

# The Old-House Journal

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Restoration and Maintenance Techniques For The Antique House

## Exterior Wood Columns Practical Repairs For Do-It-Yourselfers

By John Leeke

**H**OUSES WITH COLUMNED PORCHES and facades have been built in this country for over 150 years. These Classical and Colonial Revival homes are still popular today. But the quiet dignity of such houses is ruined when a rotting column threatens to let the porch roof collapse. This article explains methods for repairing columns, so your house can maintain its composure and serenity.

EXTERIOR COLUMNS are made of components that work together to provide massive visual and structural support for the entablature and roof framework. The main shaft is supported by a round base and square plinth. The capital visually terminates the column and serves to spread the load from the span above.

### Inspection

**B**EFORE YOU BEGIN working on your columns, you should carefully inspect your porch.

- What is the condition of the porch foundations?
- Do the joists and other structural floor members provide adequate support for the deck?
- Does the floor have weak or loose boards?
- Does the structural span above the columns sag between them? (If there is evidence of water trickling out between the soffit and architrave or fascia, remove these boards and inspect the timbers beneath.)

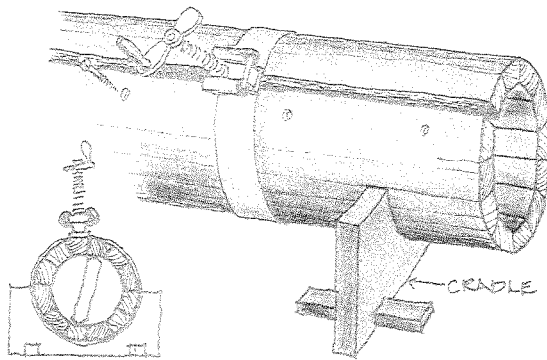
IF STRUCTURAL MEMBERS have been damaged, have an engineer or architect make a more complete assessment. Of course, you may not be able to proceed immediately with major repairs of the porch structure. Nevertheless, the condition of your columns should be stabilized or improved right away.

ROT CAN PROGRESS to such a point that you'll have to remove the column to work on it. (Rot can damage a column so severely that it's no longer supporting anything.) Removing a column isn't a complicated job. Use a system of wedges and heavy timbers to provide temporary shoring. Make sure that the load is being transferred to the ground. Place wooden plates at the top and bottom of the timbers to spread the load. Then remove the base of the column and drop down the shaft. If you're going to work on the porch before repairing the column, store it in a cool, dry place.

SPRUNG STAVES, large cracks, and chunks of rotten wood that have fallen away are the obvious indications that your columns need repair. But there are more subtle clues as well, such as the condition of the paint. If the paint is peeling, there's probably a lot of moisture in the wood. This moisture can also deteriorate the glue in the joints.

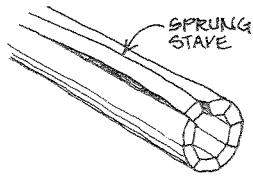
A HIGH MOISTURE CONTENT in the wood can cause expansion, stressing the struc-

continued on page 212



ture of the column and resulting in loosened joints and sprung staves. Extremes of wet and dry can cause solid and hollow-bored columns to check severely. Continuous high moisture is one of the main conditions leading to fungus rot. (See the May 1981 OHJ for methods of detecting and defeating decay.)

IN A STAVE-BUILT COLUMN, a sprung stave will have a raised surface that stands out from the surfaces of the staves next to it. More than one sprung stave in a row can indicate that the column is being unevenly loaded from above or that the support below is shifting position or failing through decay. If this is the case, you have more than just column problems--get a structural engineer to examine the situation.



AFTER INSPECTION, you'll have to decide whether to repair and reuse the existing columns or to replace them. Columns often cost less to repair than replace, but in some cases repair costs can be higher. Saving some original materials at a higher cost is justified if the structure has historical significance or the Department of the Interior's Standards for Rehabilitation are being followed for National Register or Tax Act purposes.

