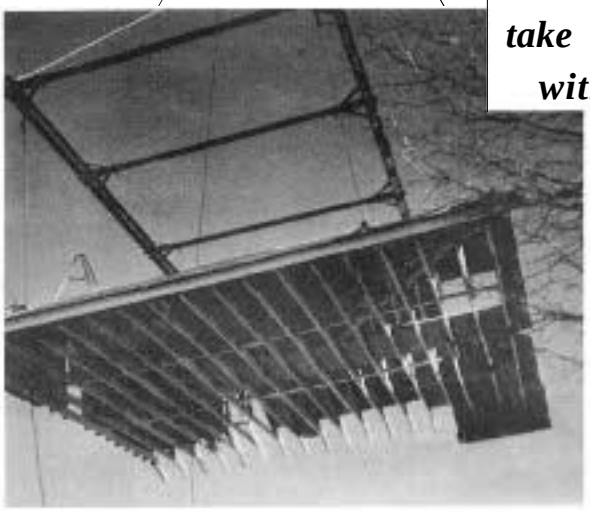
***Sometimes it pays to build up — and take the roof with you.***



# RAISING *the* ROOF

*by Henri de Marne*

Raising or moving an existing roof is often more economical than building a new one from scratch. In past issues I described two roof raisings. One was to create a dormer on a Cape. On that job, we hinged most of one side of the roof, then lifted and held it with a crane while the carpenters raised the wall they had built in the attic the day before.

The other job involved an unusual situation where part of a trussed roof was removed to add a second story to part of a house.

The piece of roof happened to be exactly the size of a carport planned for the opposite end of the house. It was carefully picked up by a crane and moved, while two men with a rope swung it around 180 degrees so the gable would face correctly.

### Setting Up

This month my subject is raising the roof of a one-story house to add a second story. Typically, a new roof is built over the old, which is later removed piece by piece once the new one is weatherproofed. But you can raise an existing roof in a fraction of the time—and with considerable savings in materials. The rafters, sheathing, and roof covering are all reused with minor alterations or repairs. Consider how veteran building mover Royce Lanphear of Waitsfield, Vermont, dealt with the situation.

The house was 40 feet long and had a few complications: an ell on the back, a two-car garage at one end, a stone fireplace at the other, and a brick chimney in the middle. Moreover, the roof was built with standard rafters; trusses would have made the job a lot easier.

The first thing Lanphear did was to erect steel staging on one gable end at the level of the attic floor. To reach the working platform, he placed against it a set of site-built stairs with a shallow pitch and wide treads. Lanphear says this speeds up the job, since workers can walk up to the staging carrying full loads rather than needing one hand to hold onto a ladder.

A "doorway" was then cut into the gable and covered with a plastic curtain. The curtain was held at the top by a cleat and lowered at the end of the day to seal the opening against the weather.

### Building Trusses

Next, a plywood deck was laid over the existing attic floor joists to provide a working platform. Another set of joists was set on top of the plywood deck and nailed to the ends of the rafters. These 2x6s became the bottom chords of new roof trusses when 2x4s were nailed between them and the existing rafters in the familiar W pattern. A 2x6 was nailed to the gable-end studs to brace them.

It was now safe to free the roof rafters from the rest of the structure. Workers crawled to the rafter seats and pulled or cut the nails holding the rafters to the floor joists and plates. In some instances it was easier to do this from the soffits outside, which had been opened to free the outlookers from the walls. The gable was cut just below the new 2x6 end joists.

Next, the asphalt shingles were removed where the roof had to be cut. Since Lanphear planned to lift the roof in two 20-foot sections (he thought the 40-foot roof was too big to lift in one piece), the shingles were removed at the midpoint of the roof as well as at the joints with the garage and the ell.

Midway across the main roof, workers cut the sheathing next to a set of rafters, removed the flashing at the chimneys, and cut four holes in the roof at the eaves about 4 feet in from each end of each roof section to be lifted. At these points, 6x6 blocks approximately 4 feet long were braced in place at the eaves between the top and bottom chords so the cables could be tied around them.

