TIMBER FRAMING

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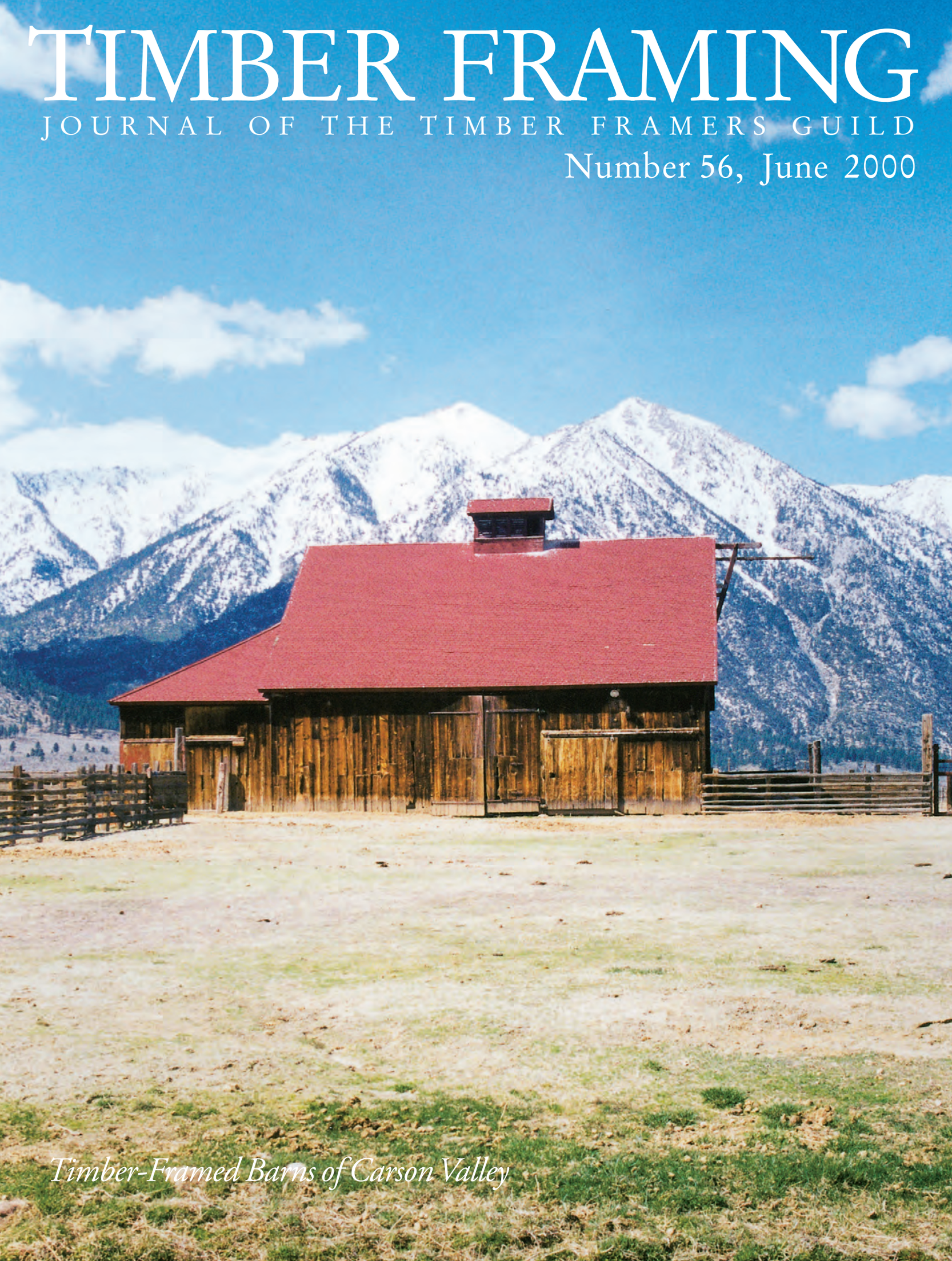

Timber-Framed Barns of Carson Valley

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On the cover, the Dressler barn, ca. 1870, Minden, Nevada. Photo by Paul Oatman.

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BOOKS
State of the Art

Timberframe, The Art and Craft of the Post-and-Beam Home, by Tedd Benson. Newtown, Connecticut, The Taunton Press, 1999. 9½ x11⅛ in., 232 pp., copiously illustrated. Hardcover, $40.

MOST builders would agree that one of the most satisfying sights in construction is the skeleton of a well-crafted structure before it is shrouded in veneers of plywood and plasterboard. Tedd Benson's *Timberframe* is one of those books that remind me how much I love wood frame construction. It focuses on and glorifies the structure of the house. This beautiful coffee-table book is stimulating to page through, and some projects featured on the pages inside its handsome dust jacket (above right) are nothing short of awesome sanctuaries. It's obvious at first glance that *Timberframe* isn't intended to be a technical book. It doesn't offer up any how-to information and doesn't have a lot of useful information would-be homebuilders could sink their teeth into. (The author has covered some of this ground in two previous publications that I briefly thumbed through at the bookstore the other day.) In fact, the written descriptions of each featured house are minimal; the success of the book relies largely on photographic merits and fine drawings. Interesting and useful detailed perspective drawings make it easy to understand how the houses went together and place the interior photos in context. These beautiful pencil sketches (by Kathy Bray at Taunton Press after Randall Walter's 3D drawings at Benson Woodworking) also provide a wonderful visual enhancement to the layout of the book. If I had to make a criticism of the book, I would lament the absence of a larger representation of projects by other timber framers. The book is dominated by Benson's own projects (one of three exceptions appears on the facing page)—though, of course, it's his book and he can include whatever he likes. I'd also have to admit that I'm not sure which of the impressive projects built by Benson Woodworking I would omit.

Benson asserts right off that the timber framing revival "began with a small group of New England craftsmen in the early 1970s and spread rapidly throughout the continent." In addition, the publishers absurdly credit Tedd Benson as "the man single-handedly responsible for the popular national revival of this beloved, age-old construction form." Benson and his publisher cannot have been looking around very hard. My observation is that the American timber frame revival of the '70s was much more widespread. At the time, a whole new generation of homebuilders, eager to explore alternative building methods and materials, instantly recognized the potential in timber-framed structures all over North America.

In the book's prologue, Benson also makes a good argument for the flexibility and adaptability of the modern timber-framed structures. Unlike log-built houses, timber-framed houses are built in a wide variety of architectural styles. The exterior photographs will bear this out, but it is clear from the book's photos that there is some hybridizing of the two styles. Certainly both methods require careful workmanship, and there are many log structures in this country (both historic and new) that incorporate equivalent aesthetic care. As a nice contrast to the mostly straight, precisely sawn

and surfaced timbers that mark most of the featured houses, a very casual and organic-looking Montana dwelling appears with a frame that reminds me of an old western lodge. It has a nice mix of sawn and hewn timber and logs, many of whose naturally curved contours were used for braces, beams, bridging and columns, in places suggesting a mature saguaro cactus. One of most elegant timber frames featured is in a home built in Colorado. What I like most about it is the craftsmanship of interior finish details. The balanced proportions and scale of the railings, paneling and cabinetwork lend visual support and punctuation to the handsome frame. Nothing is in stark contrast here. This kind of careful integration of details is evident in a couple of other projects featured and is what makes the book for me.

Benson makes the good point in the prologue that "Because all of the space within is opened to the living area, timber frames tend to provide more volume per square foot, which makes small spaces feel larger and large spaces more dramatic." A good example is a featured Craftsman-style house. This building is of surprisingly modest size, but because of its vaulted spaces it looks very grand. Timber framing is especially well adapted to the recent revival of this style, making the house one of my favorites.

Benson proposes, arguably, that timber-framed houses fit the notion of sustainability and use forest resources wisely. And who can quarrel with recycling? Included in this book are great historical photographs of the now dismantled Long-Bell Mill in Longview, Washington, revealing the forest of frames that provided Douglas fir timbers for many of the projects illustrated in the book. There is an interesting description in this section of how some of the 7 million bd. ft. used to build the mill became available to timber framers across the country. But considering the scary rate of development and homebuilding in this country, it's fortunate for our major league forest resources that timber frame structures remain an expensive building option.

The book describes some historical developments in the evolution of house construction. Benson argues that many of the surviving centuries-old buildings pictured in the book are a testament to the longevity of the timber frame. Although no one can deny that the quality of material and workmanship determines to some extent how long a building will last, it won't sustain a building on its own. Benson reports that the Nathaniel Sleeper house in New Hampshire, one of the historic houses discussed at the end of the book, received, after the death of its owner in 1821, almost no maintenance or attention for more than 100 years. "It is yet another story of impoverishment as the basis for preservation," Benson observes. I am not sure what is implied by this statement, but I am sure that this house was a rare case to survive that long on its own. It's not uncommon to see many fine old timber-framed barns around the country crumble into the landscape because of lack of maintenance. Historically significant buildings in the hands of dedicated caretakers, and with a bit of good fortune, will last a good long time, not necessarily because of the method of their construction. Frank Lloyd Wright's Fallingwater in Pennsylvania would probably not last long if left on its own to face the problems of freezing, flooding and gravity, but no one is about to let the most inspiring aspects of the building collapse into the streambed. Good craftsmanship, materials and construction technique will take a house through a few decades (at best), but without periodic care, the roof will begin to leak, the sills may rot, and decay will win out. I'll go out on a limb here and say that the cheapest and poorest example of tract house construction could be made to last centuries if someone (God forbid) thought it had "historical significance."

Timberframe's concluding historical section describes a late-1300s English timber frame and the evolution of such structures—apparently cozy, but drafty, smoke filled and floorless—into houses built in colonial New England. This section of the book has other interesting factual tidbits, such as an account of an 18th-century Pine Tree Law, which reserved all large white pine trees for the Royal Navy and provided severe penalties for anyone cutting those trees, albeit on their own property. I can fully appreciate the outrage that colonial builders must have felt being denied timber that was needed for all kinds of interior and exterior finish.

It's hard to gaze at the exquisite photographs in this book without feeling a slight pounding in the chest. (Although I wouldn't recommend it as a substitute for a good cardiovascular workout, it could elevate your pulse rate.) I'll have to admit that I was inspired by this book. The value and enduring beauty of timber frame construction are obvious. But (without getting too mystical about it) the homes in *Timberframe* also express a philosophy of concern by builders and owners for the quality of their work and lives. Even though this kind of construction can be slow and expensive, its warm and secure character has few competitors in the building industry. The beautiful frames in this book should lay to rest any doubts that the invested effort is worthwhile. I'm certain that many readers of this book will be as stimulated by it as I was. May their interest and passion insure that this beautiful craft prospers well into the future.

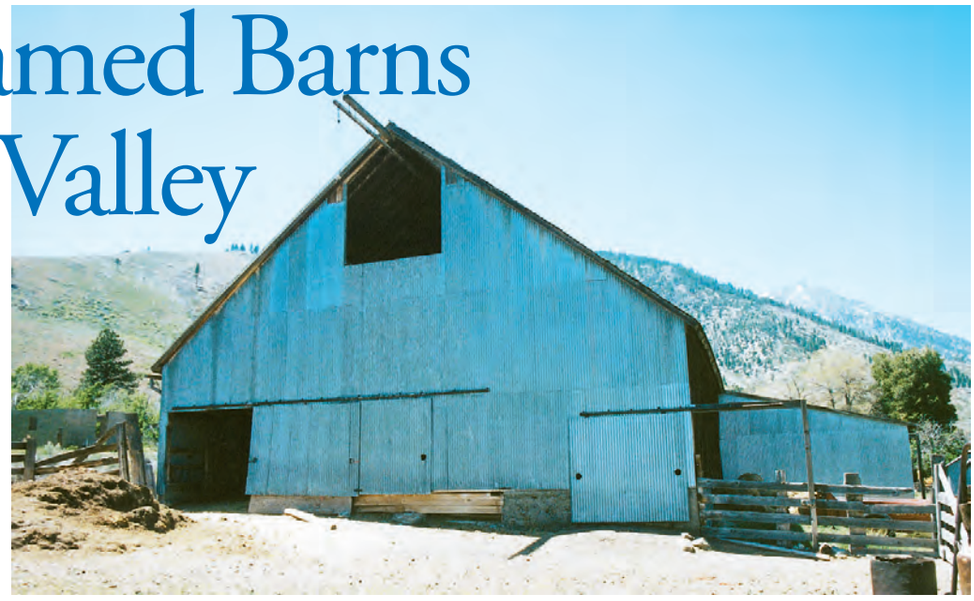
—Phil Sollman

Phil Sollman (stevsollmn@aol.com), a former homebuilder with a degree in architecture, designs and builds furniture in Bellefonte, Pennsylvania.

Photos James R. Salomon

View of house in British Columbia, designed by Blue Sky Design of Hornby Island and timber framed by The Cascade Joinery (Everson, Washington), from Tedd Benson's* Timberframe *(Taunton, 1999).

Timber-Framed Barns Of Carson Valley



IN eight years of back-road traveling through the gold country of California, I had found three timber-framed barns. The most impressive was built during the gold rush, of hand-hewn 12x12 sugar pine. I ignored the No Trespassing sign and beheld the beauty—and that's all I can report. I found the absentee owner, who informed me he wanted no one, no way, no how in his barn, just like the sign said. My sneak preview had shown me an interesting detail of the draw-bored joints: the pegs had been mostly eaten by insects, but the beams were unscathed. The pegs seemed to be softwood, and perhaps sapwood, but it's a mystery to me why the sugar pine beams, even if they are heartwood, were not eaten also. I will try again in a couple of years to enter this lovely, with permission from the barn grinch.

Then, about a year ago, I was in Markleeville, a small California town on Route 88 close to the Nevada border. In the town museum I struck up a conversation with an older gentleman who lived across the border in Carson Valley. He informed me that there were a couple of timber-framed barns in the valley, one in fact a relocated structure. He jotted down some roads to travel. A couple of months later, I packed up a ladder and a camera and headed my pickup into the valley. I had been here before on my way to Reno and Tahoe, never suspecting that not one but every barn in the valley was timber framed. I had been in the right place, at the right time—excuse me Doctor John!

