



Golden State Gatemakers

Two master craftsmen share their secrets to lasting garden gates: proper wood, proven joinery, and durable hardware



BY BEN AND CHARLES PROWELL

The long-term success of any wood assembly that's fully exposed to the weather—especially a garden gate that must remain operable—is dependent upon sourcing the proper species and grade of wood as well as employing joinery that, while satisfying the structural integrity of the work, will also accommodate that maddening variable of dimensional change.

Wood, like all living matter, is drawn from a genetic pool that defines one species from another, each bearing unique characteristics that make it favorable for specific uses. Hardwoods such as cherry, maple, oak, and walnut are ideal for fine furniture. Douglas fir—exceptional for its density, capacity for stress loads, and affordable price—is a default for most structural framing. Hillerich & Bradsby in Louisville, Ky., has learned over five generations to appreciate the properties of white ash for its Louisville Slugger baseball bats, and since the 1850s, Steinway & Sons has relied on the properties of Sitka spruce and hard maple for its pianos. Species with inherent chemical tannins that resist the infestation of bacteria and insects are vital for the products we make, regardless of whether they will



Wood jazz. Like musicians improvising, the authors do not use any drawings for the 200 series (left and above). Instead, the design of each gate is driven by a process of intuition.

be installed in bone-chilling Minnesota, the temperate climates of the Pacific Coast, or the humid smorgasbord of Florida.

Because our gates in particular are meant to remain in service for the long haul and can account for a sizable investment by homeowners, their greatest vulnerability should be the unlikely event of a collision with a wayward asteroid and not a failure of construction or a substandard wood choice.

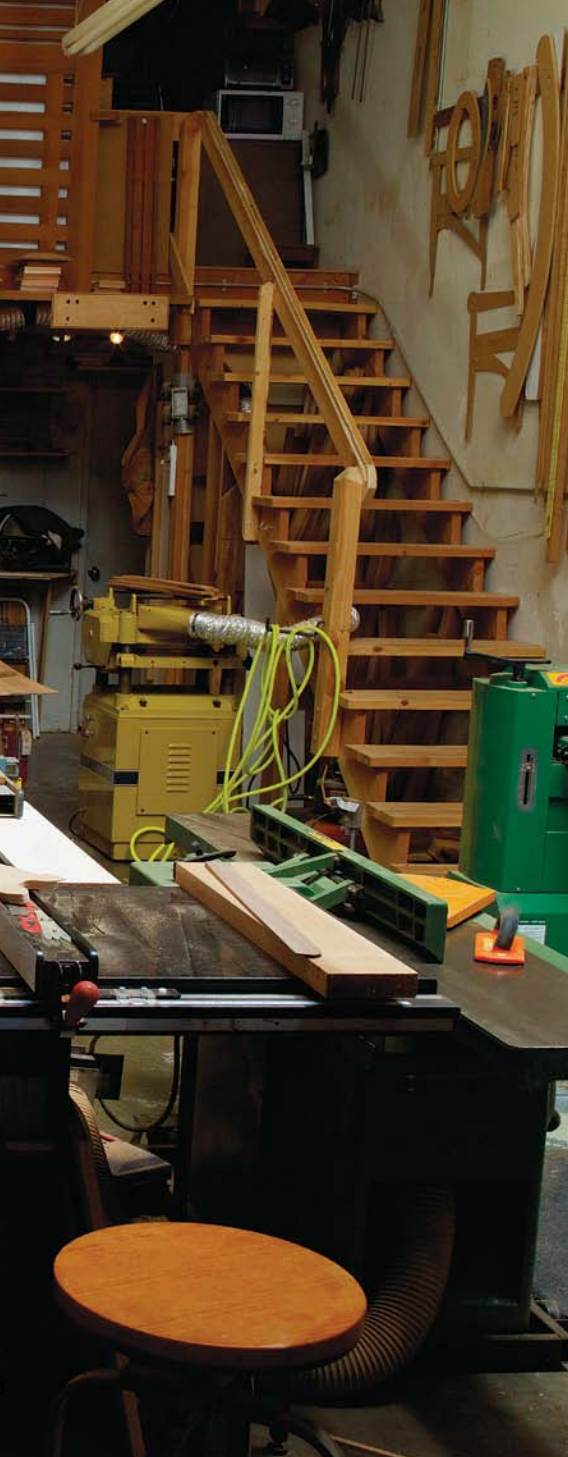
Good wood

With its life span of several thousand years, the coastal redwood would seem to be the