The new second-story walls, which had been framed and sheathed on the ground in manageable sections, were hoisted and stacked on the staging platform. The first roof section was now ready to be lifted by a 45-ton hydraulic crane.

### The Big Lift

Royce Lanphear has designed and built a lifting frame. It is made of two I-beam sections that are spread apart and held together by four pieces of galvanized pipe. The crane picked up this frame by cables attached to its four corners. These, in turn, held four cables tied around the 6x6s placed at the lifting points at the eaves.

In addition, two guy ropes were attached to the front of the lifting frame so the roof section could be guided or positioned as needed whether on the way up or down.

The main problem the chief carpenter on the job, Fred Gilbert, had to contend with was the central chimney; the slightest bump from the roof could have sent it tumbling down to the basement. Talk about precise coordination between the crane operator, those on the guy ropes, and Gilbert on the roof directing traffic!

Once it had been lifted off the house,

*Using a custom lifting frame, house mover Royce Lanphear picked up the first half of the roof with four cables tied around lengths of 6x6 braced in place near the eaves. The 20-foot section was stored on the ground while the pre-framed walls were raised*

the roof section was deposited on the ground next to the house, and the carpenters quickly erected and braced the sections of walls that had been stacked on the staging platform. The crane then lifted the roof section back up and placed it over the new walls, where it was fastened with nails and metal anchors. The procedure was repeated with the second roof section.

### Cleaning Up

Once in place, the two roof sections were secured together by doubling up the rafters at the joint between them. The free edge of plywood was nailed into the doubled rafter, the eight lifting holes were patched, and new shingles woven back in. All this was done in one day, so the finished lower level was never exposed to a change in weather.

Windows were installed, repairs made to the soffit and gables, and new siding was put on. The chimneys were raised and reflashed.

The existing 2x8 first-floor ceiling joists were adequate to support the new finished second story; only a few were doubled up as needed under partitions. The plywood decking, used as a working platform, was firmly glued and nailed as the new subfloor. Through ail this action up top, the ceiling below remained attached and undamaged.

The finishing work was ready to proceed once the mechanical systems were roughed in and the insulation was finished.

### Risky Business

As tempting as it may be to tackle this type of job, a remodeling contractor should not lose sight of the enormous liability involved and the danger to workers. Lifting a full dormer requires precise planning and bracing to prevent the remaining half of the roof from caving in or the hinged section from collapsing. But lifting an entire roof, even in sections, requires experience and skill acquired over years.

While any skilled contractor can prepare a building for roof lifting—and complete the work that follows—the actual lifting should be left to an expert. Wisdom recommends that this phase be subcontracted to a building mover.

Adding a second story this way can give you a competitive edge, and be very profitable, too. Also, without a doubt, it can be a tremendous public-relations coup. Announce it in advance and make sure there is a crowd watching. Of course, you'd better make sure that everything goes well. ■

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*With the first half of the roof replaced, the second half was lifted (left) and stored on the ground, while the pre-framed walls were raised. The second half was then replaced (middle), locked to the first, and sealed to the weather (right)—all in a day's work.*

# A BORN ENGINEER

**B**uilding mover Royce Lanphear is a bear of a man who could probably have raised the roof bodily by himself. Born in Burlington, Vermont, Lanphear has "little schooling," as he says, but is one of those born engineers who achieve wonders on instinct and experience.

Lanphear started carpentry as a kid and learned his building-moving skills by working on the St. Lawrence Seaway where a lot of buildings had to be relocated. In addition, years of operating heavy equipment have honed his feeling for the equipment and the rigging needed to perform the variety of tasks his profession requires.

Looking over the photos that document his work is an eye-opener. Among them are pictures of railroad depots, complicated buildings as long as 70 feet with several brick fireplaces and various appendages, churches, and more—each resting comfortably on huge timbers on flatbed, wheeled platforms pulled by trucks.

Raising the roof of a one-story ranch house was no great challenge to Lanphear—just a routine job. ■

*—H. de M.*