The map from the old gentleman took me off Route 88 onto Foothill Road, and I soon stopped at the first barn. I knocked on the door of the accompanying Greek Revival farmhouse, and a man of about 90 years answered the door. His name was Richard Gansberg, and the farm, he told me,

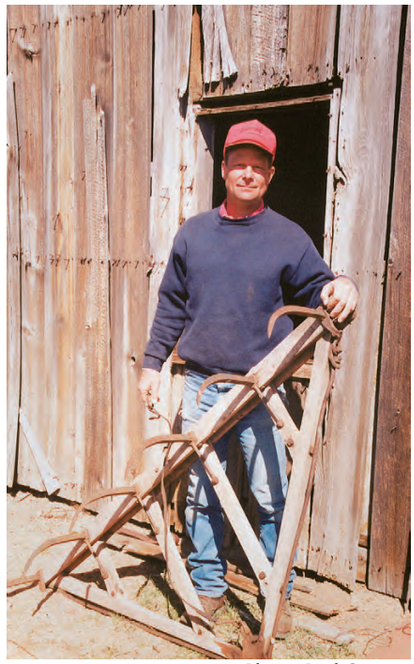
Photos Paul Oatman

The Gansberg barns, Carson Valley, Woodsford, California. The first building crew for the 1910 barn (top) was thrown off the job in the early stages for showing up drunk. The timbers (middle) are Ponderosa pine 12x12s hewn by Emory Arnet, a Washoe Indian, during the summer of 1909. The logs were brought by mule from the outlying foothills. At right, the 1914 barn is framed with mill-sawn 8x8 Douglas fir, joined by square rule and draw-bored with pine pegs.

had been in his family since its establishment in 1870. He gave me permission to haunt his two barns to my heart's content. A third barn had been lost to a forest fire that started in the high country and scorched the borders of Nevada. (In fact the property is just inside California.) This third barn was so impressive that a filmmaker for Marlboro cigarettes had intended to use it for a commercial in 1985, but he was a day late and a fire short.

The surviving Gansberg barns were built, respectively, in 1910 and 1914. Richard (called "Chris") Gansberg was seven years old in 1914, and he remembers the carpenter, Henry Mankee, vividly, with respect for his building abilities and contempt for his human qualities. In Chris's words, "He sat on a sawhorse and wrote a list of the materials he would need in about 20 minutes, and not one timber was left" when the frame went up. Even more vivid in Chris's memory was the day Henry had him hold a rope that Chris had then let go of. Henry had flung his hammer at the seven-year-old boy, grazing the side of his cheek. Chris ran his hand across his cheek as he told the story. He remembered that he hid in the woods until his father came calling for him in the dark. Chris would always return to this story whenever I visited the barn to examine different details. "He was just mean!" Chris said. "Drinking all the time, and I was afraid of the drunks." I asked him if his dad had admonished Henry, and he said, "Not enough."

The Travis barn (top), Genoa, Nevada, 1874. Including its (original) wings, the five-aisle barn measures about 66x70. Scarfed 38-ft. tie beams run over the arcade posts (middle photo) and tenon through the wing posts. At bottom, the Greek Revival farmhouse (1876) with Carpenter Gothic details on the porch.



Photos Paul Oatman

At top, drive-through doors open into the side-entry Dressler barn, Minden, Nevada, ca. 1870, about 48x52 ft. overall and still very much a working barn. Above, center aisle is 22 ft. 6 in. wide, purlin posts are over 23 ft. high. Note doubled head bracing. Above right, proprietor Devere Dressler hauls out the Jackson Hay Fork.

I HAVE now seen some 40 timber-framed barns built in this area between 1860 and 1920. Carson Valley measures about 10 miles by 16 miles, reaching from the Sierra Nevada to the Pine Nut range and from Carson City, Nevada, to California's Alpine County. The valley, though itself at 6,000 ft., is watered by snow-fed streams from the base of the Sierras. Captain Joseph Walker is said to have been the first white man to enter the valley in 1833, but it was Christopher "Kit" Carson who left his name on the river and valley when he guided General John Fremont in 1843 and 1844. The valley was inhabited by the semi-nomadic Washoe Indians, who efficiently summered at Lake Tahoe, "Lake in the Sky," and wintered nearby in the warmer Carson Valley. The history of the Washoes' encounter with the white man is the same sad tale as that of other Native Americans nationwide. They are today restricted to reservations in Nevada.

In 1851 a party of 80 Mormons on their way to the gold fields dropped out to set up a trading post for the hordes of gold seekers heading for the mother lode. (Mormon Station, the town, was renamed Genoa in 1855, and Mormon Station the building, the oldest in Nevada, was destroyed in 1910.) The Mormons left in 1858 in response to a crisis call from their church (or by staying, in effect renounced their faith), and Scandinavians and Germans then entered the valley to take up agriculture. They raised cattle and grew hay for feed. There was a great demand for beef to feed the boomtowns of the Comstock Lode.

Basque sheepherders came to the Carson Valley around the turn of the century. Basque settlers opened inns and hotels in the area, the most famous today being John Ascuaga's Nugget Casino. Ascuaga's handsome ranch in Jacks Valley has two massively timber-framed barns—the 12x12s are on 8-ft. centers. One barn has 50-ft. top plates with all posts and girts double-pegged. On the other hand, the braces, while mortised, are unpegged throughout.

Carson Valley barns all appear to have been built by one ethnic group, namely German carpenters, over a 50- or 60-year period. The early barns are identified by their 12x12 hand-hewn Ponderosa pine main members, probably cut in the backyards, whereas later barns are framed of 8x8 sawn Douglas fir. The latter were built after the Silver Rush, which demanded millions of board feet of timber for mine-shoring and presumably made sawmills commonplace. (The miners hit hot water at 3,000 ft., which halted additional mining and timber destruction.) However, all braces and common rafters, even in the hand-hewn barns, are sawn.

None of the barns has a threshing floor since, by this time, threshing was done outside with machines, but all the barns stored hay and sheltered horses, which drew the hay wagons and worked the cattle. Every barn that I visited has a hay fork running on a track along the ridge piece. I believe this device was invented sometime after 1853, as it does not appear in my Webster's Dictionary of that year. Hay was unloaded at a gable end, hooked up and rolled in, and then unloaded in the haymow, where ranch hands sifted it.

While both gable-entry and side-entry barns are to be found in Carson Valley, both types have a central aisle (or nave) and flanking aisles. The gable-entry barns originally had entrances at grade only to both side aisles (for the horses), while the central aisle had only an opening high up in the gable (for the hay fork). With the advent of large machinery and tractor haying, many gable-end girts have been cut and openings made to get direct access to the central aisle. The side-entry barns have a large central bay with openings on both sides for driving through, and also harbor a hay hook on the gable end. Many of the side-entry types support cupolas. These side-entry barns generally are smaller and in better condition.

The Dressler barn is a fine example of this latter type. It's the first I've found with paired head bracing and the carpenter's initials carved on a central bay post. (The homestead has been in the family since 1863. The tax list of 1886 lists Fritz Dressler with 9,582 acres. Today, Devere Dressler owns 500 acres, the adjacent ground being chewed up by developers, unintended beneficiaries of the merciless inheritance taxes.) The side-entry barn, ca. 1870, has a 12-ft. center bay and side bays 16 ft. 6 in. wide. Viewed the other way, the center aisle is 22 ft. 6 in. wide and the side aisles 13 ft. 5 in. The 10x10 tall posts rise 23 ft. 5 inches to the purlin plates, the shorter outshot posts 13 ft. 7 in. to their wall plates. This barn has enough bracing to enable a crippled man to walk.

Nevada winters are cold, and the wind gods wreak havoc here, so every frame has foot braces, on every post, going every which way. This structural design sometimes emulates the German Wildman pattern. All frames are joined by square rule and all pegs are draw-bored. The older barns use scarf joints to lengthen timber while the newest of the old barns have simple lap joints on the sills and plates, but always a bladed scarf on the purlins. In the older barns, aisle wall frames are tenoned together and usually pegged, but the newer aisle wall frames are cut and nailed.

The most elaborate tying joints have through tenons with three pegs. Others are single-pegged tenons about 6 in. deep. Gable roofs run at about 9 in 12 pitch. The older barns use double purlin plates, with supporting purlin posts sometimes vertical and sometimes inclined. The only finish on the beams is rather organic—pigeon dung. One handsome barn I explored had Doug fir beams so perfectly cut that they required no sizing housings and would look good in a modern timber-framed trophy house. This one may be the toughest to record as some 30 skunks think they own it, and as I was walking about they taunted me to climb the ladder. The woman who owns the place told me to come back of an early afternoon, naptime for the skunks.

There is much to learn here in a perfect case study—many barns built by the same group of people in a small area. (Even this might not be the end; one fellow told me there are barns 200 miles into Nevada.) The biggest problem in Carson Valley is the encroaching effect of housing. Ten years ago, building in this area was done on a subdivision level. Today, with all the funny money flying around, trophy houses sprout in open fields faster than a Hundegger can spit out a beam. These large houses also block the cattle movement of the remaining working ranches, and the cattle of course are the main reason that the barns still stand. If hay left by the ranchers over the years covers and rots many sills, most barn owners take a certain pride in their structures, and one owner actually still uses the Jackson hay fork. (She doesn't want to inflict any pain on her beamish beauty.) Escalating land prices will destroy this ranch culture as surely as the ranch culture destroyed the Washoe culture, but for now there is still a little light before the darkness: John Ascuaga's barn is used regularly for cattle auctions and Chris Gansberg's son is a fourth-generation rancher, along with Devere Dressler.

—Paul Oatman

Contractor Paul Oatman (209-295-5100) has adopted timber framing as his modus vivendi in Pioneer, California.

HISTORIC AMERICAN TIMBER JOINERY

A Graphic Guide

II. Tying Joints: Tie at Plate

THIS article is second in a series of six to discuss and illustrate the joints in American traditional timber-framed buildings of the past, showing common examples with variations as well as a few interesting regional deviations. The series was developed under a grant from the National Park Service and the National Center for Preservation Technology and Training. Its contents are solely the responsibility of the author and do not represent the official position of the NPS or the NCPTT. The first article, which appeared in TF 55, covered Tying Joints: Tie below Plate. Future articles in the series will cover Sill and Floor Joints, Wall Framing, Roof Joinery, and Scarf Joints.

THE tie-at-plate category encompasses the most complex and varied of timber joints, including not only wall, roof and cornice work, but also attic floor framing. Builders often used components to double advantage. Floor joists, for example, could become additional tie beams. Some tying joints could be considered "secret" joints since their configuration and method of assembly are a mystery until they are disassembled. In houses they are often difficult to document *in situ* because of their dusty, cluttered location in the attic. Many of the examples included here were wonderfully revealed during dismantling or restoration of old structures.

If plate-level tying joints were so complex, why did builders cut them? There were compelling reasons for carpenters to make the tying joint at the plate. Structurally, for resisting the outward thrust of the roof, it's hard to improve upon the rigid triangle formed when the rafters tenon directly into the tie beam. A rigid triangle at each cross-frame maintains the integrity of the roof marvelously. Second, during the scribing process (and most plate-level tying joints are from the period when frames were laid out on the ground and scribe-fitted), it was a procedural advantage to have the ties and plates at the same height and joined to each other. Finally, in early American barns the tie was often put at plate level for aesthetic reasons. In vertically boarded barns, the gable end boarding was usually lapped at the tie beam, forming a shadow line on the exterior (Fig. 4 and photo at right). Architecturally it was more pleasing to have the shadow line at the eave height than a couple of feet lower as in the dropped-tie barns typical of a later period. In fact, even in many dropped-tie barns, the end ties were framed at eave height to create the preferred exterior look.

THE ENGLISH TYING JOINT. Since the 1200s, this has been the tying joint favored in the British Isles, where it is commonly referred to as "normal assembly." In English-speaking colonies here, it became the standard for houses and barns until about 1800 and the advent of square rule layout. (See part I of this series for a brief description of this method.) The joint was then used occasionally until the waning of timber framing in the early 1900s. In story-and-a-half houses with a second floor kneewall, it was used for the corner tying joints across the ends, while the dropped tie was used on interior bents.

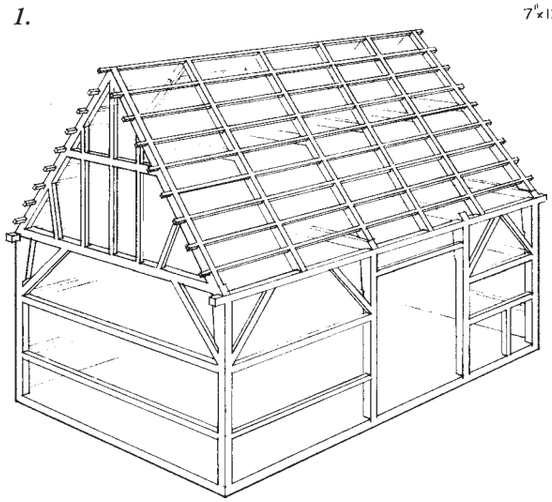
In its perfected form, the tie beam joins the plates with lap dovetails and is supported by jowled (gunstock) posts that tenon into both tie and plate. The rafters tenon into the top of the tie beam, forming a nice triangle and resisting outward roof thrust. The shallow lap dovetail in the underside of the tie beam, typically 1 to 2 in. deep, resists additional thrust put on the plate by intermediate common rafters and wind loading. To keep the lap joint together under wind loading and possible twisting action from drying, the tie beam is secured to a tenon (the teazle tenon, Fig. 3) in the top of the post jowl. The required extra width for the jowl at the post top was obtained by hewing from the natural swell of butt logs. The swelled end with its stronger fibers was placed up. In 17th-century houses, these jowls were often decorated with carved moldings. In later houses where the framing is encased by boards, the post tapers evenly from sill to tie.