A NEW, 13-INCH DIAMETER by nine-foot high column can cost between \$350 and \$600; a lot of restoration can be done before replacement

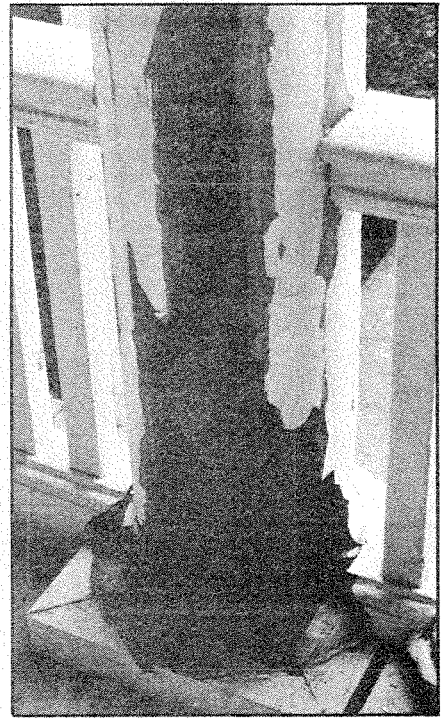
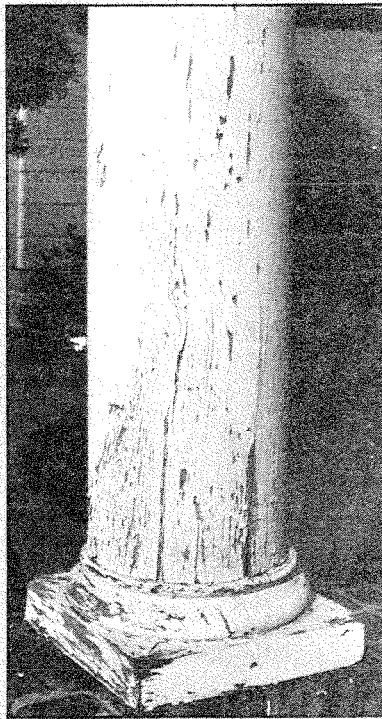
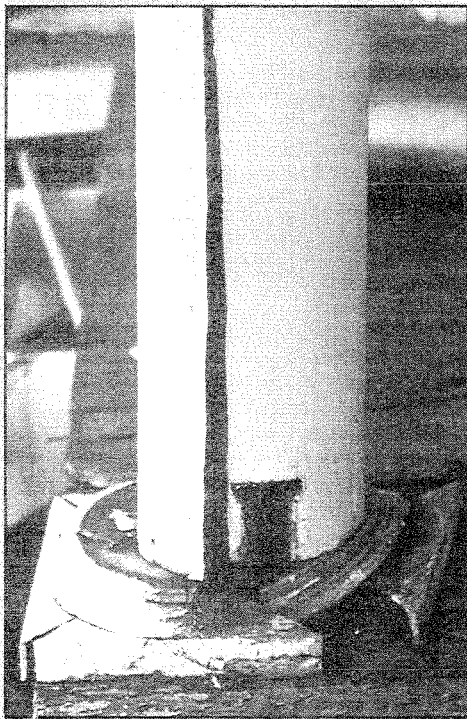
would be cheaper. Even if you hire a professional woodworker, the completely decayed end of a shaft can be restored, or a stave or two replaced, for less than the cost of a new shaft. Replacing a base and plinth or regluing open joints and sprung staves are jobs that can be done by any homeowner with experience in practical matters--and that's what this article is all about!

## Defenses

IT IS CRUCIAL to keep water from entering the wooden parts of a column. The first line of defense is a sound, continuous film of paint that covers all surfaces. Caulk should be used to seal joints between various parts. Water can enter even through hairline cracks in the paint. Once it soaks in, it can cause the paint to peel down to bare wood. This peeling occurs near breaks in the film at opened joints of wood, or where the film has been scraped or scratched.

PEELING CAN ALSO OCCUR over large areas because there is too much moisture in the whole column. In that case, the only way water vapor can escape is to push paint off the wood. This peeling also happens if the paint film is not permeable enough. A too-thick film of paint (more than .015 inch--about the thickness of four pages of the OHJ) could be too resistant to the passing of moisture.

