Lee Valley Turns 35

Go behind the scenes at a trailblazing tool company

BY JONATHAN BINZEN

Since producing its first tool—a dovetail marker—in 1982, Lee Valley has earned a reputation for designing and manufacturing the most innovative hand tools on the market. The company's Veritas honing guides, marking gauges, grinding jigs, and bevel-up handplanes, to name just a few, represent evolutionary leaps forward, and have garnered numerous awards from this magazine and others.

I'd always been curious about Lee Valley, and especially about how their Veritas tools are designed and made, so this past summer, on the eve of their 35th anniversary, I took a trip up to Ottawa to visit the company offices and manufacturing plant.

I knew the basic Lee Valley facts: It was founded by Leonard Lee in 1978, and it sells woodworking, gardening, and cooking tools worldwide through handsome catalogs, a well-designed website, and 15 retail stores in Canada. I also knew that Lee Valley retails tools from

Great leaps forward

All the tools in Lee Valley's Veritas line have some aspect that is original. Some have incorporated innovations that changed the way people work wood. Clockwise from right: Veritas's power tenon cutters, Mark II honing guide, wheel marking gauge, NX60 premium block plane, low-angle block plane, bevel-up smoother, and grinder tool rest.

Photos, except where noted: Jonathan Binzen; this page and p. 62, bottom left: Kelly J. Dunton

hundreds of other manufacturers, as well as producing its own brands. The flagship Veritas line—which includes designs dating back to that original dovetail marker—represents only a fraction of the tools in the Lee Valley woodworking catalog. Yet it is Veritas tools that have made the company's name among woodworkers.

The first stop on my tour was the office of Robin Lee, who took the reins from his father, Leonard, in 2002 (see "Founding Father," p. 63). When I asked Robin Lee what distinguished Veritas tools from the others Lee Valley makes, he said that to wear the Veritas name, a tool has to be made in North America—the vast majority are made in their own factory—and must have unique features. Often those features are patented. Veritas doesn't do reproductions, he said. That creates a contrast between Veritas and Lie-Nielsen, for example, another company whose hand tools have received armfuls of *FWW* editorial awards. But Lee has nothing but respect for Thomas Lie-Nielsen, whose high-end hand tools stay closer to vintage originals. "Woodworking is complementary," Lee says. If someone buys a tool from Lie-Nielsen, "that's good for us. That customer is buying into what we all do. Tom's classical, and we're jazz—there's room for both."

Learning from the past

Veritas tools express a forward-looking design philosophy, but Robin Lee's office also revealed a deep connection to our tool-making past. Along one wall was an old hardware-store cabinet, its drawers and shelves filled with vintage tools. As he pulled out a few—a Stanley 45, a couple of 19th-century nail-pullers, a barrel-stave saw—Lee explained that they were drawn from Lee Valley's ever-growing collection.

Then he took me to see the collection, which is housed in a high-ceilinged space that once held a basketball court. After decades of acquisition by both of the Lees, the collection now contains some 20,000 individual tools. As we walked among the metal shelves, Lee stopped to describe the function, patent history, and provenance of tool after tool. Within a few paces we had passed a saddlemaker's hammer, a planemaker's bench, a broommaker's vise, a typesetter's plane, and seemingly every marking gauge Stanley has ever made. Some of the tools are acquired for their rarity, Lee explained, but most are not. Some are included as examples of a particular mechanism, others to add another variation on a common tool. When a company like Record goes out of business, Lee said, "We will archive their whole product line."

Tools from the collection are featured on the cover of the annual Lee Valley woodworking catalog, as well as on the company's calendars. But the most important function of the archive, Lee said, is as "a physical library for our tool designers."

When I first met with the Veritas design team—three designers and a team leader—the collection came up in conversation right away. Steve Jones, who has designed some of Veritas's most futuristic tools, including the new premium block planes, echoed Robin Lee, saying, "Every project starts with existing tools. We pull them from the collection and see what was done. The challenge is not to reject what was good in the past."