The plate typically projected in length beyond the end wall of the building to provide relish past the dovetail. Though protected by the overhanging roof, a projecting plate end would still suffer from exposure. One solution was to extend the gable wall above the attic floor to conceal the joint. A different way to provide plate relish was to narrow the dovetail width toward the inside edge of the tie beam, as far as practical (Fig. 6-4, overleaf). Or, instead of a dovetail, a cog was used that didn't require plate relish at all (Fig. 4). The cog also avoided another intrinsic problem of dovetails, namely shrinkage. In England, with its higher equilibrium humidity, shrinkage is likely less of a problem. But high initial shrinkage of the dovetail, exacerbated by American temperatures and humidity swings, allows the plate to move outward under pressure, especially from any common rafters placed between the trusses. The result can be to split posts down the jowl, since the plate pushes on the back of the post and the teazle tenon in the front is restrained by the mortise in the underside of the tie beam. Many jowled posts are reinforced with iron today.

Boarding lapped at tie beam.

Figs. 1-3. Below, side-entrance, three-bay 23x32 barn in southeastern Massachusetts, ca. 1680. This barn has a steep 52-degree roof with 2x3 common purlins 24 in. on center trenched through rafters set about 6 ft. apart. A collar beam joins each pair. Unusually, one tie beam doesn't receive a rafter pair. At right, English tying joint with half-dovetail at the gable end. The plate, originally longer, now extends only 2 in. past the tie beam. A groove in the underside of the tie (Fig. 3) accepts the boarding.

1.



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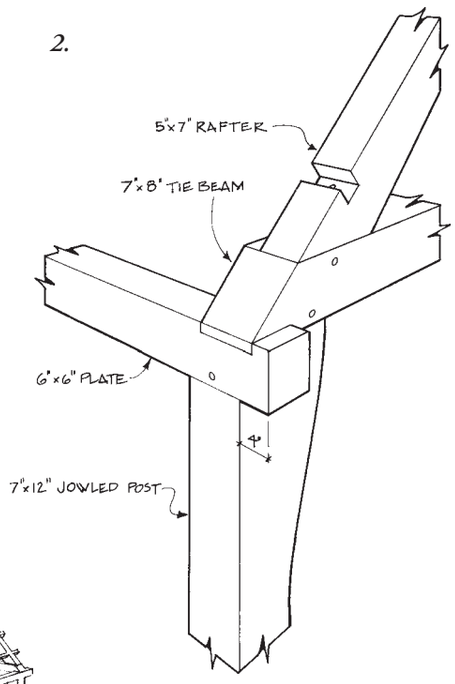

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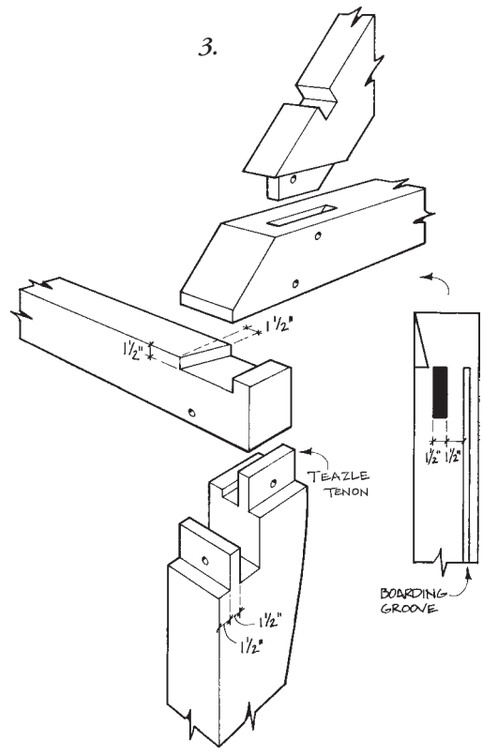


Drawings and photos Jack A. Sobon

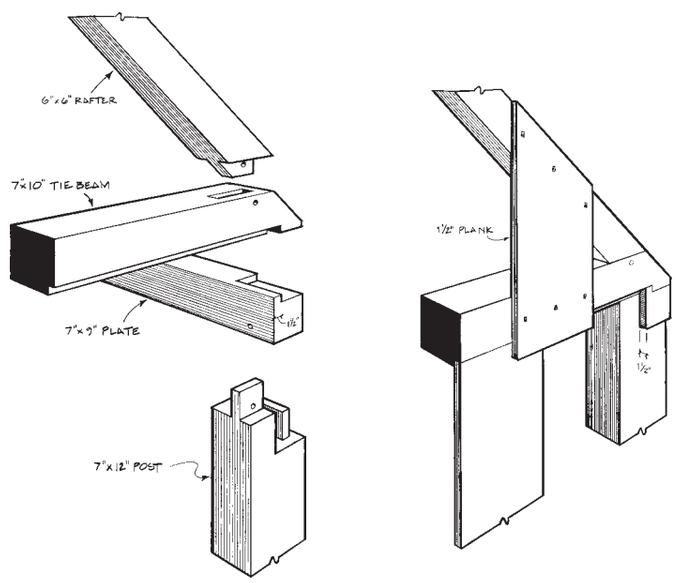


Fig. 4. Full-width cog (1½ in. square) found on the corner joints in a 1773 three-bay 28x36 barn in Adams, Massachusetts. This barn has dropped tie beams on interior bents. Note lapped end boarding.

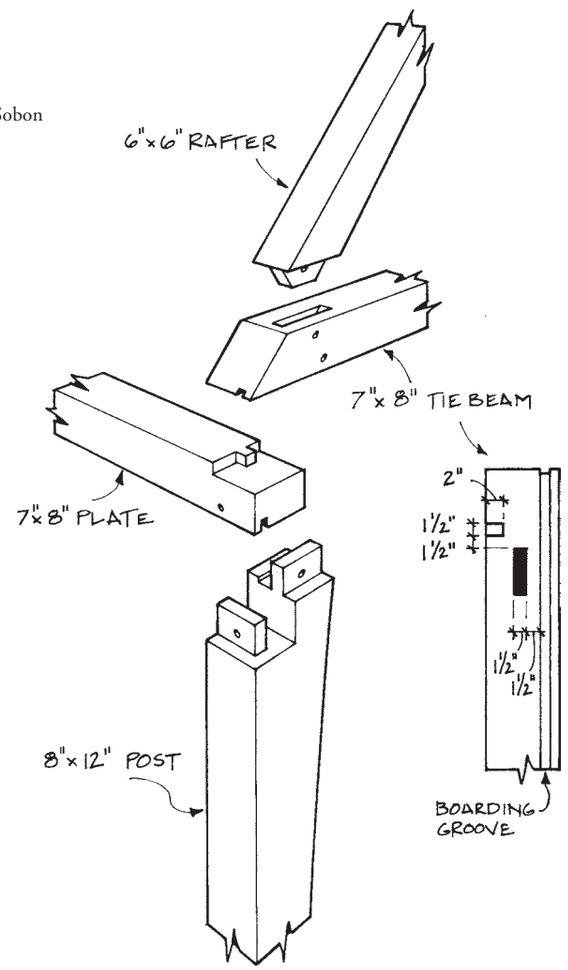


Fig. 5. In this corner tying joint from a 30x42 barn (1715) in Uxbridge, Massachusetts, a cog is used instead of a dovetail for the four corner tying joints to address the plate relish problem. Both plate and tie are grooved for vertical boarding.

To reduce stress on the posts, some builders added more tie beams, one for each rafter pair. Thus each rafter pair makes a rigid triangle and there is no longer any thrust on the plate. Each tie functions as an attic floor joist, sometimes spanning the width of the house. On wider houses the intermediate ties framed to a summer or spine beam, shortening the span. The principal tie beams were the full width of the house and often in conjunction with jowled posts. Extending all these tie beams over the plate could support a boxed-in cornice. The ties could be dovetailed, notched or cogged over the plate.

Other variations of these joints where ties and joists lap over the plate can be found in Tidewater Virginia. Here, the attic floor level is a few inches above the plate. The tie beams are lap dovetailed, and the joists simply notched to go over the plate. A raising plate, originally a timber but later a plank (Fig. 8), is nailed across the tie and joist ends for the rafters to bear on as in three of the flush lap examples described later. (See "The Eighteenth-Century Frame Houses of Tidewater Virginia," by Paul E. Buchanan, in *Building Early America*, ed. Charles E. Peterson, 1976. For additional New England variations, see Isham and Brown's *Early Connecticut Houses,* Cummings' *Framed Houses of Massachusetts Bay 1625-1725*, Kelly's *Early Domestic Architecture of Connecticut* and TF 36.)

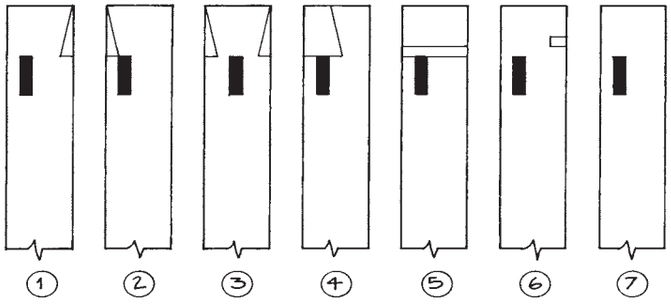


Fig. 6. Undersides of tie beam ends showing half-dovetails (1, 2, 4), full dovetail (3), cog types (5, 6) and one example (7) merely trenched across the plate.

FLUSH LAP TYPES. In houses, it's desirable to have the top of the tie beam flush with the top of the plate. But in frames with the traditional English tying joint, the attic floor is level with the top of the tie beams and thus several inches above the top of the plates. In medieval times when the tying joint originated, rooms were open to the roof and there was no attic floor to consider. Inserting an attic floor at tie beam level creates a somewhat awkward appearance at the plate (see photo on back cover).

The ceiling-wall junction is much cleaner when both the top of the tie and the top of the plate are in plane and, if the ceiling is to be plastered, when both timbers are the same depth. To gain this effect, various lap joints, some using dovetails, some with cogs, were developed. Many still used the jowled or tapered posts to secure the lap. There was much experimentation during this period. Many new joints emerged, and often more than one type appeared within a building. A few buildings have four different types! End joints were different from intermediate joints. Sometimes the front eave of the building had a different cornice from the rear. As the jowled or tapered post gave way to a post with a single top tenon, the joints became simpler.

Though strong enough in tension, these lap joints appear too weak to carry vertical loads. Often bearing only on its tenon, the tie beam receives no direct support from the post. However, such tie beams and plates are typically supported by plank partitions or timber studs, often for their whole length.

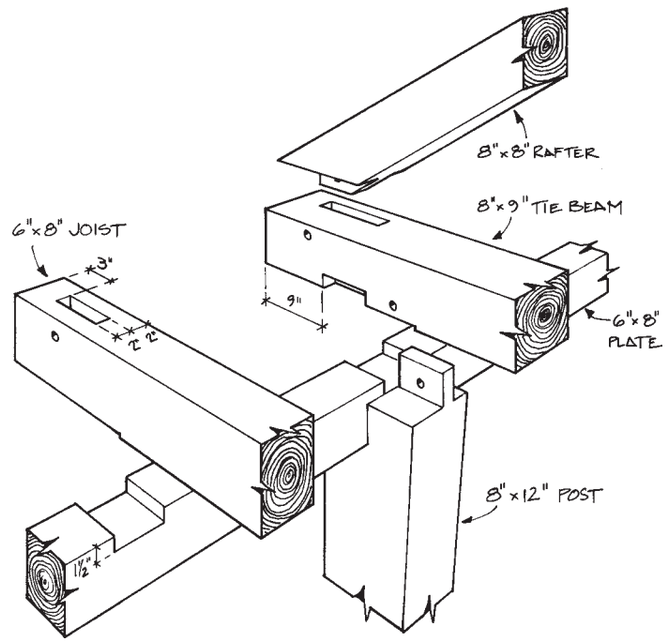


Fig 7. In this early 19th-century 32x40 two-story house in Washington, Massachusetts, the rafters tenon both into tie beams and joists, which extend 9 in. past the plate for a boxed-in cornice. The principal tie beams sit on tapered posts and are cog-lapped over the plate. The 6x8 joists do not run the full width of the house but frame into a central summer beam. They are notched through the plate without cogging. The roof has purlins framed between principal rafters and supporting the commons at mid-span.