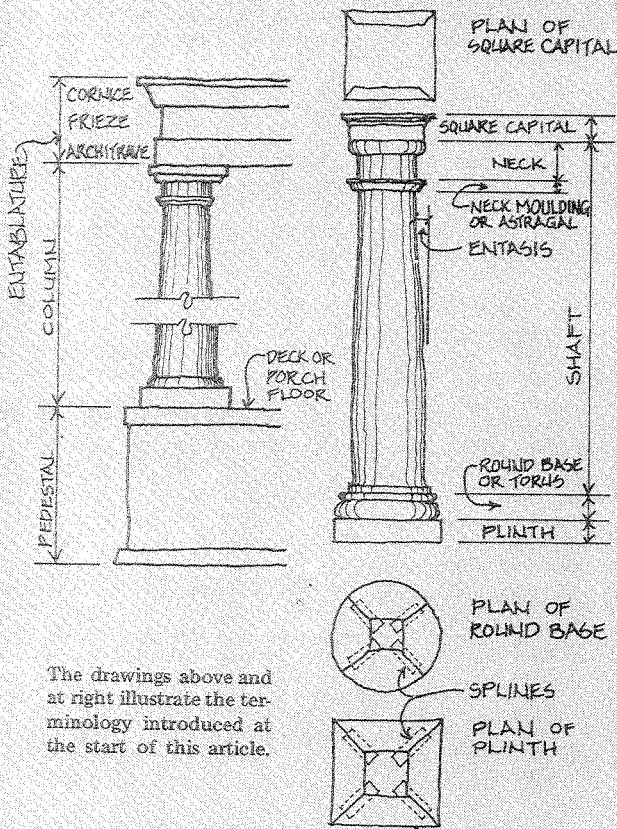
IN EITHER CASE, strip all the paint and recoat the columns. Bare wood, whether stripped or new, should be treated with a clear, paintable



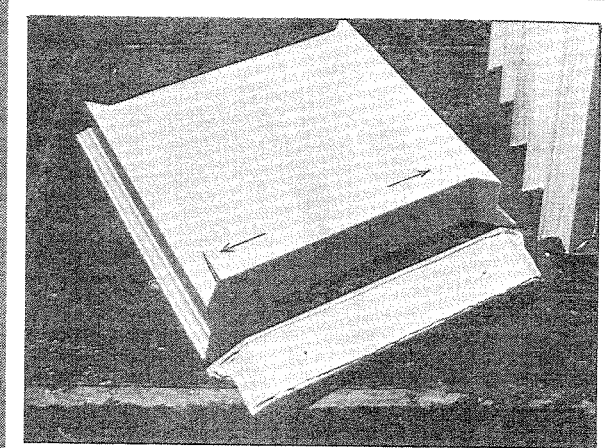
Left: Here's an extreme example of how uneven loading can split a sound shaft. Center: Paint peeling near checks and joints allows water to soak in. This column will deteriorate rapidly if it isn't re-

paired. Right: Water from a leak in the roof entered this column through the unflashed capital. That's all that was needed for rot to cause this extensive damage.

# ANATOMY OF A COLUMN



The drawings above and at right illustrate the terminology introduced at the start of this article.



The capital in this photograph is an example of the care and forethought that must go into a column part if it is to last. The endgrain of this plank-cut piece is covered with a mitred-in piece of sidegrained wood. Notice that the joint is caulked prior to assembly. It will be nailed on, which will allow for some expansion in the main piece (indicated by the arrows).

## Types Of Columns

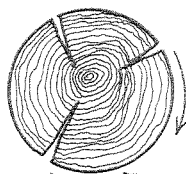
In the past, blanks were made from the trunk of a tree, with the heart of the tree down the center of the finished column. This type of column almost always develops large cracks, or checks, because it shrinks as it dries.

If the tree was large enough, a solid blank would be cut "beside the heart" of a log. Such wood is less likely to check.

With a hollow-bored shaft, the center of the blank has been bored out. This allows the wood to shrink without the stress that causes checks.