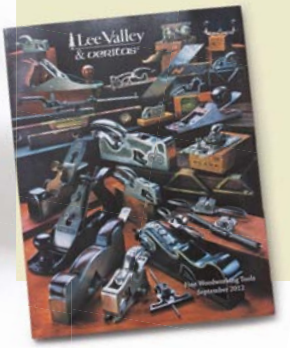
Best of the old and new

A line of joinery saws launched in 2008 provides a good example of Veritas's characteristic combination of new ideas, cutting-edge manufacturing, and elements of traditional function.

The heart of the new saw is its innovative spine, which is injection-molded right over the blade. Having the appearance of plastic but the heft of metal, the spine is powdered stainless steel in a polymer resin binder, with glass fiber added for strength. It took the team many months to find the right material and the right

THE VALUE OF VINTAGE

Old tools beget new ones. *Robin Lee, president of Lee Valley, shown here with the company's extensive collection of vintage tools, says old tools are the starting point for new designs. Lee helps assemble catalog covers using tools from the company's trove.*



BIRTH OF A TOOL: FROM VINTAGE TO VERITAS

The Veritas side rabbet plane followed a typical design process.

1. FOREFATHER

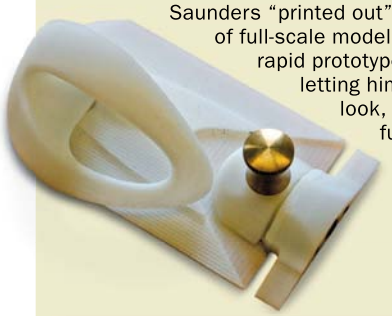
Close study of this plane, the Record 2506, was the starting point for the design.

2. ROUGH DRAFT IN WOOD

Designer Terry Saunders began the new design with quick prototypes in wood. A handplane knob gave way to modeling clay as he considered handle designs.

3. RAPID PROTOTYPE IN PLASTIC

As he developed the design in CAD, Saunders "printed out" a series of full-scale models with a rapid prototype machine, letting him test the look, feel, and functionality of the tool.



4. FINAL PRODUCT

Like many Veritas tools, the side rabbet plane shares DNA with vintage versions but incorporates significant innovations.

manufacturing process, but in the end they came upon a solution that was not only technically effective but also cost-effective.

And that was essential, because although Robin Lee admires the higher-end tools on the market, he tries to steer Veritas toward the middle, halfway between the boutique and the mass-produced. These saws weren't going to be cheap—they retail for around $70—but they would be half the price of their higher-end competitors. What Veritas is trying to do, Lee says, is "produce tools that make people say, 'How did they make it for that cost?' We want to make affordable tools that last a lifetime."

A high-tech material was fine for the saw's spine, but the handle would be made of wood. And its design came directly out of the tool collection. The designers picked 20 or so old joinery saws, lined them up, and did a test: Which handle feels best? They picked two, averaged their contours, and scaled them up about 10% for today's bigger hands. Presto.

Jones, who designed the new saws, pointed out that most of Lee Valley's customers are weekend woodworkers. "Our goal," he said, "is to make professional results more easily achievable by amateurs." The designers wanted this to be a "gateway tool," one suited to woodworkers just getting into cutting joinery by hand. "If they can't get the saw started smoothly, they're never going to get an accurate cut," Jones said. So he relaxed the rake on the saw's teeth, with the result that "our dovetail saw cuts a little bit slower than some, but it starts much more easily."

Where ideas come from

Rick Blaiklock, director of Veritas research and development, has a running list with some 100 new tools his team might pursue. The ideas come from all directions, he said, some from the designers themselves and some from Robin Lee, who is "the one with an ear to the ground." Lee taps the large and vocal Lee Valley customer base, which lets the company know, Lee says, "what they like, what they don't like, what they're looking for, and what they can't find." At many companies, he says, "the feedback link is broken. We listen."

Lee Valley keeps the door open to outside inventors, and pays a royalty for tools they decide to manufacture. In 1996, Paul Ruhlmann, a shop teacher in Cambridge, Mass., with an interest in rustic furniture, traveled up to see Leonard Lee and show him his idea for a tenon cutter that could be chucked into a brace. Lee liked the tool right off, and the two signed a deal that day. With some modifications to the original tool, Veritas has been producing the line of tenon cutters at a good clip ever since.