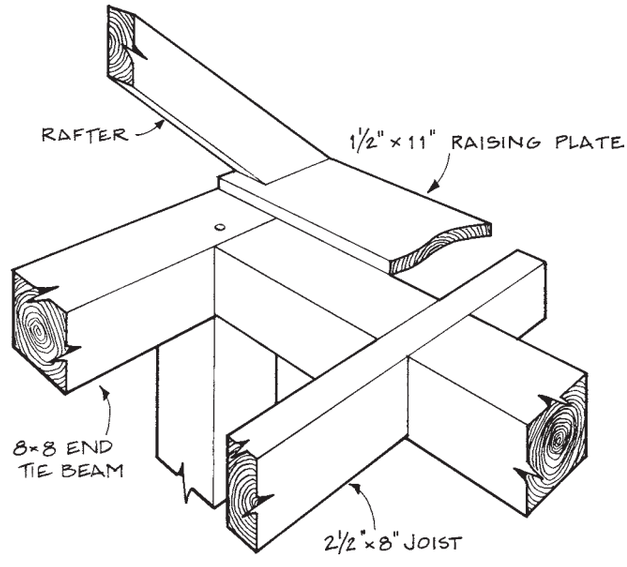
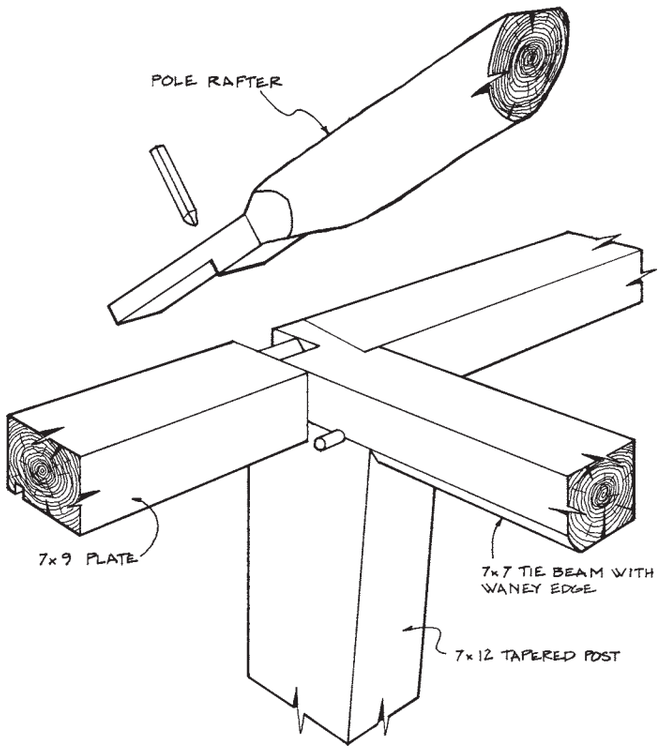
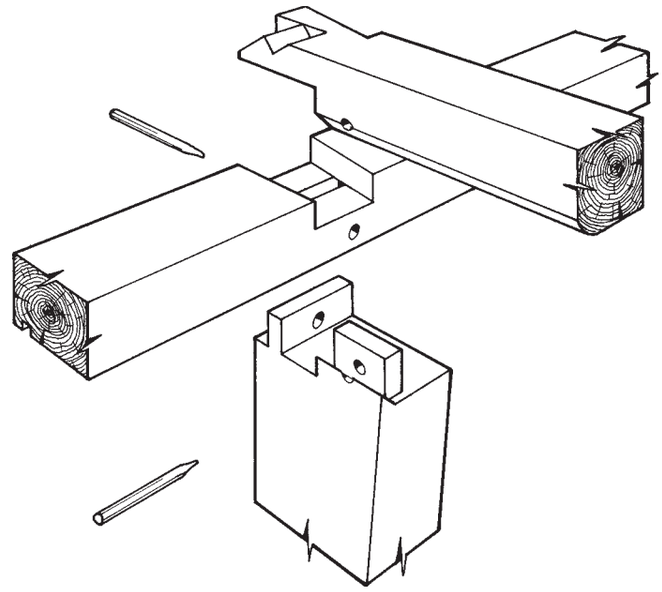
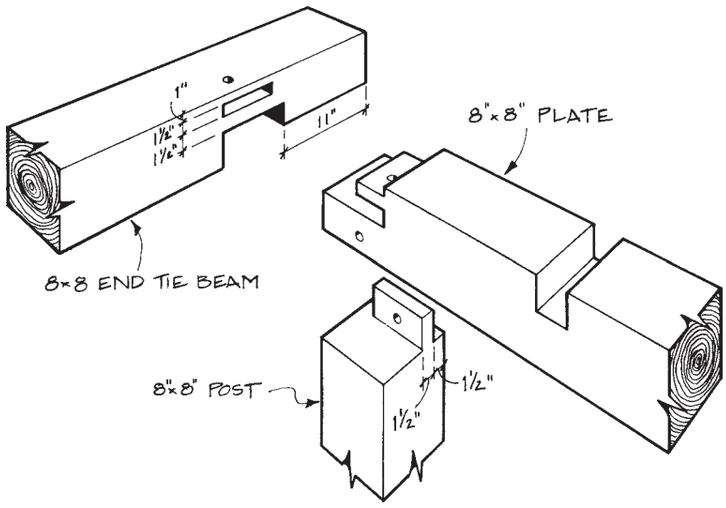


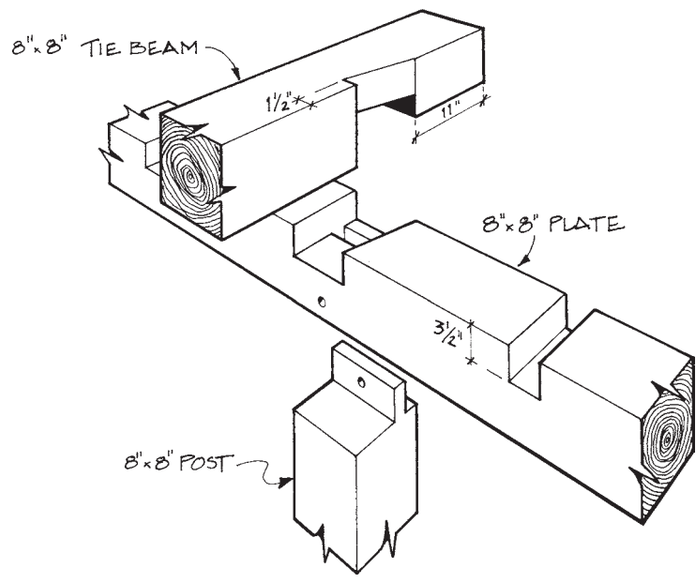
Fig. 8. A plank called a raising plate was nailed to both ties and joists, and rafters were nailed to it in turn. Attic floor boards butted to the plank. This arrangement was found in a 1791 house formerly standing in Cheshire, Massachusetts.



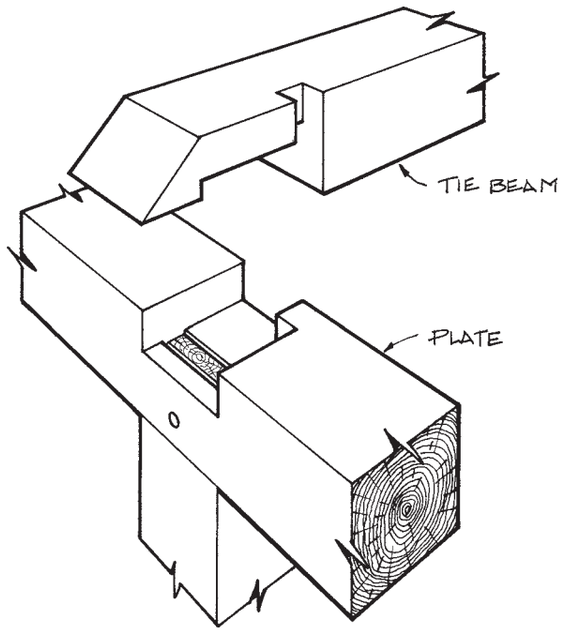


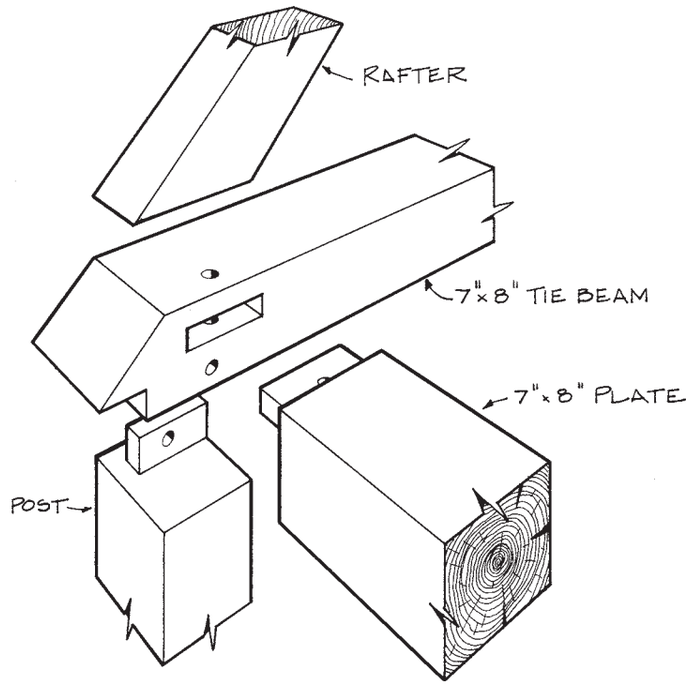
Figs. 9 and 10. This tying joint is found in a 28x38 three-bay, pre-1812 English barn in Goshen, Massachusetts. All of the tying joints are of this type. Instead of the rafter tenoning into the tie (as is more common), it is step-lapped, as are the intermediate common rafters to the plate. The post is scribed to meet the waney edge of the tie beam. (The corner joints are the same, without relish past the dovetail, but with rafter pins extending through the dovetail into the plate.)





Figs. 11 and 12. In the 1791 Cheshire house, a 30x40 Cape, non-jowled posts terminated in a single top tenon. Tie beams and floor joists extended 11 in. at the front eave to support a boxed-in cornice. At the front corners (left), a combination of lap, tenon and overhanging tie avoided the plate relish problem. The two intermediate tying joints on the front wall (right) were lap dovetails. Curiously, one had the dovetail reversed: a mistake? Additionally, all the floor joists notched through the plate for additional tying. At the rear wall (not shown), there was no overhang. Instead of lap dovetails, the intermediate tie beams joined the plate with a straightforward 4-in. deep horizontal mortise and tenon, and at the corners the joint was the same as at the front sans the 11-in. projection. See also photo of frame on back cover.





Figs. 13 and 14. A two-way cog was used in this lap joint in a 26x27 pre-1810 house in North Adams, Massachusetts. The tie beam end was notched on the bottom and the side to engage the plate. The cog measured 2x2½x3 in. The joists and ties extended about 7 in. to frame a cornice. At right, the end condition. A simple mortise and tenon is substituted for the lap.

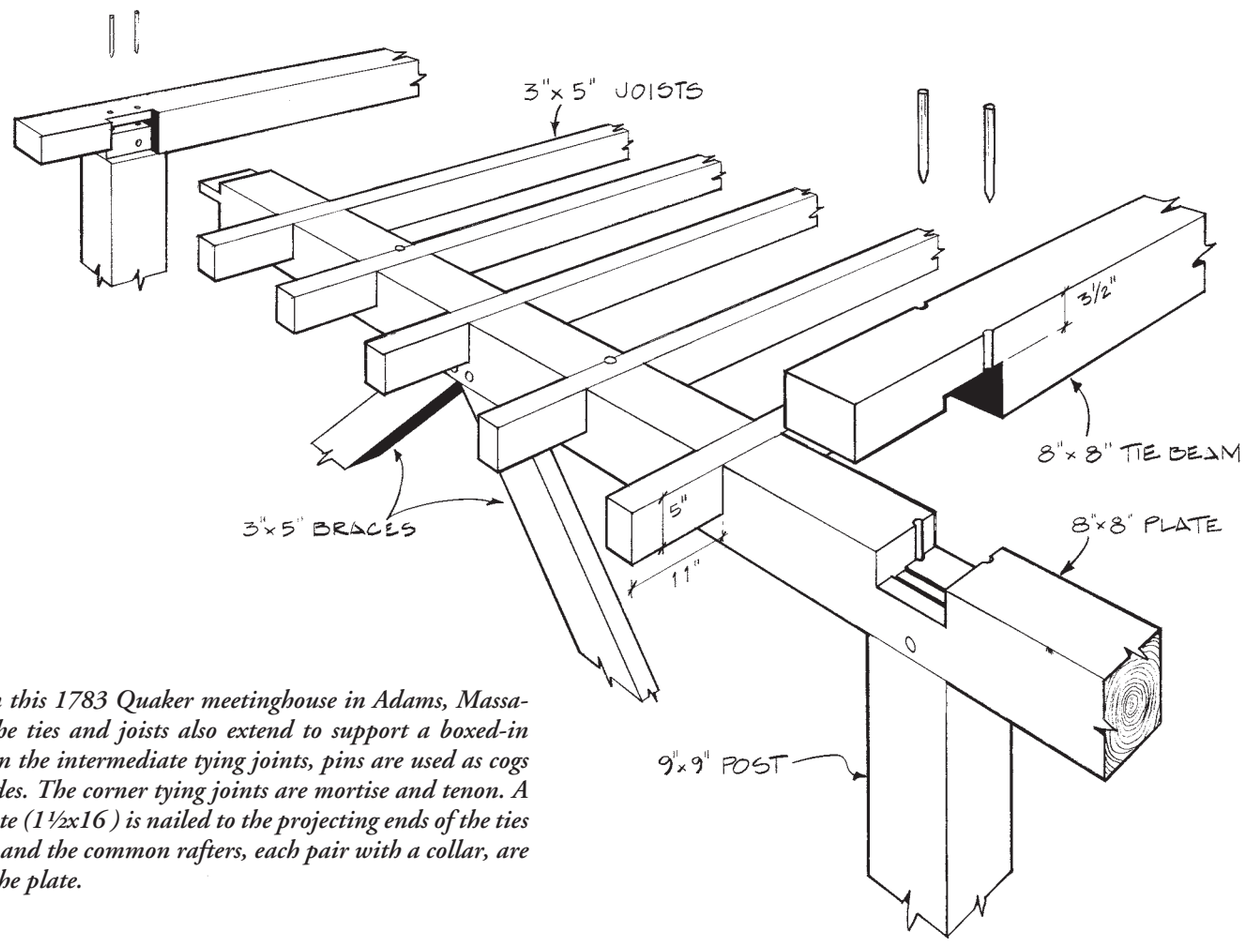
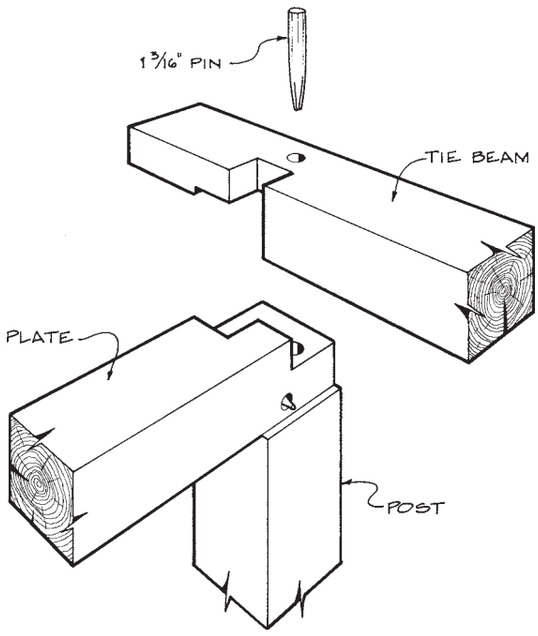
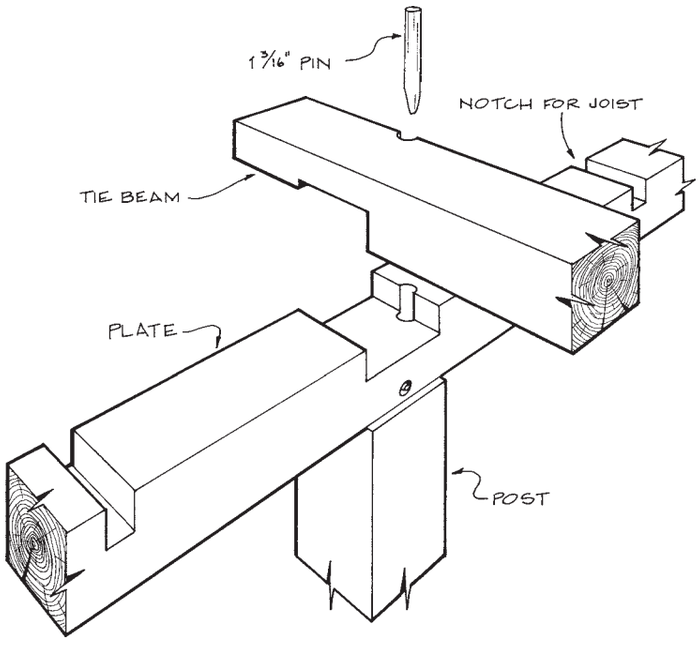
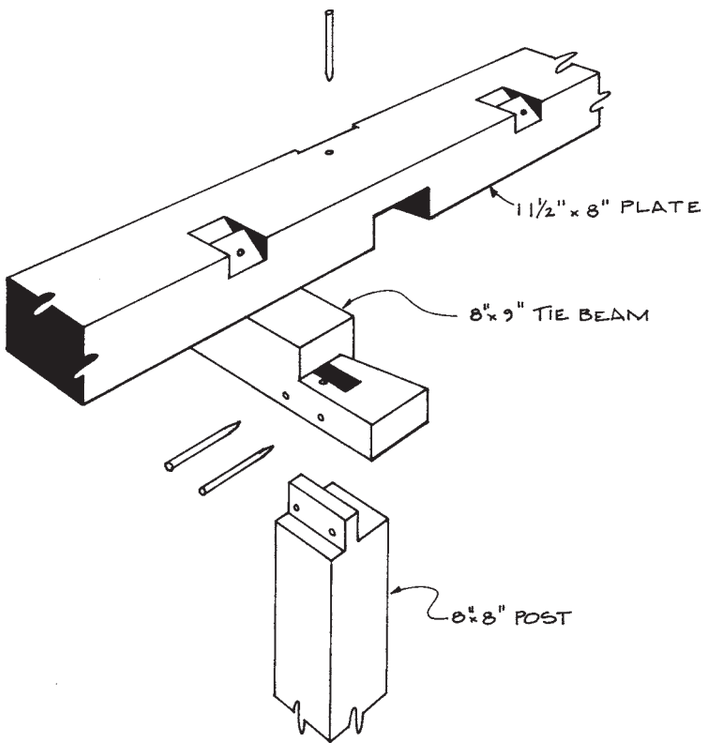