Shafts are also made by gluing up common lumber into a blank. After the rough blank is made, it is mounted between the centers of a lathe and the outer surface is turned down to the proper size and shape. These shafts can carry heavier weights. They usually fail by delamination, coming apart at their "seams."

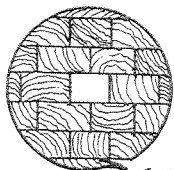
In a hollow, stave-constructed column, the individual stave is shaped with the correct bevel on its edges and a taper along its length. A set of staves is then assembled into a blank. These columns are more stable dimensionally than other types. However, they are subject to glue failure and stave separation.



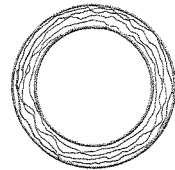
SHRINKING WOOD CALVES CHECKS



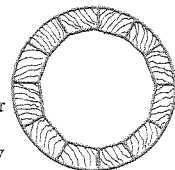
COLUMN BESIDE HEART



THIN SECTION MIGHT DELAMINATE



HOLLOW BORED



STAVED

## Types Of Joints Used In Stave-Built Shafts



BUTT JOINT



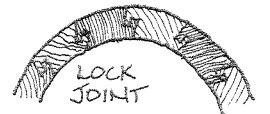
SPLINE JOINT



EARLY ALIGNMENT JOINT



ALIGNMENT JOINT



LOCK JOINT



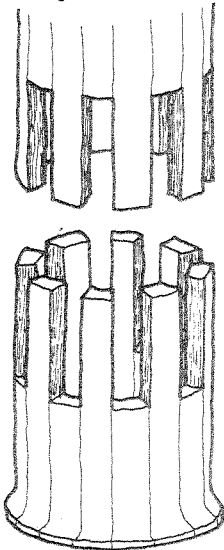
BUTTERFLY SPLINE

wood preservative such as Cuprinol #20. After two or three good dry days, a linseed oil or alkyd primer should be used, followed by two coats of exterior latex paint, which is more permeable than oil/alkyd paint. If the old paint is oil or alkyd paint and in good shape, use an alkyd primer and a latex or alkyd finish coat.

HOLLOW COLUMNS should be vented top and bottom. If yours are not, it's a design flaw that you should correct now. Even without removing the old columns, you can probably drill or cut inconspicuous holes in them.

SOMETIMES IT'S POSSIBLE to vent through the soffit above the capital. If not, drill the vent holes through the face of the capital on the non-weathering side. The vents should be located to keep out rainwater but to allow air to circulate into the column and to allow water vapor to exit. (Use screened vents if you have a problem keeping birds, insects, and so on, out of the column.)

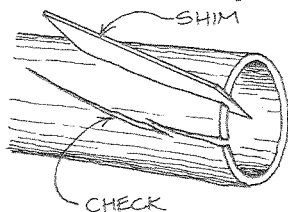
AT THE BOTTOM, cut weep holes or slots to allow water drainage out of the column interior. You may be able simply to cut through floor decking under the hollow column.