ideal species to use in gate construction. It's practically indestructible—thanks to its peculiar repellent tannins—to the point where its only real enemy is the chainsaw. But not all redwood is the same. The redwood used by Charles and other craftsmen in this region during the 1960s and '70s was all salvaged from the first- and second-growth trees that had been used to build San Francisco and that were milled within a 20-mile radius of the city (most of which were lost in the fire following the 1906 earthquake). However, the redwood found in today's market has been harvested on a

30-year, commercial-growth cycle. For a species that doesn't mature until its trees are 150 years old, the tannins that account for its exalted status are not fully developed as a decay-resistant property. One look at the end grain of a redwood 2x6 in the local lumberyard reveals only four to six growth rings per inch, which limits the board's long-term dimensional stability. This means that it's inappropriate for the gates we make.

Without redwood, there are only a handful of species with the tannins that provide resistance to the decay organisms that can thrive in any landscape. Flourishing along



SUSPICIOUS SPECIES

Customers frequently ask us about the following wood species. While all of them have inherently strong qualities, it doesn't mean that they are a suitable choice for gates.

Teak Although possessing excellent density and resistance to decay, legally harvested teak is prohibitively expensive and has a heavy carbon footprint, mostly because it needs to be shipped from Asia.

Ipé With its potent tannins and extreme density, ipé is not a bad choice for a deck, but asking a tenoned joint to bear the stress load of such weight and density against the gravitational pull of a gate over decades eliminates ipé. In addition, cutting mortises and tenons into a species known also as ironwood is very difficult.

Larch If we were concerned only with a wood's ability to withstand harsh conditions, then European larch would be preeminent: It provides the supporting piles beneath Venice, Italy, which are replaced every 600 to 800 years. This regional species is difficult to source in the United States, however, and it shares few properties with the more common western larch of the Pacific Northwest.

Mahogany There are so many species within this one genus and so many ways to bypass certification that it no longer matters what this wood is called. For example, much of the wood identified today as Honduras mahogany does not come from Honduras, nor does it share the properties that made Honduras mahogany popular in the 1970s. Yet many subspecies are good choices, such as African striped sapele, with its density, quartersawn stability, and low cost (about \$8 per ft.).

Yellow cedar, Eastern cedar, Alaskan cedar, and Spanish cedar Don't let the cedar moniker fool you; none of these are particularly stable or resistant to decay over the long haul, and many are simply unavailable in a dry, clear grade. We've worked with all of them, and in follow-up visits over the years, they have shown bowing, cupping, and checking.

the Pacific Northwest from British Columbia to Northern California is Western red cedar, a dimensionally stable, fast-growing species with straight trunks of diameters 7 ft. to 13 ft. Infused within its fibers is a tannin rich with the organic compound tropolone, which provides its distinctive scent and resistant properties.

All of our gates and fences are built using Western red cedar from mills in Oregon and Washington. The wood is clear, quartersawn, and kiln-dried to 7% to 9% moisture, and it has a minimum of 12 to 15 growth rings per inch (although it typically arrives

with closer to 20 to 25 rings). Available in consistent sizes and affordable bulk prices, Western red cedar has been our default choice for the past 25 years.

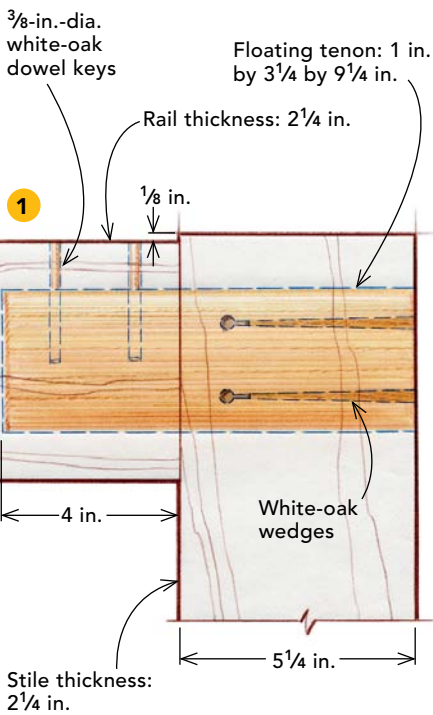
Having it quartersawn is ideal because the grain runs close to 90° off the face of the plank, providing a more uniform appearance and maximizing its dimensional stability. Wood that is flat-sawn has less stability and reveals a cathedral pattern that runs the risk of scaling away from the face once it's exposed to the elements, especially if the cathedrals are oriented upward, where they are more vulnerable to moisture.