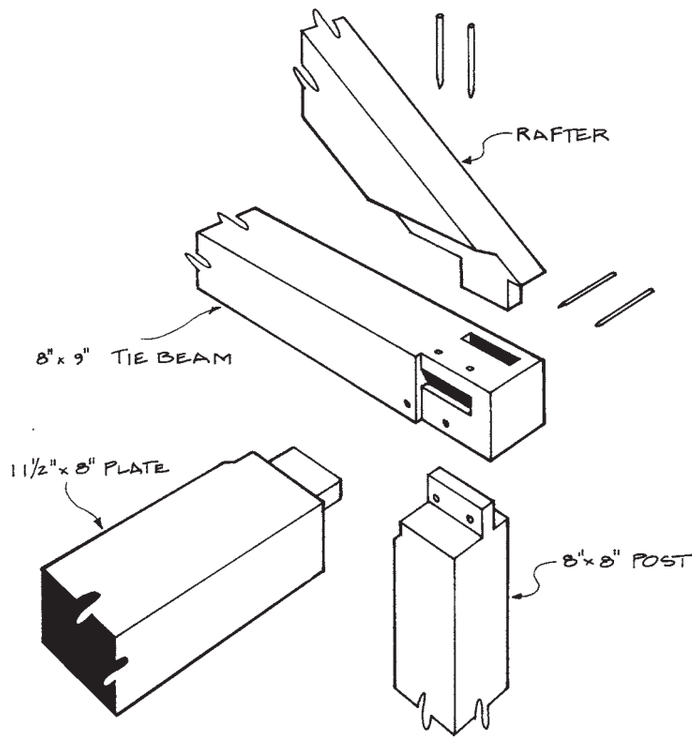
Fig. 15. In this 1783 Quaker meetinghouse in Adams, Massachusetts, the ties and joists also extend to support a boxed-in cornice. On the intermediate tying joints, pins are used as cogs on both sides. The corner tying joints are mortise and tenon. A raising plate (1½x16) is nailed to the projecting ends of the ties and joists, and the common rafters, each pair with a collar, are nailed to the plate.





Figs. 16 and 17. In this 26x32 Adams, Massachusetts, house (1785), the cog was used on the corner joints, the opposite of the North Adams house. An oversize pin was used to keep it in position. The hewn beech timbers were 7 in. square. On the intermediate joints, a single pin cog was utilized. This frame also had through notched joists and a plank raising plate with common rafters nailed to it.





Figs. 18 and 19. In a Charlemont, Massachusetts, house, now dismantled, the front plate lapped over the dovetailed end of the tie beam. A single pin also resisted movement. The plate, together with the tie beam dovetail, projected 6 in. to become a solid cornice base. The rear plate (not shown) did not overhang and the rear tying joints on the intermediate tie beams relied on through mortises and two pins. The common rafters step-lapped into the plate, except at the front corners, as shown (note hewn rafter tenon). The back corners did not project.

MORTISE AND TENON. The mortise and tenon joint performs better than a lap dovetail when shrinkage is a factor. Because the pin hole in the tenon is bored a little closer to the shoulder than in the mortise, or *draw-bored*, the pin pulls the joint together very tightly. The joint remains tight under normal shrinkage and loads. At the connection between tie and plate, the mortise and tenon gradually replaced the lap dovetail.

In its most basic form, the tie beam tenons into the side of the plate and is secured by one or more pins. There are countless examples of this joint. Many of these simple joints have not fared well over time, and spreading plates are restrained by cables. If the tie beam occurs over the post, much wood is removed from the plate.

It is prudent to stagger joints whenever possible. There are several ways to accomplish this. First, the plate can project from the face of the building, creating a cornice. Thus the post is tenoned into the tie beam, not the plate (Fig. 22). The drawback here is that diagonal braces can't be framed from the post up to the plate, only down to the floor beams or sill. In some houses framed plank-on-timber, there were no braces. The wide planks, well fastened to sill and plate, braced the walls.

Second, the tie beams can be offset from the posts. But end wall tie beams are outside of the plank wall and the plates cantilever out to support them. Again, braces can't be framed to them. On intermediate tying joints, a through tenon with two or more pins can be used or, better yet, a wedged through half dovetail (Fig. 23). Third, the plate can be raised and the tie beam deepened so that the post tenons into the tie beam instead of the plate. This tie to plate joint is an improvement over the normal mortise and tenon. Instead of the tie beam pins having two shear planes, they have three (Figs. 25-27). These mortise and tenon tying joints require a different raising technique. The plates must be slid horizontally onto their respective tenons and plate bracing is tricky to insert. A fourth method is to raise the tie beam above the plate (Fig. 24).

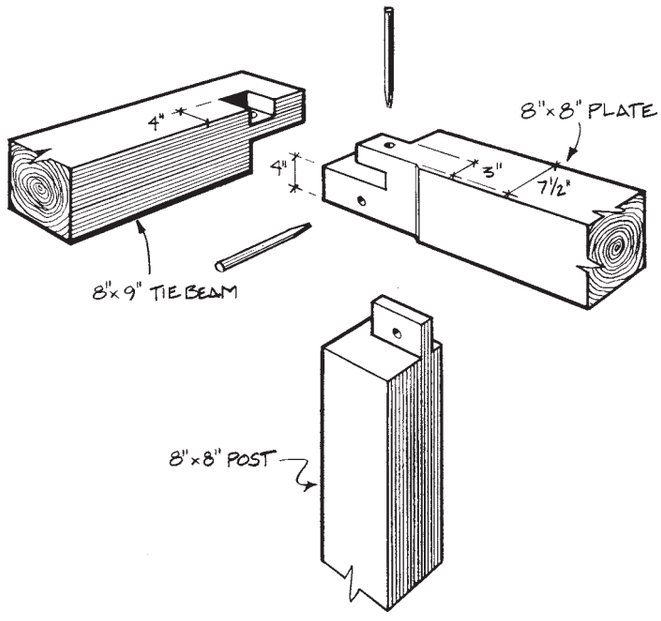


Fig. 20. This joint is a cross between a cog and a mortise and tenon, and occurs (as far as is known) only at the corners of a 1785 three-bay 30x40 barn in Adams, Massachusetts. The intermediate tying joints are the dropped type. The common rafters with collars are step-lapped into the plate except at the corners where they are butted and nailed.

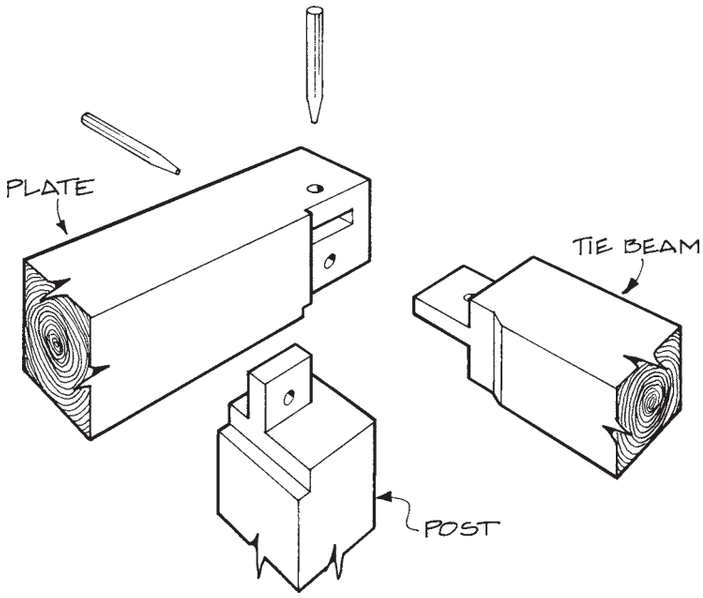


Fig. 21. This simple joint is found at the corners of a square rule barn in Huntington, Massachusetts.

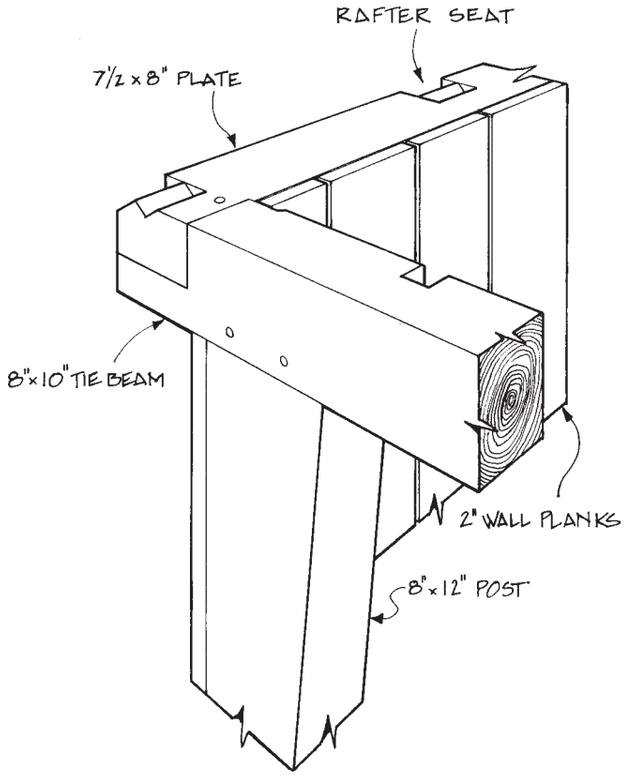


Fig. 22. In this Canaan, Connecticut, example (after 1810), now dismantled, the cantilevered plate projected enough to allow the wall planking to nail to the inside surface. The 6-in.-long tie beam tenons to the plate were secured by one pin at the corners and two pins on intermediate joints. The posts were tapered.

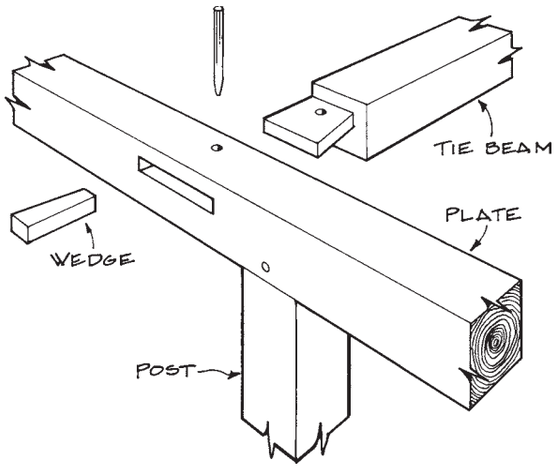


Fig 23. This rugged offset tying joint, a wedged through half-dovetail mortise and tenon, is only used on intermediate tying joints.

