# Smoothing Planes

New planes out of the box, tuned up and tested—a look at the spectrum of smoothers, from \$27 to \$3,800

BY GARRETT HACK

A Stanley No. 604 Bedrock smoothing plane—vintage 1910—is always on my bench. The plane is a handy size for smoothing a board, shooting the edge of a drawer, cutting a tapered leg and many of the other daily planing tasks. I have other old smoothers, Norrises and Spiers, heavy planes I keep tuned to take whisper-thin shavings. Most of my planes—not just the smoothers—are old. But when I demonstrate these tools in my classes, invariably I am asked which new smoothing plane I would buy. Not really knowing how to answer, I decided

to examine a range of new smoothers.

Even though I limited my selection to western, cut-on-the-push-stroke style planes, the variety of smoothers I tried was astoundingly wide. The selection isn't exhaustive, but the ones I picked run the gamut in terms of their construction, their function and how much they cost. One is made of beech, another of laminated nickel. One has a replaceable blade the size of a shaving razor; another has an iron that could anchor your rowboat. One can be had for under \$30 and delivered overnight; another will set you back some \$3,800 and cost you a year's patience, too. Yet these planes were all built to do the same job. My question was, how well do they do it?

I gave each plane a quick tune-up (see the story on the facing page), and then I put them to work. I used each one on softwoods and hardwoods, calm grain and ornery. I planed pine, poplar, curly maple, abrasive teak and a pile of cherry wainscoting to see how the planes behaved and how their irons held up.

Although smoothing planes can be used successfully for all sorts of planing tasks, they are designed to perform best at taking an already flat surface to a fine finish. A good smoothing plane can create a surface as smooth as if it were polished, giving wood an unmatchable clarity and depth in a fraction of the time it takes to sand or scrape. The best smoothers have plenty of mass, wide, thick irons, short, thick bodies and tight throat openings. Mass keeps the plane hugging the surface, and just as with old cast-iron woodworking machines, lots of mass dampens vibration and gives stability to the cutter. A thick iron remains stiff and engaged in the wood despite resistance for the smoothest, chatter-free cut. A smoothing plane doesn't need the long body of a jointer or a jack plane because its job is to smooth more than to flatten. Rather, it needs a compact body that is easy to grasp and control, one that concentrates the forces of your upper body, through your hands, close to the cutting action of the iron. A tight throat, or one that can be adjusted to be tight, creates pressure on the forming chip very close to the blade, permitting very thin shavings to be taken and minimizing tearout.

Plane makers have met these criteria in very different ways over the years. They have made wooden planes, metal planes and planes that combine the two materials. Each type has its virtues and drawbacks, and for this article I've tried smoothers in all three categories.

#### Three styles of smoothers

For centuries, wood was the material of choice for smoothing planes. It was a natural choice because it was plentiful, it worked easily, and it provided that silky, sublime feeling of a wood sole upon wood. Even fashioned from dense woods such as beech or lignum vitae and supplied with thick irons and cap irons, such planes were light enough to be comfortable to use all day, which they once were. But a wood body required maintenance. It could warp or crack, and as the sole wore away through use and repeated flattening, the tapered throat opening eventually widened, and performance suffered. Although they represent only a sliver of the market, there are still fine wooden planes being made.

The logical solution to the problems of a

wooden-bodied plane was a more durable sole. That is just what Leonard Bailey and the Stanley Tool Co. were thinking when they introduced cast-iron planes for everyman just after the Civil War. In addition to long-wearing soles, these planes introduced easy-to-use cutter adjusters and a price so economical that no other planes could compete. Along with the cast-iron body and the low price came some compromises. The plane had a thin (easier to hone) iron, which was bedded against an adjustable frog screwed to the sole, an arrangement that invited some cutting vibration. The frog was designed to hold the blade at a 45° angle, which was better for smooth-planing softwoods than for hard ones, for which a slightly steeper bed angle is preferable. In these and other ways, the Bailey smoothing plane was designed more for general carpentry than for planing difficult figured wood. Furniture makers and cabinetmakers quickly adopted the plane anyway, but the compromises of the design left open a window for competition at the top end of the market.

Through that window came the British Norris-type planes, easily the most beautiful and best performing of all smoothers. Called infill planes, they combined the virtues of a metal sole and sides with the tactile pleasure and stabilizing mass of dense rosewood handles (the infill). On the best of them, the sides and the soles were dovetailed together. Traditionally, infill planes were coffin sided-wide in the middle to accommodate a wide iron and narrow at the ends to reduce sole drag. With minute throat openings, irons as thick as <sup>3</sup>/16 in. and enough mass to make you take notice when you hefted one, these planes were capable of achieving a polish no other design quite measured up to. Their major drawback was their cost. When introduced in the early 1900s, a Norris smoother would have cost a craftsman a week's wages; a Stanley at the time cost about a day's pay. As you will see on the following pages, today the disparity is just as wide.

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### Fine tune-up

My procedure for tuning each plane was the same. I carefully unpacked the plane, looked over any instructions, examined it for unusual features and noted how the parts were set. I twirled adjusters and took frogs apart to see how they mated with soles. I lapped the back of



each iron and honed the bevel. I smoothed the curved leading edge of cap irons and flattened their front edge to fit them to the iron.

