You can install roof or ground gutters, at least temporarily. The installation of permanent gutters requires a knowledge of earlier materials and designs.

Early stone foundations were often laid with a rough exterior face below grade. Water seepage through this face may have leached out the mortar leaving the equivalent of a dry wall. You can grout these walls, but only by disturbing adjacent soil. If you must excavate to grout, remember that the filled builder's trench may be rich in artifacts.

Insect damage and rot must be stopped. Find and evaluate their causes first. Chemicals used to treat these problems may create others. Some gases used in fumigation damage books, furniture, draperies, and wallpaper. Nor is fumigation a lasting treatment. Environmental controls are a better solution. Insects and fungus are less attracted to dry buildings and building contents.

Save all old parts

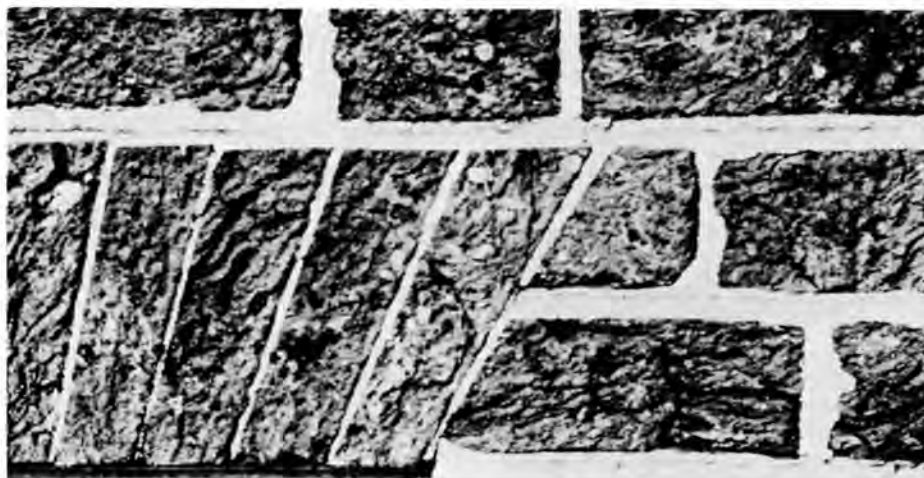
Deteriorated fabric, including structural members, may contain evidence of former windows, doors, porches, or walls. If you must replace a deteriorated part before restoration, record it in position with photographs and carefully prepared measured drawings. Remove the piece intact, label it carefully, and store it as reference for the restorationist. I emphasize proper identification. An unidentified piece will be useless in future years.

In restoring an eighteenth century building, we discovered that windows had been added soon after the period of historical significance. We recognized these later windows by tool marks, nails, and hardware even though the original window designs had been duplicated faithfully. One window was the recent replacement of an earlier one that had rotted. But because the rotten window had not been saved, we could not determine whether it replaced a early window we wished to restore or a later one.

An altered building almost always contains original building materials adapted to

new locations and uses. It is important to recognize and save them. In an eighteenth century house in Nashville, Tennessee, that had been enlarged and altered in later years, the original stairway of the earliest portion of the house had been removed. Evidence on both floors showed the confines of a stairway, but little else. In removing a doorway that had been installed at the time the stairway was removed, we found a reused piece serving as a stud. It proved to be a post that reached from floor to ceiling where the stair had turned in a series of winders. Evidence on this one piece gave us the height of the stair risers, nosing detail of the stair tread, the number of winders and height above the floor that they commenced, design of the boxed stringer, height and profile of the stair rail, detail of the hallway baseboard, size and swing of the door to a closet under the stair, type of hinges used on the door, and the original buff and prussian blue paint scheme of the entry hall.

Materials used in alterations made after the period of historic importance and then reused in still later alterations may also help explain confusing evidence. Independence Hall is a case in point. In 1815 when it ceased to be the Pennsylvania State House and became Philadelphia City Hall, the decorative features of the room in which our Declaration of Independence and Constitution were adopted were removed and a new interior of the style then in vogue installed. In 1831, public indignation over the destruction of this very historic room forced the removal of the 1816 woodwork and the restoration of the historic period style. Unfortunately, it was not of the Ionic Order design of the original room. During architectural investigations in the early 1960's, architects found that 1831 craftsmen had used 1816 salvaged woodwork to back up their materials. From the multiplicity of detailed evidence still on the walls, architects could differentiate among evidence pertaining to the 1816 room, the 1831 room,



These brick have had the hard fired surface sandblasted from them exposing the softer interior. They are now deteriorating very rapidly and will eventually require total replacement.

and other changes from the "historic" room of 1776.