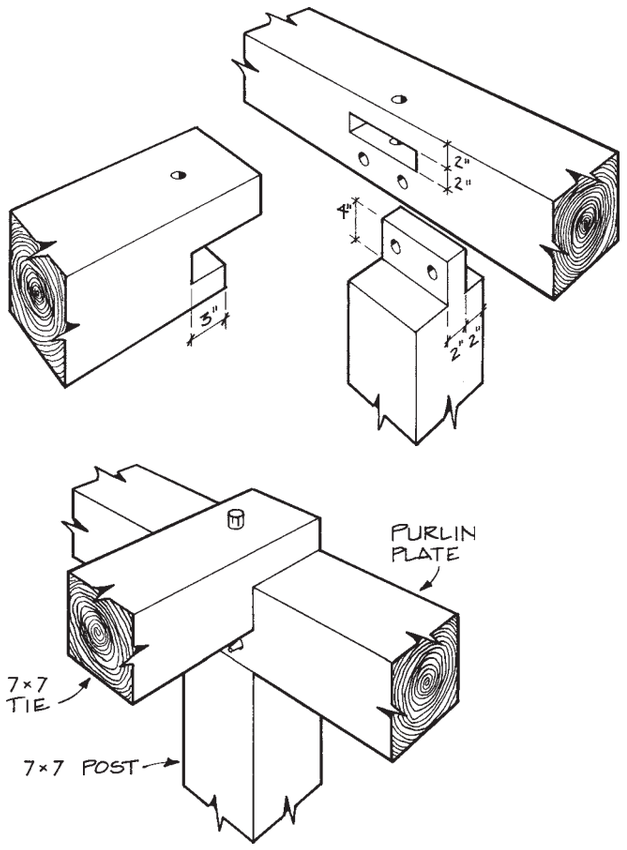
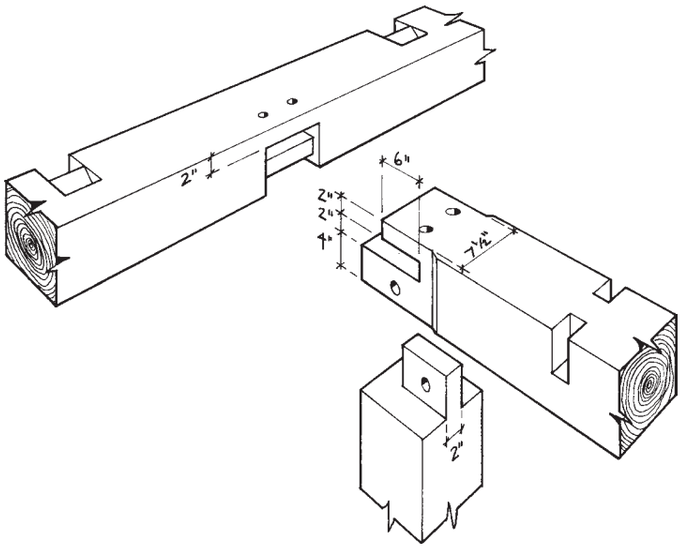


Fig. 24. This tenoned tie connects purlin plates in a barn in Goshen, Massachusetts. It also has an additional pin shearing plane in the tying joint.

25.



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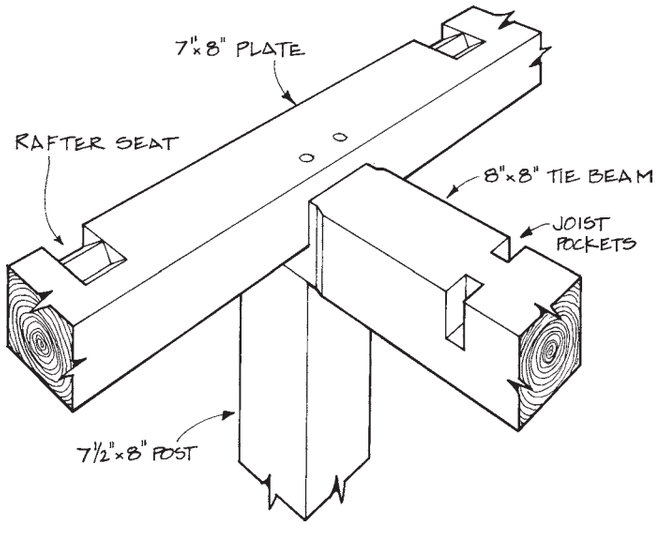

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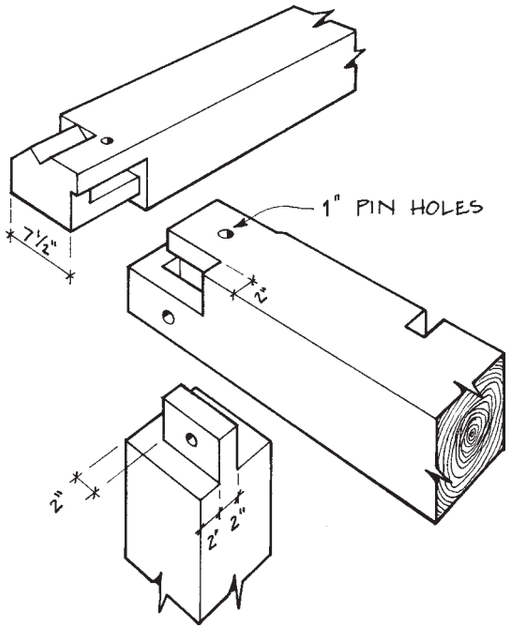


Figs. 25-27. Intermediate (Figs. 25 and 26) and end (Fig. 27) tying joints in a two-story 28x36 post-1810 square rule house in Windsor, Massachusetts. The plate is 2 in. above the tie, allowing the post to tenon into it. The braces from the post up to the plate fit elongated mortises and were apparently inserted after the plate was slid on, and the extra space in the mortise was then filled with a wedge. The end tying joint is similar but with 2 in. of plate relish and only one pin.

TRIPLE BYPASS. This is arguably the most perplexing of tying joints located thus far. It is found along the border of New York and New England in four states. Some refer to it as *secret* joinery because it can mystify the casual observer. Its name, coined by Don Carpentier of Eastfield Village in East Nassau (Rensselaer County), New York, is apt. The connection has three mortise and tenon joints, not counting the rafter joint (Figs. 28-30). In Buskirk, New York, a barn with all of its tying joints of this type shows evidence of having been dismantled previously. All the tie beam tenons are inserts (free tenons). Undoubtedly the dismantler was perplexed at how to take the barn apart. He cut the tenons off (a hanging offense in my book) and then spent considerable time putting tenons back on.

How was such a joint assembled? Different bent configurations would call for variations, but all would involve blocking up either the plate or the tie to allow the other to slide on over the post tenon. In a Shaushan, New York, barn, the post tenon into the tie beam is a couple of inches longer than the one into the plate. The tie beam could be blocked up high enough to allow the plate to slide on but still be engaged on its tenon. This particular builder, I would say, had raised more than one of these barns.

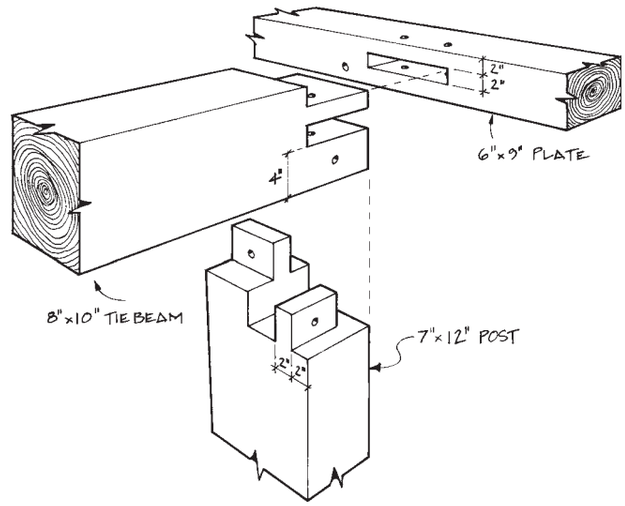
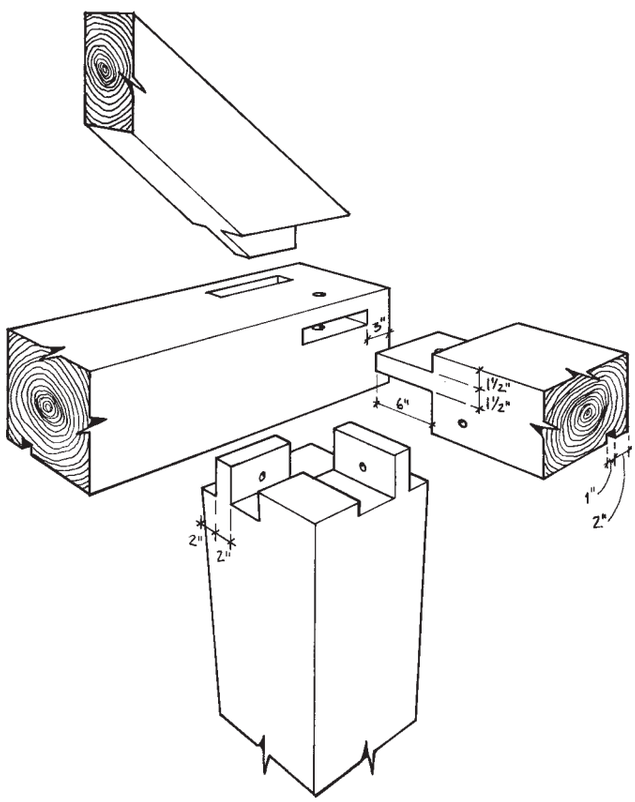
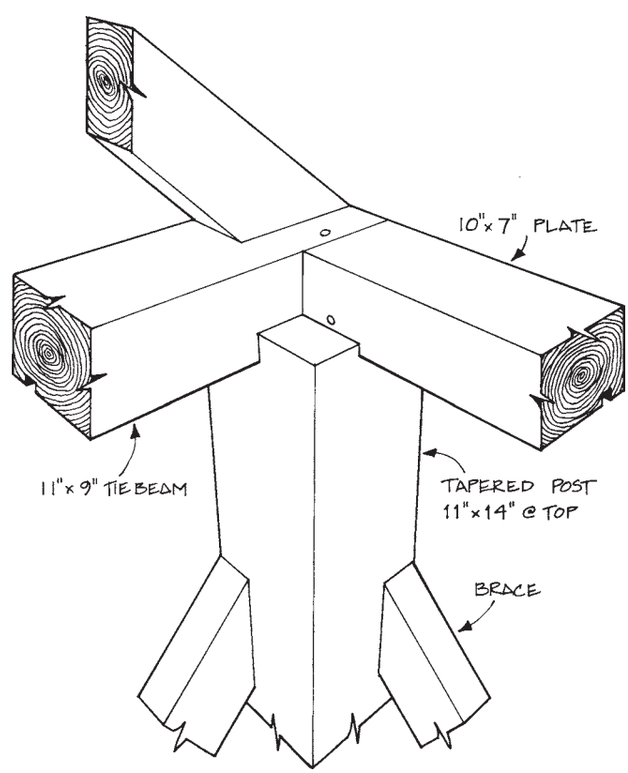


Fig. 30. A triple bypass joint in a 26x38 three-bay, side-entrance barn in Richmond, Massachusetts. All eight tying joints in the barn are of this type. End joints are of course provided with plate relish. The tying pins have an extra shear plane. This early scribe rule barn was framed before 1810.

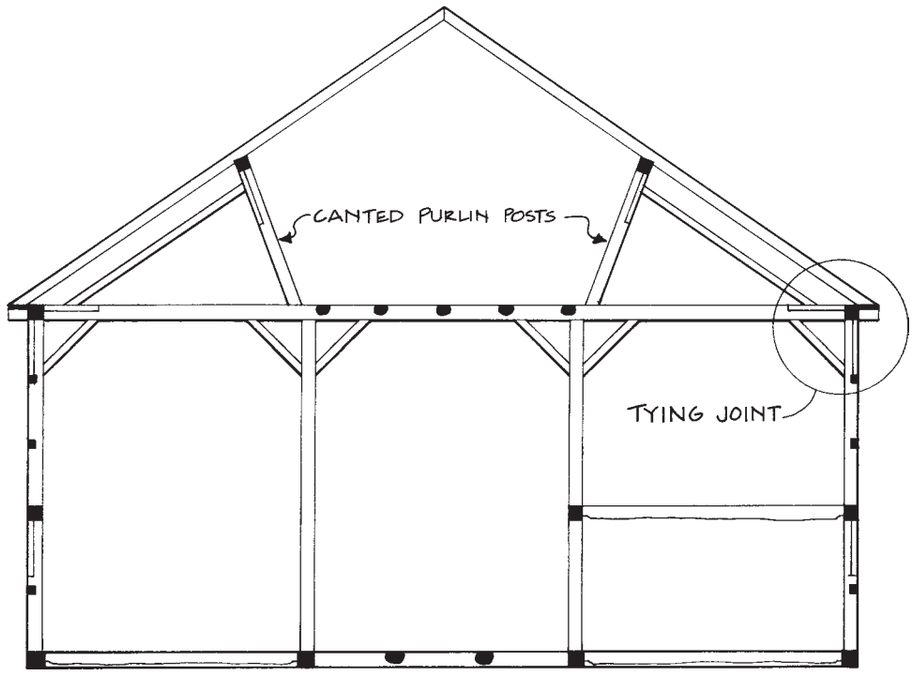




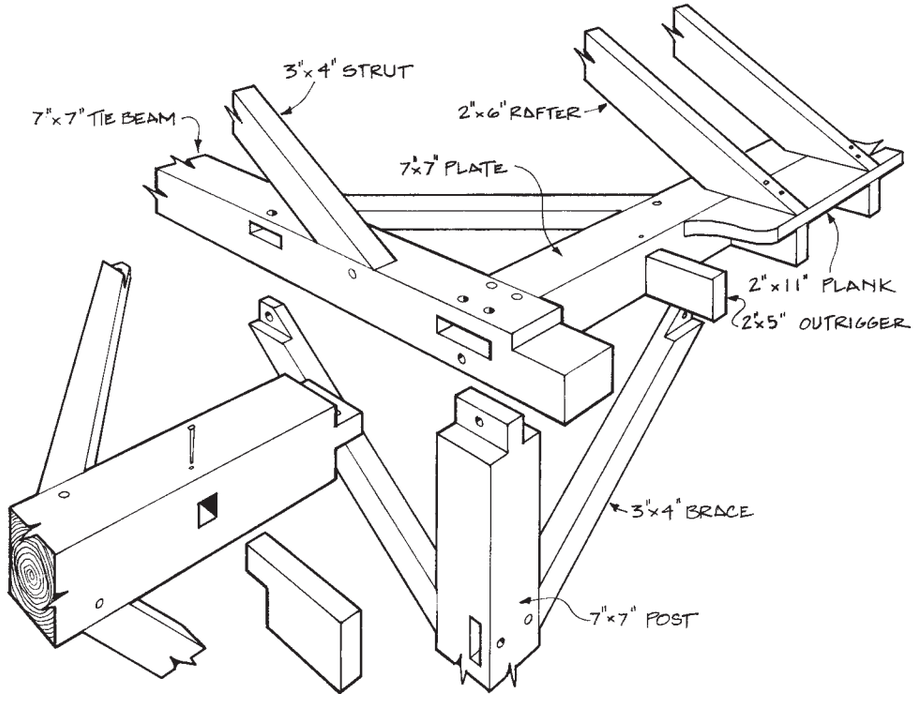
Figs. 28 and 29. This triple bypass corner tying joint was found in an early scribe rule (late 1700s) four-bay, side-entrance barn in Hoosac, New York. The 36x49-ft. barn appeared to be Germanic in origin, with purlin plates and a ridge beam. Intermediate ties were the dropped type. Long braces extended German-fashion from the sill up to the corner posts. These undoubtedly helped stabilize the structure during the setting of the plates. Boarding grooves were worked in both plate and tie. This barn was carefully dismantled but unfortunately burned while in storage.

