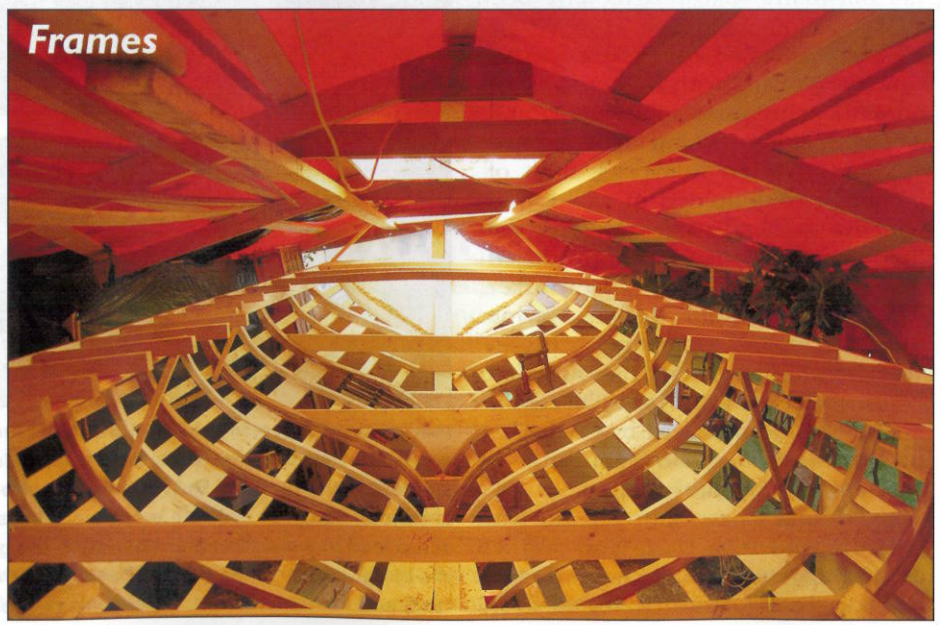
The next step was making the timber keel and the floors and bolting them together. All the measurements came from the lofting. A light, full-sized pattern makes it much easier to find the right piece of wood. The keel assembly was then bolted to the lead ballast keel, isolated from each other by a layer of tarpaper. In the H-28, most of the ⅝" keelbolts are tapped about 4" into the lead. It's crucial to lubricate with oil when tapping and drilling lead.

molds specified by L. Francis that are common to most plank-on-frame boatbuilding projects. Instead, the laminated frames themselves defined the boat's shape. Why, then, did I laminate only half the boat's frames? It was a matter of economy: Laminating is a lot of work, and the weight of the glue results in a heavier frame. By laminating only half of the frames, I saved time and weight compared to a full set. And I believe the resulting structure will remain strong enough even if some of the intermediate steam-bent frames were to break.

To avoid a hump in the sheer near the chainplates caused by the pull of the rig, I glued the edges of the topside planks together. This, along with the laminated frames, the plywood deck, a bulkhead in the chainplate area, and an extra hanging knee, I feel make for a stronger and more durable structure. Edge-gluing planking in this manner is controversial, and with good reason: Excessive shrinkage due to drying out can cause split planks. But I have a number of factors working in my favor with this technique: I used only vertical-grain heartwood, which is reasonably stable; I limited the widths of my planks (and thus their ability to shrink and swell) to a maximum of 4½"; I dried my planking to 14 percent moisture content—which matches the drying effect of the average humidity in my area; I built a leak-free deck in order to control humidity inside the boat; I oiled the planking both inside and out in order to limit shrinking and swelling; I painted the hull, and maintain that



Half the boat's frames are laminated with epoxy from 3/8" laminates, and the remainder steam-bent. While oak has a reputation for gluing poorly, I've never had a problem with it. One critical step in my process is to retain the rough-sawn surface of the laminates for gluing, rather than planing them smooth. The rough surface gets a better grip on epoxy.

A steambox was required for half the frames and a few of the planks. While most of the planks can be bent to shape without steaming, the garboard and the plank above it—the so-called first broadstrake—have quite a bit of twist, and thus must be softened with steam. To make a steaming setup, I used an old gasoline tank (well flushed with water!) for a kettle and made the steambox of plywood, about 8′ long and a foot square in section. Propane heated the kettle. Surprisingly little water is needed for the required one hour of steaming—only about 1½ gallons. (I avoided wasting propane by not putting more water in the kettle than what was needed—but also taking care to not boil the kettle dry.) The inset photograph shows the new plank in place.

painted finish carefully; and I live in northern Europe, whereas if I lived in a sunny tropical region I would have resorted to double planking.

I built the boat of fir and oak, which I could acquire locally. The fir that grows in Norway has been widely used for building boats of all sizes, including keel, frames, deck, planking, mast, and superstructure. Still, Norway's fir is not the ideal wood when compared with other options: It varies hugely in quality, only the heartwood is reasonably rot-resistant, it has a lot of knots, and it swells and shrinks quite a bit with fluctuations in humidity. But even if it is not ideal, it is usable if chosen

After the stern and stem timbers were sawn to shape, the frames laminated, and the keel assembly completed, it was time to put it all together. I hired a crane truck to move the keel assembly to the building site, then built a temporary shed over it. There was no heat in the shed, so I spent some cold winter hours there. Gluing and painting had to be done in the summer.

When setting up the hull, the first thing I did was to position the keel assembly so the faces of the floors were plumb and their tops dead-level. The next step was to carefully and accurately fasten the stem and the stern to the keel. Then the laminated frames were raised and riveted to the floors. I was mindful during this operation that the frames be located accurately and symmetrically, and well fixed in their positions. To help strengthen things, as soon as the stem, stern, and frames were in place and fastened, I fitted the sheerstrakes. That and the ribbands against which the remaining frames were bent stiffened up the whole affair sufficiently.