Even buildings on a site that postdate the historic structure undergoing restoration require examination. At the home of General Phillip Schuyler, whose property was involved in the battle of Saratoga in the American War for Independence, a tenant house was built many years after the period of historical interest. We noted that this house was framed with materials from an earlier structure used with no regard to their original relationships. In dismantling the tenant house, we set aside the reused pieces and by matching cuts and the incised Roman numeral code we found a large part of the framing for General Schuyler's eighteenth century barn.

Paint can also serve as a dating tool. The number of paint layers on structural pieces installed at different periods will vary. By comparing the layering on fabric of known date, you can often date questionable members in a relative way. For example, we found that the stairway in the home of President Andrew Johnson in Greeneville, Tennessee, was not original. Was it installed during a remodeling that occurred just before his return from the presidency in 1869 or in a major alteration ordered by his daughter some ten years after his death? By comparing paint on pieces that could be securely assigned to both dates, we determined that the stairway was erected in 1869 and was indeed known to and used by Andrew Johnson.

Cleaning problems

Buildings that have become drab and dirty over the years may need cleaning to restore their historic appearance. Cleaning methods should be chosen very carefully since incorrect methods and materials can do irreparable damage.

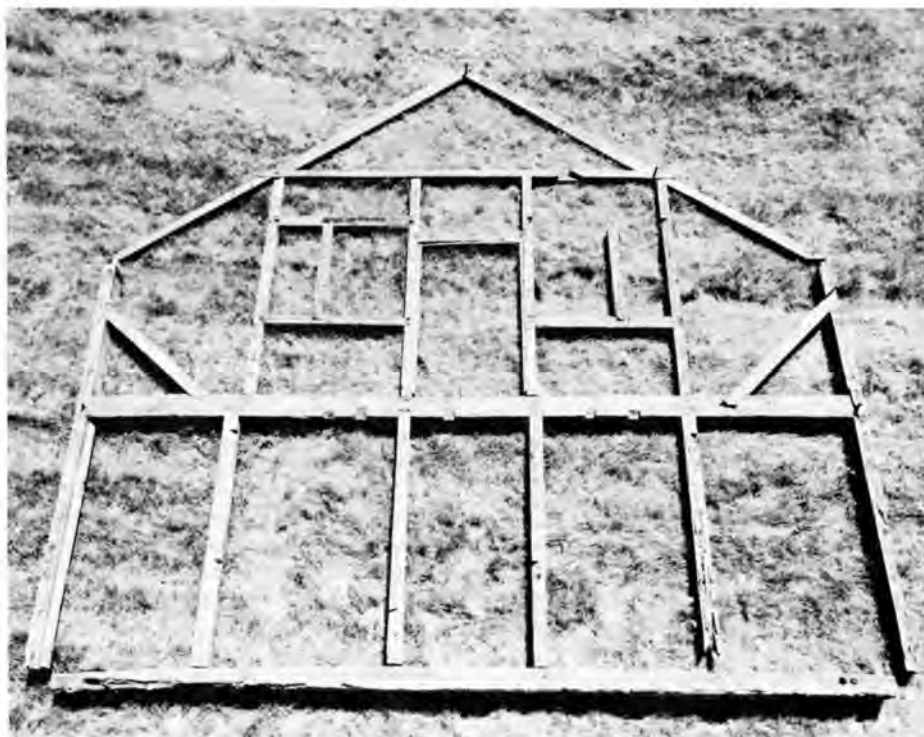
Avoid abrasive cleanings such as sandblasting in nearly all cases. In cleaning masonry, that process abrades away existing weathered surface leaving a roughened and softer surface exposed to the weather. Decorative features lose their sharp detail and variations in material density result in an uneven surface. Polished stone surfaces are destroyed. Brick is particularly susceptible to damage since removing the exterior hard-

Paint and paint removal

Buildings to be restored are often in serious need of paint. Frequently, an existing finish is so deteriorated that it must be removed first. Some segments may have been painted only in recent years. Before proceeding, record the colors of all paint layers and match them against a standard that can be checked in the future, such as the Munsell Color System. Wherever possible, save all paint layers for future restorationists to study. Stripping paint with heat or chemicals may damage original materials; scraping often destroys sharp moulding profiles.