The design process

Designers Steve Jones and Terry Saunders showed me their workstations, where tools go from rough concept to full-blown design. The first sketches of a new tool are still sometimes made on paper, but very early on the designers switch to computers, working in a 3-D CAD program called Pro/Engineer. As soon as the designer has a workable 3-D model on the computer, he makes the leap to a physical prototype. To demonstrate how that process goes, the designers walked me back to their testing workshop and project storage space.

On shelves in the project storage area were scores of boxes containing models and prototypes, false starts and finished products for every current Veritas tool, one tool to a box. Pull out the box for a tool designed 10 years ago, and you'd see mockups and models and prototypes in all sorts of materials, some fashioned quickly by the designers themselves, others highly accurate full-scale examples of the finished product made in wood by patternmakers.

These days, however, a pair of rapid prototyping machines have put the patternmakers out of work. Affectionately referred to as Hal and Dave, the machines can turn a computer-generated drawing file into a full-featured, full-scale, physical model overnight. Standing about the size of a vending machine and working like a cross between an ink-jet printer and a hot-melt glue gun with a brain, the machines deposit a continuous ribbon of melted plastic, gradually building the prototype from the bottom up in a series of thin layers. The machines use different colors and densities of plastic, some tough enough to be drilled and tapped and put to work.

Developing a tool can consume hundreds or thousands of hours, and the sooner you can go from a drawing to a physical prototype the better, Jones says. "No matter how well you've envisioned the tool,

Photo, top left: courtesy of Lee Valley

ABOVE AND BEYOND

Consistency and refinement are built into the manufacturing process.

How flat is that? *Using a dial gauge, machinist Scott Shelley checks the flatness of a jointer plane that he's been milling. Multiple checks are built into the manufacturing process in the Veritas machine shop.*

Better blades. *Veritas, which makes all its own blades, laps them dead-flat on this machine, which has a grooved, cast-iron table. The blades are pinned under iron weights and bathed in a 600-grit slurry.*

you're always going to discover something when you hold it in your hands."

Quality control equals reputation

After my visit with the design team, I toured the manufacturing plant, just a short walk up the road. In the machine shop, with its enormous grinders, milling machines, and metal lathes, I witnessed nearly as many steps involving inspection and quality control as machining. And once the tools left the machine shop, they passed through multiple checks in the assembly and packing area. For planes, the first is a comprehensive examination of features critical to use and a visual inspection for even the smallest scratches or casting flaws. When the plane moves on to assembly, it gets a functional test as well as another visual one, and then before it goes into a box it gets a final visual check.

Online Extra

FWW Editor Asa Christiana, a former machinist, also toured the plant. Check out his blogs at **FineWoodworking.com/extras** for more pictures and video from the Veritas manufacturing process.

At the end of two very full days, I saw Robin Lee once more in the Lee Valley retail store down the block from the main office. As we stood among the workbenches where customers can try out tools, I asked him how Veritas fits into the bigger picture of Lee Valley. "It's not where you make your money," he said, "but it's where you make your reputation. Profit's nice, too, but the Veritas line is really about advancing the art, advancing knowledge, and demonstrating competence." □

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Hand tools hand-assembled. *After leaving the machine shop, the tools are assembled, tested for functionality, and inspected for defects before being boxed up and shipped off.*

Founding father

Leonard Lee was looking for an adze and a broadax. He wanted to build a log cabin as a summer house for his family, but he couldn't find the traditional tools of the craft. It was the mid-1970s and Lee, who grew up on a remote, rock-strewn farm well off the power grid in western Canada, was living in the Ottawa Valley and working for the government, running a division of the Department of Trade. A fine job for someone, but not Lee, who found the bureaucracy infuriating.

Thinking he might start his own business, Lee began spending evenings and weekends making and selling woodstoves with help from his wife and his 15-year-old son, Robin. Reflecting on the difficulty he'd had finding traditional hand tools, he thought, "that's a market someone should be serving." Before long, Lee had left his government post and launched Lee Valley Tools, which mailed its first catalog in the fall of 1978. The company produced its first tool four years later. These days, Lee Valley has 850 employees and over 6,500 products in its woodworking catalog.