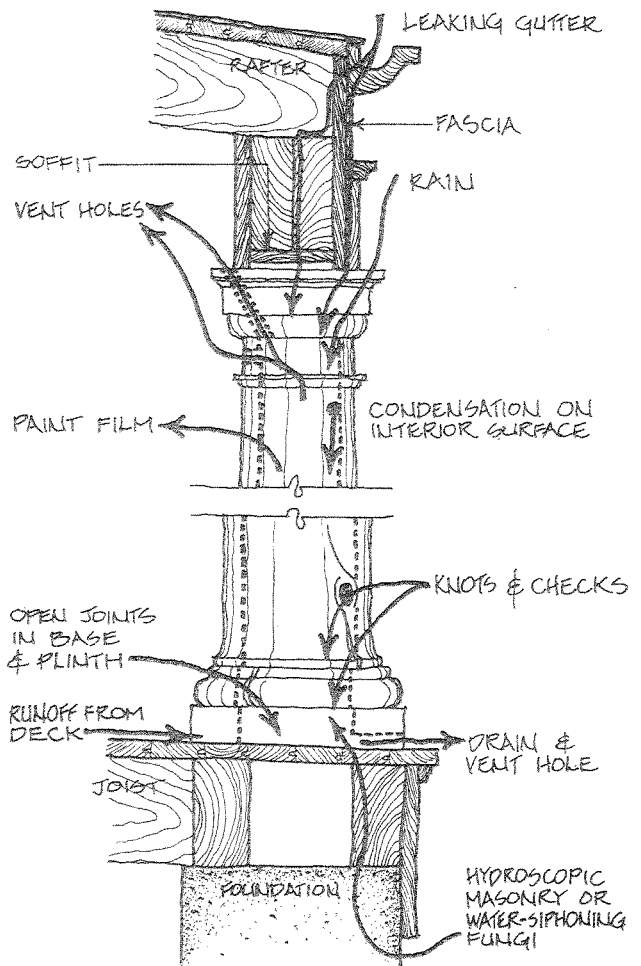
THE DAMAGE caused by decay may force you to make replacements in your column. In this situation, the column should probably be removed so all of its parts can be inspected thoroughly. The replacement of shaft ends is a job for a professional woodworker who has had experience with columns. Careful attention should be paid to matching the species of wood as well as the direction of the grain. Also, the original method of construction for the blank should be used.

### Repairing Checks

SOME CHECKS CAN BE REPAIRED with the shaft in place. Minor checks (1/8 inch or less) on solid and hollow-bored shafts can just be caulked. But larger checks demand special consideration. They should be filled with a long slat of soft pine, tapered very slightly in cross section and wider than the crack on its widest edge. (Have several thicknesses of slats on hand, so you don't waste time at the table saw, thinning down each slat.)



FIRST CLEAN ANY OLD PAINT OR PUTTY out of the check. Select a slat that is about the right width for the crack at hand. With checks that taper to nothing at each end, start at the middle and work towards each end with a separate



Heavy arrows indicate the direction of water entry and exit.

slat. Apply a resorcinol resin glue (such as Elmer's Weatherproof) to only one side of the slat. To the other side, apply a thin layer of caulk. Drive the slat into the check with light taps from a hammer. Enough of the slat should be down in the check to make good contact with the sides of the check.

LEAVE SOME OF THE SLAT standing above the surface. After the glue has set, trim off the excess glue and slat. The caulk will seal the check but allow it to open up again without stress. Use this method only near the end of the wet season in your area; that's when the checks are narrowest. If you do this in the dry season, when the checks are wide, the wood of the shaft will expand later, build pressure on the slat, and possibly cause the shaft to crack elsewhere. This long-lasting solution is especially useful for checks wider than 1/4 inch. Never try to close a check by clamping. A solid shaft can't be clamped. A hollow-bored column will probably just crack somewhere else if you clamp it.

### Staved-Column Repair

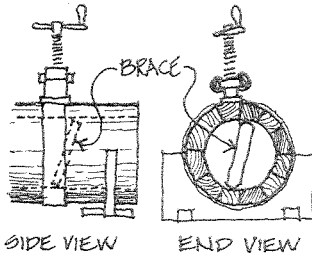
THE FOLLOWING METHOD is used to repair a staved column with joints that have become unglued. Work with the column laid across a couple of sawhorses. If more than one joint is open and the column is falling apart, make

a couple of cradles, each with an inside radius just larger than that of the column. These will hold the column together. Clean off all caulk, old paint, and glue from both sides of loose joints. Scrape down to bare wood but be careful not to damage the joint. Use weather-proof glue and heavy band clamps. (Lightweight web clamps that operate on a ratchet with a small wrench won't do.) Plan to glue one joint at a time until two are left, as nearly opposite each other as possible. Then glue both at the same time to form the complete shaft.

GLUING AND CLAMPING should be done by two people. Rehearse gluing and clamping procedures by putting the pieces together without glue and clamping them. (You have to get everything together in the time it takes the glue to dry.)