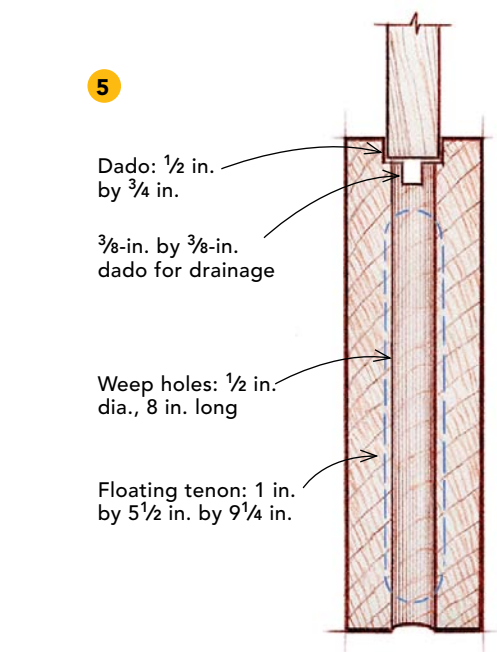
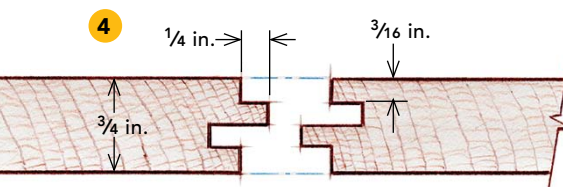
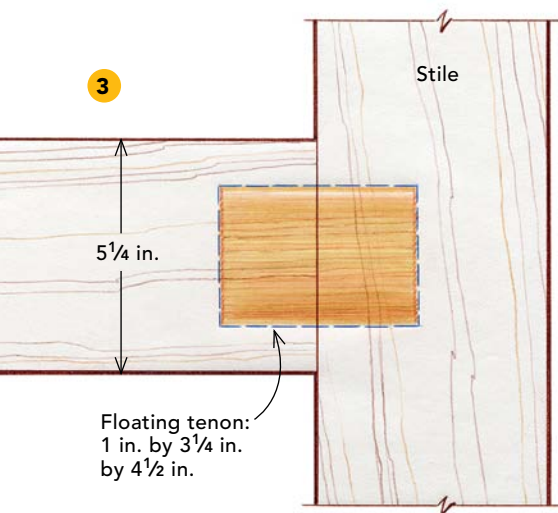
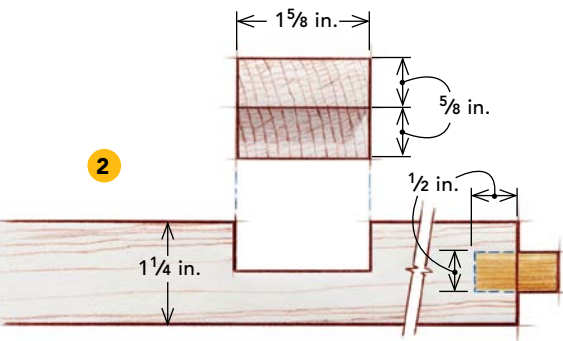
Wood movement

Moisture content is a crucial factor in the success or failure of any wood joint, but particularly when the joint is exposed to the full spectrum of seasonal and regional climates. For assemblies where perpendicular grains are joined flush—as in the stiles and rails of our gates—the stiles expand and contract horizontally, and the rails expand and contract vertically. Our experience shows that no matter the climate, if the stiles begin with a moisture content over 9%, they shrink away from the rails in the dry season to create a gap that is both structurally and visually

ANATOMY OF A CUSTOM CRAFTSMAN GATE

The Prowell #4 is a Craftsman-style garden gate and one of the original seven designs. Joinery is glued, and emulsified wax is applied to the top and bottom of the stiles, the top and bottom of the tongue-and-groove panel, and the dados in the bottom rail.





problematic. If the moisture content is less than 7%, however, the wood fibers will be parched of the tannins that help resist bacteria and decay.