Civil War (1864) photographs of Arlington House, the antebellum home of General Robert E. Lee, showed that the shutters were not then the dark green that had since been used. The shutters now on the house had recently been stripped of all early paint so that no evidence of early colors appeared to be available. A maintenance man recalled that one badly deteriorated shutter had been discarded and replaced with a new one. Fortunately, the discarded shutter was still on the trash heap. Study of this shutter revealed the early color to be a light brown. Had that shutter not survived, we could not have determined the early color or the evolution of color schemes on the house.

These framing members from an eighteenth century barn were discovered used out of context to their original relationship in a mid-nineteenth century tenant house.



fired surface exposes the softer interior to weathering, rapid deterioration, and drastic visual change. We do not know how to rectify this damage once it has occurred.

Cleaning may be done with plain water under moderate pressure, or by spray. Take precautions to avoid saturating the wall; saturation may destroy interior finishes or create the salt or freeze problems mentioned earlier. Water under high pressures may cut the surface in a manner similar to sandblasting.

Numerous chemical cleaners are available also. Although some work very well, they must be carefully chosen for each project. For example, an acid cleaner will damage marble. In short, you must know the properties of the cleaner and the surface to be cleaned. Remember that several types of materials may be involved on one surface—brick, stone, mortar joints, paint, and metals exposed and behind the surface.

Make complete records

Recording what you find and all that you do is of utmost importance. You may use both photographs and accurately measured drawings as appropriate. The restorationist must know what has already been done, and we know from experience that memory is not infallible or complete. In recording, remember that buildings may not be level, plumb, or square. Distortion that is part of a structure rather than a result of deterioration should be recorded so that new or replacement parts can be designed to fit and so that derelict or loose members can be reinstalled in their original locations. Many intricate details may be best recorded by

rectified photography or, in specialized cases, by photogrammetry. These photographs are to record detail. Pretty transparencies to show your friends should be made separately.

In general, it is better to preserve a structure as it evolved over the years. A range of philosophical reasons exist for this position, but it has practical implications as well. Fabric that you might remove to return to a historic moment in time may, in itself, be valuable. Such an approach would retain maximum physical evidence which, when supplemented by additional documentary evidence and a clearer understanding of your structure, would permit more accurate restoration and interpretation in future years.

In summary, hesitate before rushing into a restoration project. Be sure that evidence essential for an accurate restoration is not destroyed in initial cleaning and repairs. As soon as possible have your building recorded. Keep careful records of what you do. Label loose material as to use and origin of source and store it where its preservation is assured.

Do not arbitrarily restore back to a moment in time before the pieces of your puzzle all fit in place. The public is becoming increasingly aware of its past and will recognize highly conjectural work as misleading or dishonest. If in doubt, seek knowledgeable assistance. The fee for an experienced consultant in advance may be the best investment you could make.

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Limited Opening



A simple block of wood with one face cut at an angle is all that is needed to make certain the hinged lid of this rubbish bin can never be left open. The idea and photo comes to us from Dr. E. C. M. Roderkerk, former Director of Kennemerduinen National Park, The Netherlands.

More on Signs

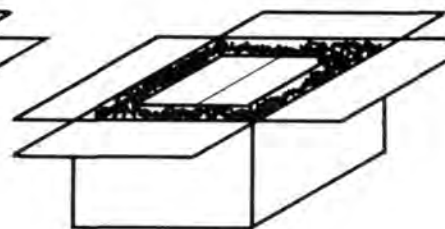
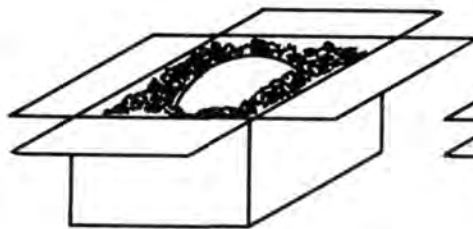
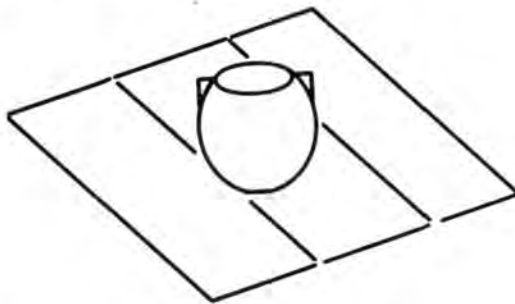
The following extract from a recent letter to the Editor from Sir Hugh Elliott (UK) refers to PARKS issue No. 1 and, in particular, to the article "Signs for Parklands."