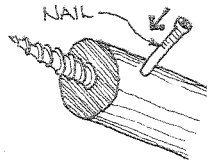
SPREAD GLUE on each side of the joint, assemble the staves into a cradle, and lay wax paper over the joint to protect the canvas bands. Loop the band clamps over an end of the shaft and tighten just enough to hold them in position, with the clamp heads directly over the joint. Use a clamp every 12 inches. (Clamps cost \$40 each, but that's cheap compared with the cost of replacing a few columns. And you can also get clamps from a tool-rental store.)

TIGHTEN EACH CLAMP A LITTLE, in succession up and down the joint, until there is enough pressure to squeeze excess glue out of the joint. Use calipers to check that the shaft is still round. If the shaft is slightly oval, loosen the clamps a bit and insert internal braces that will hold it round. Retighten and check again for roundness. Allow one or two days for a full-strength cure, because the joint will be put under heavy stress when the next joint is glued up. When taking the clamps off, loosen each one a little at a time.

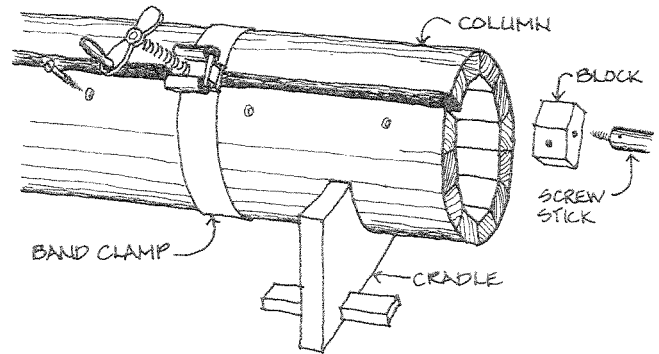


WHEN GLUING only one joint, be certain that there is enough flexibility in the shaft to allow the joint to close without breaking another joint or splitting a stave. If the joint can be completely closed by hand, it is flexible enough. (If it doesn't have sufficient flexibility, insert a wooden slat, using the procedure described earlier.) If the surfaces beside the joint don't line up, use the following method instead.

MAKE A "SCREW-STICK" out of an old broom handle. Cut off the head of a #12 or #14 steel wood screw. Use pliers to twist it into a pre-drilled hole in the broom handle. (Be careful not to mash up the threads too much.) Lock the screw into position by drilling a hole through both the stick and the screw and driving in a thin finish nail.

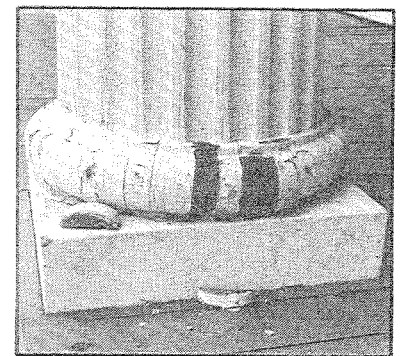
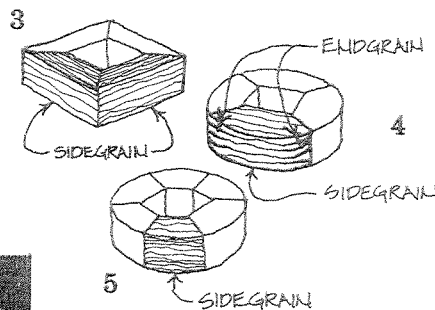
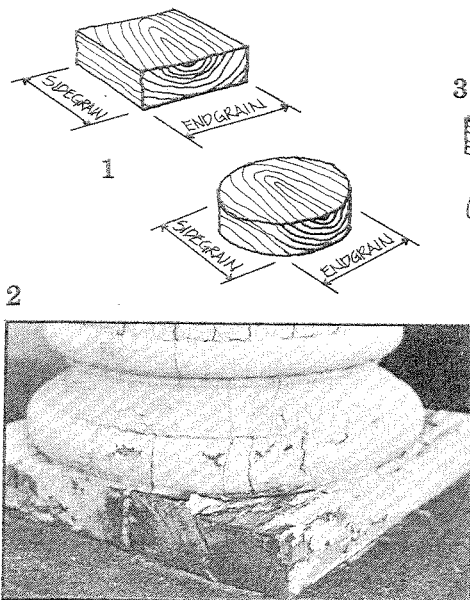


stick and the screw and driving in a thin finish nail.