INTERRUPTED PLATE. In the early 19th century, a new barn type emerged in New England, a gable-entry, aisled barn that could vary in length from two to 10 bays (or more). Bays were typically 12 ft. Such barns were often built into side hills to allow access on more than one level. Figuring prominently in their design was a frame with interrupted plates. These shorter plates, tenoned between tie beams or posts, allowed standardized joints and components. A builder could vary the size without changing the design. Bents were raised and connected by plates and braces. As soon as two bents were connected, the frame was braced and stable. There were variations in this joint depending on cornice design. Some barns had two plates. One was in the normal position to receive the tops of the wall boards. The second tenoned between the projecting tie beam ends to support the fascia and soffit.

The interrupted plate was not an improvement over the continuous plate. Wind loads cause the plate braces to exert tension on the short plate tenons, typically 3 to 4 in. long, which can handle only small tension loads. But roof boarding, flooring and cornice work often provided enough continuity to make up for what the continuous plate had provided, and some barns had continuous purlin plates with a scarf where necessary. Some houses as well were built with interrupted plates, but by this period balloon framing was becoming popular for houses, and timber framing was in decline. —JACK A. SOBON



Figs. 31 and 32. This ca. 1850 barn, now rebuilt elsewhere, stood in Shrewsbury, Massachusetts. Measuring 37x50, it has canted purlin posts, continuous purlins and interrupted plates. All principal timbers are 7x7. To support a substantial Greek Revival cornice, the builder has inserted outriggers into the plates and secured them with nails (Fig. 32 below). A 2x11 raising plate is nailed to the outriggers, and the projecting tie beam ends stiffen the assembly and support the rafters. Braces in three planes reinforce the structure.



Jack A. Sobon

The English tying joint tradition lives on even with interrupted plates in this Newfields, Maine, aisled barn. The plates tenon into the side of the post and a flying plate (not visible) is supported by the tie beam ends.

Restructuring for the Long Term

WHEN we think of the best moments of our lives, they are invariably times of intense community and teamwork: that first summer away as a crew member on a schooner, the athletic team with perfect chemistry that went on a great roll, the early heady days of the commune in '68, the frame-raising with 100 of your closest friends.

Can work be like that, most of the time? What would it take? Like others, our two companies, South Mountain Company on Martha's Vineyard and Big Timberworks, Inc. in Montana, have doggedly pursued answers to these questions.

In 1987, South Mountain Company had reached a hinge point in its development. I, John Abrams (founder and owner), had parted company with my original partner. Several key employees who had been with the company for many years approached me. They wanted to stay with SMC, to make their careers here, but they felt they needed more than an hourly wage—they needed a stake. I wanted the commitment, the teamwork and the shared responsibility that lead to some of life's great moments.

In 1998, I, Merle Adams, a founder and owner of Big Timberworks, had also been through a parting of the ways with my partner. My company was 16 years old, still growing and profitable, but way too dependent on my energy and investment. I wanted my life back, and I wanted to be a part of my 10-year-old son's life. I wanted to plan for my eventual exit and the succession of the company. And I too wanted the committed group of co-workers that had formed at Big Timberworks to evolve further—to reach for a larger satisfaction.

Though at different points in our company histories, and in different circumstances, we both came up with the same answer—restructure as a worker-owned co-operative corporation. We sold our companies to key employees (including ourselves!) and established a structure whereby other employees could buy in over time and the worker-owners would control the businesses. Why was this attractive? Why would we diminish our control and ownership share of businesses we had poured heart and soul into and helped to build into thriving, profitable entities? Good question. This article explores the reasons and makes a case for worker ownership.

SOUTH Mountain Company was founded in 1975. From the beginning, it was a design-build firm driven by a passion to create well-crafted buildings and good relationships. We have nearly always done all parts of the process, from conceptual design and site development to finishes, cabinetwork, furniture and (more recently) interiors. We were lucky: we had good work to do and good clients to work with. We remained busy through the early '80s. What had begun as just my partner, myself and a flatbed truck with our name painted (drips and all) on the door became something else. My partner left in the mid-'80s to raise sheep, and SMC gradually grew. By 1985, there were 10 employees. Key employees wanted a stake, and we felt the need to formalize a process to facilitate and insure greater participation in decision-making. Until then the company had been small and familial; with growth came new needs.

We have continued to prosper, continued to grow (always slowly and with trepidation) and continued to mature. We currently have 25 full-time employees (eight in the office and design, four in the woodworking shop, the remainder in the field), in addition to a broad network of subcontractors whom we work with consistently, and we do approximately $5 million worth of work each year. Of the 25 employees, 10 are full owners. In the next two years, that number will grow to 15 or 16.

Big Timberworks incorporated in 1983 and worked primarily as a log building company doing start-to-finish projects and log shells with timber roof systems. In 1985 we started doing timber frame jobs in a part of the country where there was no timber framing tradition. Until the '90s, jobs were few and far between and profits nonexistent. Personal sacrifice by owners and workers held it all together.

The '90s began a new era of investment and prosperity in the West; Big Timberworks was in the right place at the right time. Maybe we really could make a living at this after all. . . . We recognized that our workers' good work was the reason we were able to increase our profits and our reputation, and we began to share profits and encourage our workers to share in decision-making. Knowingly or not, we started taking baby steps toward an ownership culture among our workers; this process led to the eventual formation of our co-op in 1999.

Listening to our workers has caused our business to change in ways it may not otherwise have. Our original goal—to be "America's Timber Framer"—has evolved to become "Best Darn Design-Builder in Gallatin County, Montana." Sure, we still timber frame, but we have expanded our building and design skills so we can focus on projects in our backyard and our immediate region. Because we do more of each one, we do fewer projects per year. We currently employ about 45 people (30 in shop and on site, five to mill and remanufacture our wood products, 10 others in design, management, and the office). Of these, a dozen or more will be owners by the time you read this.

What are the common threads that led these two different businesses toward worker ownership? Both owners shared a commitment to community and quality, to good work and good lives for their employees. Both businesses had made it through the difficult start-up years and found profitable niche markets that could be sustained over time. Both businesses were diverse enough that there were opportunities for employees to advance and learn new skills. Both had a strong core group of employees dedicated to their jobs and their co-workers. These conditions led to an optimistic, affirmative and progressive switch to employee ownership.

Can a transformation to employee ownership be used to save a sinking ship? Perhaps, but it seems more likely that a healthy business and mutual trust are prerequisites to a successful restructuring. For us, as the original owners, and for all our employees as well, there appeared to be tremendous potential gains.

IT'S important to recognize why we are in business in the first place and what makes our businesses what they are. We're in business because we believe our businesses do something of value; therefore, we hope our businesses, like the buildings we make, will last. Very few businesses last more than 40 years; many that do are family businesses passed down from parent to child. As family structure changes and breaks down and our society offers broader opportunities, we can expect to see fewer businesses passed down from generation to generation. In craft-based businesses like ours, the employees are the business—they are all we have to offer. The development of the business is the development of the employees. Neither can progress if the employees are constantly moving on. We need to keep them. Can we stabilize our workforce and extend to our craftspeople a greater stake in their careers?

These two critical goals—planning for longevity and keeping our people—give rise to several key needs. If we are creating wealth and prosperity, it should be shared with those who are responsible,

not as a handout but as earnings. If we wish to promote teamwork, co-operation and responsibility, we must formalize a democratic process that allows for shared decision-making. If we imagine our workplace as a vital, thriving community, there must be diversity, as in Nature, and we need a structure that can handle and incorporate diverse viewpoints, celebrate them and find resolution among them. And to make a durable, robust and flexible business that outlasts its original owner(s), we must also plan for succession, so that we and others can gracefully depart and take our equity with us without threatening or harming the company.

Strong and durable structures are rarely supported by a single post—we distribute the loads. A tree has both roots and branches to support it and feed it. Our businesses, if they are to succeed and endure, need the same. To accomplish this, some businesses distribute stock to the employees through employee stock ownership plans or by making key employees minor partners. But if these benefits don't come with a full stake in the decision-making, they may only take us partway. Offering ownership without control is like turning over the keys to a car with an empty tank. The dynamics change when the *power* is distributed as well as the wealth. Our cultural perception of power is the critical underpinning that makes employee ownership and control possible, or not. We've been taught that power is like pie: if I give you a slice I have less of the pie. But there's another view. As organizational consultant Robert Leaver puts it, "Power is infinite, more can be created. If I offer you some, suddenly there's more of it." If we can create more power, we can accomplish more. As we considered our futures and that of our fellow workers and our businesses, we both came to the conclusion that without this key ingredient, true sharing of power, our efforts would come up short and our structures would be hollow. Sharing both the profits and the power provides incentives for greater employee productivity and effectiveness, thereby increasing the supply of both.

BOTH companies restructured in the following way: we, the owners, sold the companies to ourselves and several long-term employees. The companies were valued by an accountant, and a long-term buyout strategy that would not strap the company was engineered. (Sympathetic, broadminded accountants and attorneys are important to the success of these restructurings. Big Timberworks' first accountant said, "I can't in my right mind recommend this to Merle." Hmm. . . wrong accountant.) Bylaws were developed to give all decision-making power for policy matters to the owners (more about this below), to establish a consensus decision-making process with a 75 percent majority backup in case of deadlocks and to allow employees with long service to buy-in (for roughly the price of a good used car) if accepted by the existing owners.

The structures are essentially the same. BTI's service time to qualify for ownership is two years, SMC's is five. (Do we have here western time sense versus eastern?) The separation between management and policy is different in the two companies. The restructuring came at different times in the company histories. SMC was smaller, less developed, and the driving force toward change was keeping long-term employees. BTI is larger, more mature, and the driving force was long-term planning for succession.

There is danger that an organization run by consensus will become bogged down by process and indecision. No business can successfully run that way. This is where the distinction between policy issues and management issues come into play. Policy decisions are broad and must be deliberated. They cover issues like accepting new owners; compensation and profit-sharing; company direction and future planning; major expansions, new ventures, or investments; involvement in community projects and major donations.

Management decisions must be more efficient, nimble and unencumbered, so management people must be invested with the authority to make decisions and carry out projects. Sometimes it's not so clear which decisions are policy and which management; making this distinction is a skill that must be developed. Owners and managers must work together to evolve a comfortable understanding that works for all parties.

Our governance systems are democracies with clear divisions of responsibilities and authorities. The group of owners has ultimate control, but it delegates much of the trust and authority to management. This comes easily, because this was the established mode of operation before the ownership was shared. The difference is that there is now a clear mechanism for discussion, debate and change. This may be one of the advantages of a company converting to worker ownership and control rather than starting that way. The entrepreneurial leap of starting a new business has been achieved without constraints and a viable company has been established. Restructuring becomes a part of the maturation process.

WE should not over-freight the ownership part. Restructuring to employee ownership won't turn a business around. If you take a rotten-to-the-core, dysfunctional business and restructure it, you can be sure you'll have a rotten-to-the-core, dysfunctional worker-owned business when you're done (although the inquiry itself may be an avenue toward solving internal problems). Employee ownership is a vehicle, and it's hardly the only one that encourages more responsible and more democratic business practices. In the end, it's not about what we say, but about what we do, not about the package but about the contents. What's important is whatever it takes to get to fairness, transparency, shared responsibility and promises kept.

Most forms of ownership create distance between owners and employees. In our companies, there is little distance because the owners are spread through all parts of the company, and the non-owners could, and very likely will, become owners in the not-too-distant future. When we hire new people, we are looking for future owners, which changes in subtle ways who it is we hire. But ownership is not a requirement. Neither is it a right. It is a privilege to be enjoyed by those for whom it is appropriate and who want it.

For both these companies, the process of change has been cathartic. It has given us a keel and a rudder, and it has stimulated us to articulate and understand our mission. In SMC's case, we have found that it has allowed us to take more risks, because we have a better sense of who we are. Together we've become better problem-solvers and better dreamers. At BTI, it has been remarkable to witness the new owners' progress: in six short months they have made important changes that might previously have taken years to accomplish. They have not only taken ownership of the parts that work well, but have grabbed hold of those areas needing improvement. Many BTI workers were skeptical about the change of ownership, but the skeptics are witnessing positive change through collective teamwork.

Peter Senge, author of *The Fifth Discipline*, a wonderful book about how organizations learn, writes about the difference between a company that is seen as a "machine to make money" and a company that is perceived as a "living being" with a heart and a mind. "Seeing a company as a machine," he says, "implies that it will run down unless it is rebuilt by management. Seeing a company as a living being means that it is capable of regenerating itself, of continuity as an identifiable entity beyond its present members." Worker ownership can help to transform our companies from machines to living entities that support a satisfied and productive work community. It can help to create a powerful group of dedicated decision-makers to support, uplift and extend our efforts. It brings many questions as well. Most we can only answer over time—by clearing out the undergrowth, making a path, stumbling along and seeing where the path leads. —JOHN ABRAMS and MERLE ADAMS

John Abrams answers mail sent to jabrams@vineyard.net. Merle Adams can be reached at merle@bigtimberworks.com.