"... It was therefore only today that I took half an hour off to run through Volume One No. 1 and find a lot in it of interest. I would guess that in the light of the developing national parks situation, ably touched upon by Frank Darling in his prefatory remarks, you have got the mixture just about right. The only thing that I must admit grates on me a little, but it is a personal and old-fashioned viewpoint, is what seems to be a slight over-emphasis on 'standardization'—shown perhaps more particularly on pages 18-20. While at Grenoble we at long last achieved a short visit to the Vanoise National Park: one of the features which helps to give this park its special flavour, is the very distinctive type of homemade or rustic signboards. I would hate to see the symbol of a man striding along (third from left third row under 'Recreation' on p. 19) superimposed by an oblique stripe substituted for the notice which said simply, in French, 'This path is not maintained'—a fact which became obvious when we arrived at a footbridge which had been washed away, making a mountain torrent impassable! Having said which, I agree that there is much to be said for standardization, provided it is made clear that alternatives exist and that there is no necessity, when standardizing, to eliminate local talent."



Antelope leap through a break in a cattle fence known as an "antelope pass." A grating over a shallow pit 1 1/2 metres wide and 2 metres across (the leaping distance) made of pipe, steel bars or wooden poles on 15 cm spacings impedes cattle from crossing the break. This idea, which has been studied and tested in the western USA for many years, may have applications in parks or reserve areas where movement of wild ungulates is impeded by fences erected to control cattle or sheep. Details are available from the Bureau of Land Management, US Department of the Interior, Washington, D. C. 20240. U.S.A.

Photo: Bureau of Land Management



Packing Fragile Items for Shipment

Special care must be taken to protect specimens, artifacts, archaeological relics or any fragile museum materials against damage during shipment. It is good practice *always* to anticipate that such shipments will be subjected to rough handling during transit, no matter what shipping agencies are employed. Prior planning and special care in packing can go a long way toward ensuring safe arrival.

Some of the principal causes of damage are shocks, chaffing, squashing, vibration, humidity, and heat. Careful packing with appropriate materials can guard against damage from these sources.

Double crating is a basic method. This involves firmly packing the item to be shipped in one box which is then surrounded with cushioning material and packed into a larger shipping container. The double cushioning absorbs and distributes shocks or vibration, insulates and protects the item shipped.

The items should be wrapped carefully with clean tissue paper, then wrapped again with kraft paper or corrugated cardboard and sealed with tape. If it is subject to humidity damage a bag of silica gel can be included. It should then be packed into a box or tin and firmly cushioned all around so that it cannot shift or settle. This packed box can be further protected by sheet plastic or enclosed in a waterproof bag. Be sure to attach a packing list and other necessary documents to the outside of this package.

This next step is to enclose the packed item in a second box or wood crate large enough to permit a minimum of some six inches (about 15 cm) of firm cushioning material all around. Dimensions would vary proportionately, of course, for larger items. A variety of cushioning materials can be used. Wood shavings or excelsior are excellent. Rubberized hair, foamed plastic beads or small shapes as bulk fill, shredded paper, straw, and even dry moss have all been used successfully. This outer package is then closed, sealed and affixed with proper address and return address labels.

If you have special problems, or must ship large or particularly fragile items, by all means seek expert advice before attempting the job.—Robert I. Standish

Open-Air Exhibition Pavilion

A pavilion housing a history exhibit was built last year at the national historic site of Fort Temiscamingue, Ville-Marie, Quebec. It was designed with the following original features: the exhibits do not fill the inside of the pavilion, but are arranged on the perimeter where visitors face the natural outside view. This feature results in savings in construction and operating costs, as well as maximum utilization of the pavilion's inner space, improved handling of visitors, and a better presentation of the exhibits. Built of wood and covered with a canvas tent during the summer season, this pavilion also has space for audio-visual presentations for groups of 20-30 persons. It is suitable for all kinds of sites and parks that do not require or cannot support large structures such as a museum or an information center.