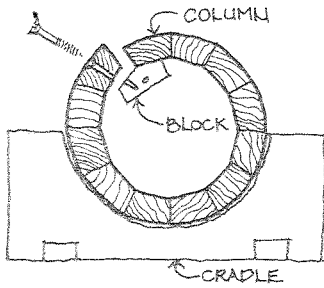


CUT SOME BLOCKS that have two surfaces that are the same angle as that of the flat inside surfaces of the staves. Clean the joint in preparation for gluing. Drill 3/16-inch countersunk holes, about 7/8 inch from the edge of the joint in the higher stave. Use a #10, rust-resistant (hot-dipped galvanized or better) screw. Starting with a block near the middle of the joint, hold it in position behind

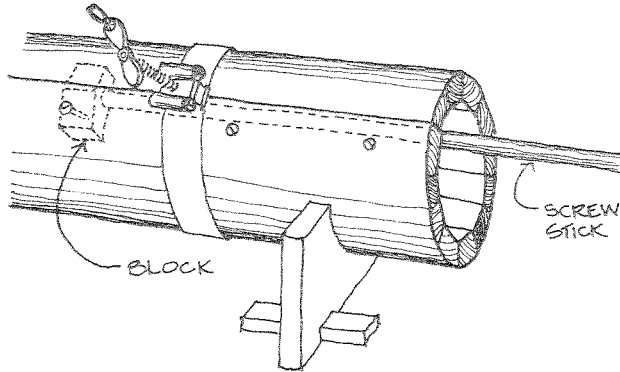
## Base Problems



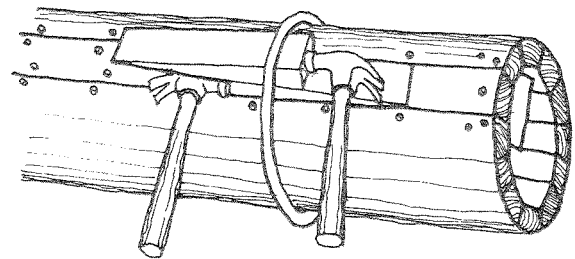
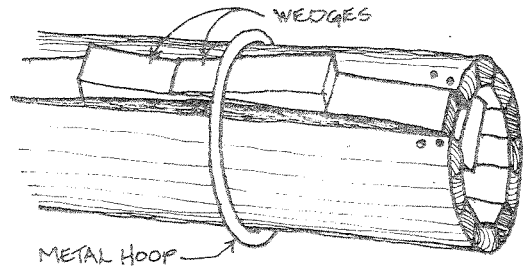
1 Round bases, plinths, and capitals are sometimes made by cutting a piece of wood from a plank and shaping or turning it to the desired form. 2 The problem with this method is that it exposes a lot of endgrain to weather. Endgrain is more likely to check, thus allowing water to enter and further deterioration to occur. 3, 4 It is preferable to construct them so that only sidegrain or a minimum of endgrain is exposed. 5 The more segments the round base is made from, the less endgrain there will be. 6 However, too many joints can weaken the base; if the glue fails, water can enter.



the joint with the screw-stick. As it is screwed to the higher stave, the lower stave will be brought up level to it. Unscrew the screw-stick and fasten it in the next block. When all blocks are in place, the surface of the staves should be even; you can then proceed to glue the joint, using band clamps.



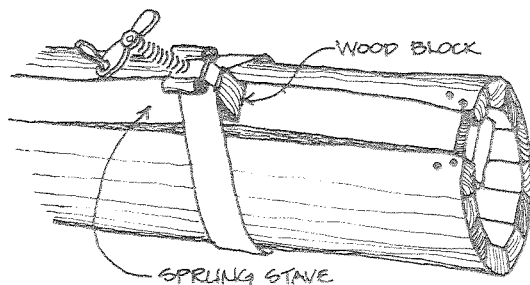
IF THE BAND CLAMPS aren't powerful enough (or if you don't have any), get a blacksmith or welding shop to make a hoop of 3/8-inch mild-steel barstock, with an inside diameter just larger than that of the shaft plus the height of the sprung stave. Explain how you plan to use it so it can be made strong enough. (A hoop like this should cost much less than a band clamp.)