The specifications of the joinery vary per application, but we use a system of floating tenons that are sized proportionately to each gate's weight, width, and thickness. Although our process is collaborative, it is Ben who largely develops the joinery, drawing from a repertoire of historical interior and exterior precedents as well as a healthy dose of imagination.

To illustrate the importance of joinery to an assembly's life span, consider the Horyuji Temple in Ikaruga, Japan (circa 607) or the Urnes Stave Church in Norway (circa 1130). Both provide a living history of structural joinery. Unlike in layered construction—with its hierarchy of levels fastened, bolted, or bracketed to one another to create a structure—a joined assembly begins with the wood at its smallest dimensional size, and as it absorbs moisture from humidity, dew, fog, and rain, it swells, causing the joints to become even tighter. This centuries-old method allows our assemblies to rely on a variety of joints that incorporate floating tenons, spreading wedges, and locking keys, giving the joints unfettered movement and drainage and leaving them unchecked by nailing patterns or fasteners.

Finding the right adhesive to complement such joinery has involved a journey. It began with two-part resorcinol, until it was outlawed in California. We moved on to West Systems epoxy with an adhesive additive, which gave us 50 to 100 games of one-on-one basketball to play behind the shop while waiting for it to dry. An era of tedious trials with polyurethanes followed, but then Titebond III arrived. This glue has proved to have an excellent balance of traits that no single product alone had before: strength, ideal set time, full waterproofness, low cost, and accommodation of dimensional fluctuations. Anchorseal, an emulsified wax, is used for end-sealing critical locations, which also helps to control moisture.

Hardware for the long haul

Of our many exterior assemblies, only gates require hardware. For our early prototypes, manufacturers at the time (1992 to 2001) had little to offer beyond substandard powder-coated latches and Romanesque-style accoutrements. Throughout that period, we asked

manufacturers to expand their lines, but it was not until Rocky Mountain Hardware and Coastal Bronze stepped up with solid-bronze offerings that we were able to provide an alternative.

Our preferred hinges are 4-in. or 4½-in. bronze butt hinges with extruded ball-bearing barrels. Because we want our customers to use them, we include them with every gate. We always recommend surface-mounting the hinges to both the gates and the posts to ensure airflow and drainage. Due to the joinery, the gates do not require strap hinges as a hedge against sagging, and we've never had a callback.

To finish or not to finish

For years, we have offered only one option for gates and fences that are ordered with a factory finish. WoodRX Ultra (woodrx.com) is a water-based, environmentally friendly silicone-acrylic blend with a limited palette of earth-tone patinas. This product has a waxy, mild sheen that will last eight or more years in freezing climates, slightly less in the southern humid zones, and slightly more in the temperate climates of the Pacific coastal corridor from Canada to Mexico. If the wood is not maintained on a regular basis, there is no downside beyond a gradual loss of color. As a deep-absorbing finish, WoodRX Ultra does not impede dimensional movement or confine the wood behind an iron curtain of layered sealants, such as a two-part sealing varnish, an epoxy composite, or paint. Because it dries quickly, its two-coat application is best sprayed.

One of the advantages of nearing the 40-year mark in business is the opportunity we have to visit sites anywhere from a year to 20 years later, and in every microclimate imaginable. These trips provide a measure of proof that trumps every other means of determining what works and what doesn't. We have learned that if an exterior wood assembly has been made of the correct species and constructed using the right methods, there is no finish that will prolong its life by a single day. To finish or not is purely a matter of aesthetics, but any homeowner should understand that an exterior finish requires a lifelong commitment to its maintenance. □

Ben and Charles Prowell are the principals of Prowell Woodworks in Sonoma County, Calif. All photos courtesy of Prowell Woodworks, except where noted.