It is clear that the design of an exhibit housed in such a pavilion must be circular, since visitors must be able to approach it

from all sides. Therefore, an "impressionistic" theme has been designed, presenting to the visitors a different theme at each of the display windows or panels.

The pavilion is built on a concrete base of irregular shape with maximum dimensions of 72 by 40 ft. (21.94 m × 12.19 m). Well anchored in this base are the posts that support the canvas roof as well as the wind-screens of the audio-visual show room. Although the main part of the pavilion is rather small in size (25' × 15' or 7.62 m × 4.57 m), it offers an excellent area for exhibits. The display windows have a total exhibit space of 432 cu. ft. (12.23 cubic meters) and the walls measure approx. 350 sq. ft. (32.5 square meters). Inside the pavilion, there is multifunctional space: a booth for the projection equipment, access to the display windows, and miscellaneous storage.—René Rivard, Parks Canada



Shelters for Severe Weather Areas

Administrators of the Auyuittuq National Park on Baffin Island have long recognized the need for simple camping shelters to serve both park rangers and hikers. The technical services office of Parks Canada, Region of Quebec, was asked to find an economical and functional solution to this problem.

The location of these shelters along the Pangnirtung Pass created serious problems of design and construction. The area is subject to severe weather conditions and is located far from any urban center.

The proposed solution, which subsequently proved very effective from several points of view, took into account the following factors:

- severity of the Arctic climate (-60°F or -51°C)
- extremely strong winds (130 mph or 209 km hr.)
- shipment and delivery by boat and snowmobile;
- rapid, on-site installation;
- economy of manufacture and assembly;
- maximum living space in relation to the total space;
- easy to anchor in or stabilize on the ground;
- easy to disassemble for relocation or removal;
- easy to identify at all times.

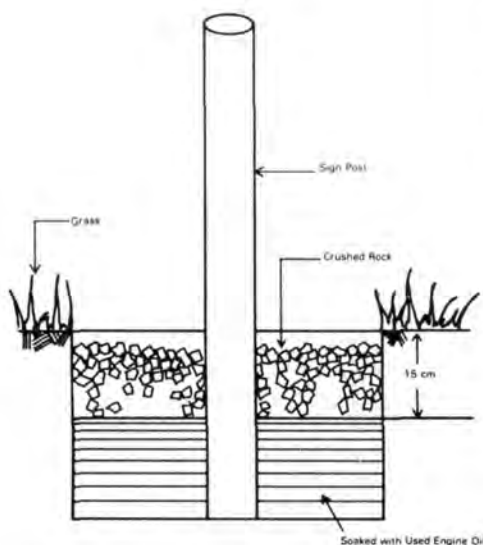
The photo and drawings give a clear idea of the construction principle of these shelters. Note that in this example the basic

frame consists of 4 triangular support structures of timber measuring $3'' \times 8''$ (76 mm $\times$ 203 mm) in cross section. Prefabricated plywood panels with a core of solid insulating material are attached to this structure to form the floor, the side walls, and the two-sided sloping roof.

The outer horizontal members of the triangular support structure are bridged over with beams on which heavy rocks can be piled to anchor the shelter in place. It is set up directly on ground surface. All components are prefabricated and may be assembled or disassembled easily.

The exterior color of the shelter is orange for high visibility among rocks, ice, and snow, even at great distances.—*Jean Laroche, Parks Canada*

How to Cut the Clipping Chore



This idea is not new but it is worth repeating for the benefit of those who must mow and trim lawns or grassed areas on which flag poles, sign posts, gate posts or similar structures have been placed.

To keep grass from growing around the base of such posts, simply remove the top soil within any prescribed surrounding area to a depth of about six inches, pour in several litres of used engine oil and, when this has soaked into the ground, fill the depression with crushed rock or gravel. The area around the post will remain free of grass and weeds. It will present a neater appearance, without the need to trim around the post by hand.