### Repairing Sprung Staves

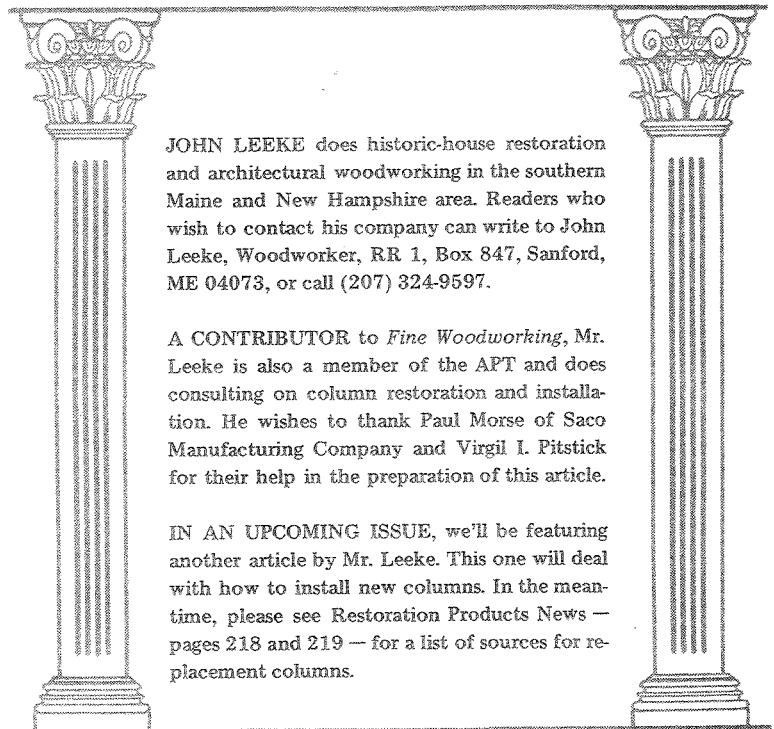
**S**PRUNG STAVES are repaired in a somewhat similar manner. The plan is to push the stave back down and realign it with the surface of the adjacent staves. Use caulk instead of glue to seal the joint, if you find that you can't work fast enough to complete the procedure before the glue sets.

BEGIN BY supporting the ends of the sprung stave with a block cut precisely to fit the inside of the staves. Screw the block to the neighboring staves, not to the sprung stave itself; it must be able to slide out to the end of the shaft as it is pressed straight. If the stave is thin and flexible, you may be able to push it into place by hand, while a friend positions a block with the screw-stick and you screw it into place. But if it is stubborn, use one of the following approaches (which can be done working alone).



ARRANGE ONE OR TWO band clamps over the highest part of the stave, with a block of wood between the clamp head and the stave. Tighten the clamp, pushing the stave back into place. Use the screw-stick to position blocks that are then screwed into place.

PROTECT THE OPPOSITE SIDE of the column by placing a 1/4-inch-thick slip of hardwood between it and the hoop. Arrange the wedges and drive them together with two hammers, forcing the stave down. Fasten it with blocks as before. Fill the countersunk holes with a good exterior filler, such as Woodepox-I.



JOHN LEEKE does historic-house restoration and architectural woodworking in the southern Maine and New Hampshire area. Readers who wish to contact his company can write to John Leeke, Woodworker, RR 1, Box 847, Sanford, ME 04073, or call (207) 324-9597.

A CONTRIBUTOR to *Fine Woodworking*, Mr. Leeke is also a member of the APT and does consulting on column restoration and installation. He wishes to thank Paul Morse of Saco Manufacturing Company and Virgil I. Pitstick for their help in the preparation of this article.

IN AN UPCOMING ISSUE, we'll be featuring another article by Mr. Leeke. This one will deal with how to install new columns. In the meantime, please see *Restoration Products News* — pages 218 and 219 — for a list of sources for replacement columns.