A Day in Malmö

I LANDED in Malmö harbor late one crisp October morning hoping for nothing more than a pleasant day discovering a bit about Sweden, the country of my maternal lineage. I had been staying in Copenhagen with a friend and serendipitously decided to take the 45-minute hovercraft ride south across the Øresund to Malmö. Arriving with neither expectations nor a guidebook, I quickly discovered a city resplendent with well-preserved timber-framed buildings from the 16th to the 18th centuries. The low angle of the late October sun revealed the rich textures of weather-worn wood and brick infill.

Malmö (pop. 250,000) is Sweden's third largest city and lies about 350 miles southwest of Stockholm on the eastern coast of the Øresund, a narrow channel that separates Denmark and Sweden. This channel, the only means of access from the shipping ports of the Baltic to the North Sea, was a source of great power for the medieval Kingdom of Denmark. Under Valdemar IV (ca. 1320-1375), the realm encompassed all the territory in today's Denmark, Sweden, Norway, Iceland, Greenland and the Faroe Islands. The northern part of Sweden broke away during the 15th century, and the southern provinces were united with it under Karl X in 1658. Several of the timber frames of modern Malmö, however, were constructed during the 16th century, a period of great prosperity, when the port of Malmö was still part of the Kingdom of Denmark. During the 16th century, much of Denmark's wealth derived from a tax levied on ships passing through the Øresund. Denmark controlled both coasts of the sound, notably the towns at the mouth, Hälsingborg (now in Sweden) and Helsingør.

The fortified Kronborg castle at Helsingør was constructed specifically to enforce the Sound Tax. Such was its reputation in Elizabethan England that Shakespeare immortalized the castle as Elsinore, the setting of *Hamlet*, despite the fact that the action of the play takes place many years before the castle was built. A short boat ride further down the Øresund, Malmö was also a fortified town and shipping center. The city castle, Malmöhus (which now houses several excellent museums), was completed in 1542 and used for many years as a prison. James Bothwell, sometime husband of Mary, Queen of Scots, was its most famous prisoner. The castle is surrounded by a beautiful city park complete with an early timber-framed windmill. But for the wood enthusiast, the center-city holds the real treasures.

As in much of Scandinavia, Swedish culture emphasizes community, and manifests itself in a distinct historic preservation philosophy. The preservation of historic buildings is a symbolic act. Buildings may be preserved as symbols of former glory or power, as embodiments of exemplary designs or technologies that have been displaced, or for their special significance for an ethnic or racial group.

In Sweden, old buildings are viewed as "tombs" of the ancestors, a physical connection to a chain of historic events that embodies not only the physical, earthly work of ancestral carpenters, but their spirit as well. Old buildings and cemeteries are cared for with the same attention, whether high architecture or vernacular. Swedish cemeteries are still used as parks, public spaces in which to celebrate life as well as to grieve for the dead. The upkeep of cemeteries and family tombs is not the responsibility of the individual or of private societies as it is normally in America (where the notion of private property prevails), but of the town.

Malmö, like many Swedish towns, has a beautiful public cemetery with huge shade trees, benches and well-groomed walking paths. Just as Sweden's *allemanscratt* law guarantees public access to the countryside, other laws prevent true private ownership of recognized historic buildings, monuments or sites. Identified historic treasures are actually the legal property of the king or queen and by extension the whole population. Historic buildings provide a direct connection to ancestors, and this chain of ancestry is the key to preserving history. It is the responsibility of the monarch to preserve and defend this connection to the past as much as it is to preserve Swedish lands from foreign attack.

The three southernmost provinces of Sweden, the last to be wrested from Danish control, have, naturally, the strongest ties to continental Europe. These influences are seen in the regional accents of the language and in the architecture. The timber framing style is simple, reflecting the abundance of timber and the availability of long straight pieces.

Despite varying construction dates, the buildings in Malmö are coherent in form and decorative detail. Rectangular in plan, with the only decorative bracing appearing on the eave façade that fronts the broad street, these buildings appear rather wide in comparison with the narrow façades commonly seen in the densely populated town centers of Germany, France and the Benelux countries.

Roofs, generally pitched at 10/12 to 12/12 and now tiled, would have been thatched originally and ridged with a weighted cap of thatch and short timbers lashed together, probably like the Danish house shown at left. Malmö's wall framing patterns frequently divide surfaces into even, nearly square openings; this seems to be by aesthetic choice rather than creative necessity, however, as the framing contains many long timbers as well. Larger buildings use fancy brick infill (much of the brickwork very recent), while smaller ones tend to have painted plaster infill. One of the aesthetic joys of Malmö's buildings is the completeness of the frames, built well above the modern street level on stone foundations. Centuries of careful attention have prevented the usual sill rot that leads to the aesthetically unsettling "floating frame" phenomenon.

A summer home in Denmark.

Street façades are visually divided into a ground floor and a tall, slightly projecting second story. Upon rounding a corner, however, one realizes that second story framing is identical to ground floor framing except for a short knee wall added below the roof. Through tenons from the interior floor system are sometimes exposed. The platform system with exposed floor joists ends is often camouflaged with decorative carving in the short overhang of the fancier buildings, or simply left exposed on buildings of lesser aesthetic importance.

—Kristen Brennan

Kristen Brennan (kbrennan@ulb.ac.be) studies at the Free University of Brussels and does independent research on historic buildings.

Above, brick-infilled timber frame in Malmö shows mix of short and long timbers, as well as typical projections of upper story floor framing, including ties and tying joists. Note healthy wooden sill at base of wall. Above right, house in Copenhagen whose wooden sills have been replaced with masonry, yielding the peculiar floating look. Below left, Malmö's buildings generally run eave (or wide) side to the road, unlike other urban buildings in northern Europe. Bottom left and below right, tying joists and supports for jettied overhang pierce the walls.

Photos Kristen Brennan

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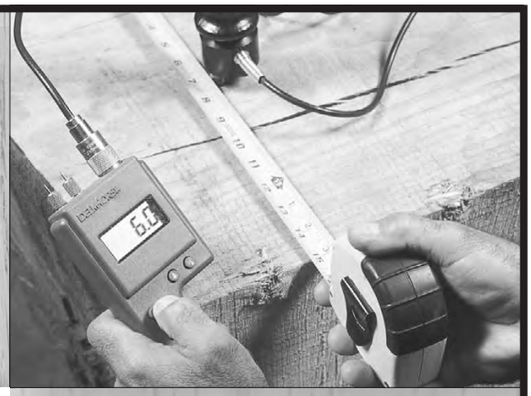

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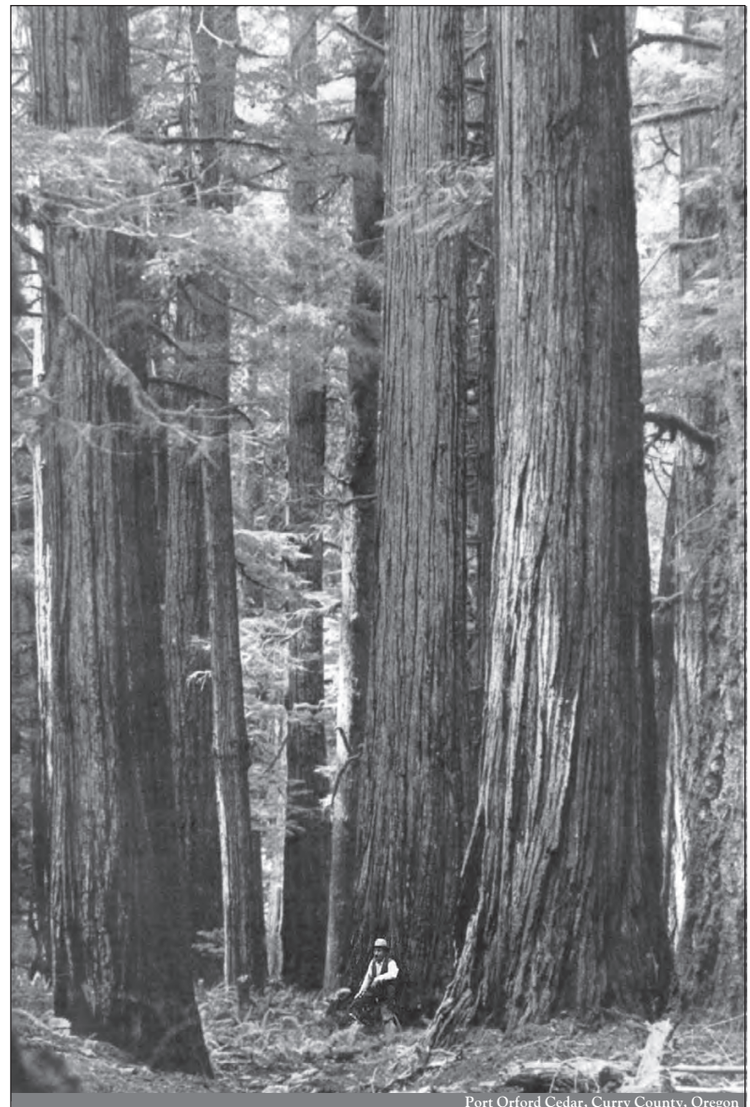

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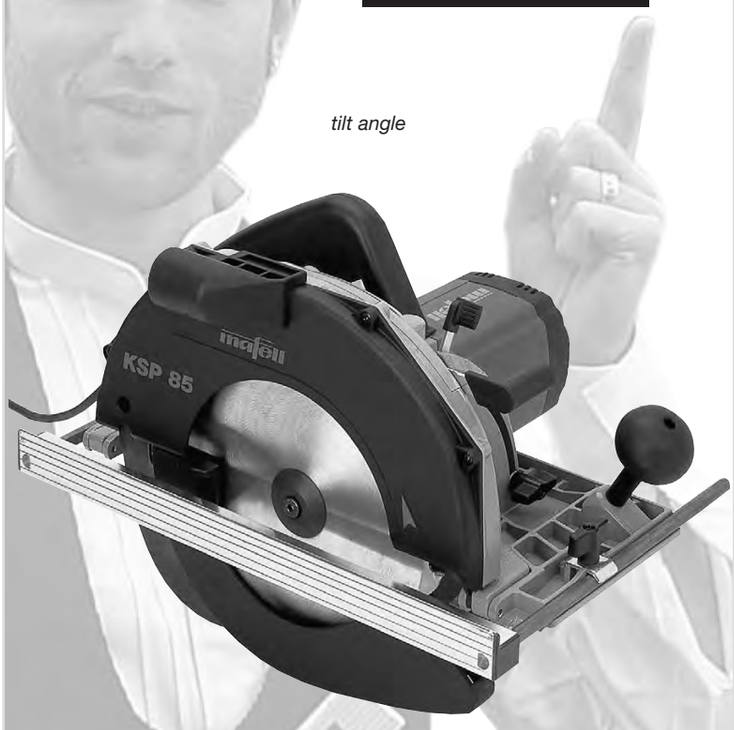

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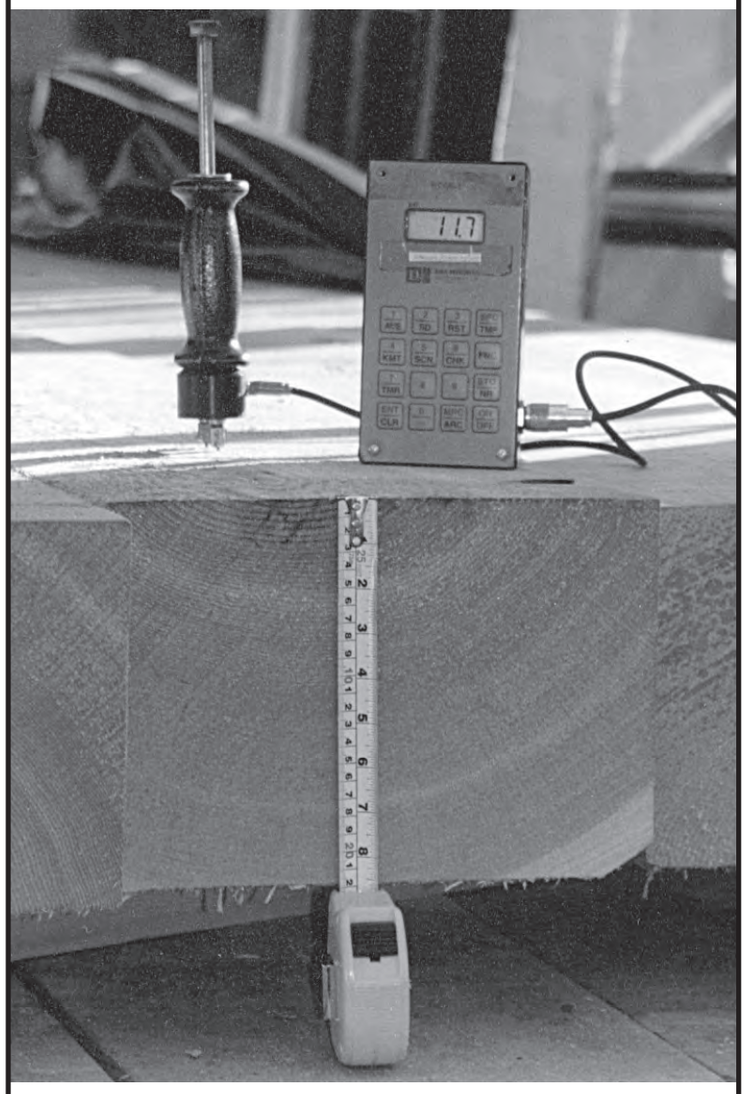

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Photos Jack A. Sobon

Above, flush tying joints yield neat box frames, as seen in this partly dismantled 1791 house in Cheshire, Massachusetts. At right, the Howland House, a 17th-century dwelling in Plymouth, showing the awkward bit of roof visible above the plate in the normal configuration of the English tying joint. Here the summer beam bears on the plate, but it was more common in such houses for the summer to span between the ties, and thus for common joists to bear on the plates.

Below, a typical English tying joint, from a 1750s blacksmith shop in Sherborn, Massachusetts. Below right, mid-18th-century aisled barn in Kensington, New Hampshire, with English tying joint and rare extended tie beams that carry an interrupted flying plate tenoned between them. The plate supports a Greek Revival cornice.

Tying Joints, Page 8