Finally, I lapped the plane soles, noting how long it took to get them flat. To lap the plane soles and irons quickly and accurately, I used abrasive paper glued to a dead-flat machinist's true table. I worked through the grits from 120 to 600 before finishing on my oil stones.

#### Watch it on the web!

See Mario Rodriguez tune a handplane at www.finewoodworking.com

# STANLEY NO. 4, RECORD NO. 4 (\$55)



| Otoninoy          |   |
|-------------------|---|
| 3 lbs., 12.75 oz. | 4 lbs., 3.75 oz.  |
| 9⁵⁄≋ in.          | 9³⁄₄ in.  |
| 0.080 in.         | 0.085 in.   |
| England           | England   |
|                   | 3 lbs., 12.75 oz.<br>9 <sup>5</sup> % in.<br>0.080 in.<br>England |

eonard Bailey devised most of the details of these cast-iron planes 125 years ago, and the planes have been sold by Stanley virtually unchanged ever since. Record and many other manufacturers recognized a good thing and copied them. Except for the beautiful blue color of the Record, its slightly heavier casting and a screw cap vs. Stanley's traditional lever cap, these two planes look nearly identical, and their performance was quite similar as well. Once tuned, they both planed well in softwoods, which is



The Anant is a copy of the Stanley-Bailey, but compared to the Stanley or the Record, the Anant is less enjoyable to hold and certainly to behold. The first things I noticed about the plane were the handles. Made of plastic, they have prominent casting ridges, which irritate your hands as you plane. Many other details of the Anant—the sloppy adjuster and its pressed yoke, the blade badly out of flat, the rough cap iron—betray mediocre workmanship.

None of this surprised me, considering the plane's price. But in other ways the Anant did surprise me. I expected a nightmare when it came to flattening the sole—surface grinding is costly, and what they were designed to do. On harder woods, whenever adverse grain conditions arose, they had problems. In curly maple, for instance, they could plane but only with some tearout. They simply do not have the overall mass or blade stability to overcome the stresses of more difficult cutting. Still, these widely available planes are versatile and durable and a very good bargain.

In small but important ways the Record smoother is the better of the two. Overall, the parts are a little better finished and fit, adding up to a plane that tunes up more quickly. The Record even improves upon the original in small ways such as a front knob that is tapered to seat firmly in a boss that is cast into the body of the plane. The surface grinding of the Record's sole was quite coarse, but it was flat (lapping time: 15 minutes). The Stanley sole was warped and quite hollowed down its entire length (lapping time: well over an hour, and even then there were hollows left).

The Stanley iron took about an hour to lap and hone; the Record took 15 minutes. Both irons held an edge well. The proper bevel angle for the blade is stamped onto the Record cap iron so the iron can easily be compared; on the Stanley it is stamped not quite so handily on the iron itself. The end of the Stanley cap iron was ground quite blunt (vs. the Record's nice, smooth shape) and clogged readily until I remedied it.

Both planes came with good instructions, explaining the basic tuning they definitely needed. One feature common to the planes shocked me: Their plastic handles felt as good as the rosewood handles on some of my other planes. Even so, I'd prefer rosewood.

manufacturers try to save money by keeping it to a minimum—but it lapped flat quite easily. And the frog fit the machined area of the body well. Unfortunately, the frog is secured with poor-quality screws and thin, soft washers, so I was reluctant to really tighten the screws. If you buy an Anant, replace the screws and washers and make or buy replacement rosewood handles, or at the very least smooth off the rough casting ridges on the plastic ones. Despite its lack of refinement, the Anant is still a reasonable copy of a very solid design. With a couple of hours of tuning, it's a serviceable plane for softwoods and well-behaved hardwoods. The Anant is available through Woodworker's Supply, Inc. (800-645-9292).



The story was in the details. Coarsethreaded screws and flimsy washers for the frog were typical of the Anant's mediocre detailing. The leading edge of the cap iron was rough and blunt, making chips clog.

#### LIE-NIELSEN NO. 4 (\$250)

 Weight:
 4 lbs., 10 oz.

 Length:
 9½ in.

 Blade thickness:
 0.115 in.

 Made in:
 Maine

By now, Lie-Nielsen's reputation as a maker of Stanley-pattern planes that are better than the originals is well established. This No. 4 smoother based on Stanley's old top-of-the-line Bedrock is no exception. Everywhere you touch the tool the impression of precision and quality is reinforced.

The main advantage of the Bedrock design is that the frog has a long, tapering underside that mates solidly with a similar wedgeshaped area of the sole (see the bottom photo at right). The result is better support for the iron, less chatter and, due to the method of connecting them, simple adjustment of the throat opening. With its throat set tight, the Lie-Nielsen No. 4 approached (but did not quite match) the planing quality of the \$3,800 Holtey (see p. 45).

The Lie-Nielsen (pronounced LEE NEEL-son) comes in a choice of manganese bronze or ductile iron, a tough modern cast iron. I bought the bronze version, as much for its beauty as for its slightly greater weight, which helps a smoothing plane maintain momentum and overcome cutting resistance. In softer woods, this plane breezed, cutting almost effortlessly. And in cherry and maple, even where it encountered difficult grain, it did admirably, too, outperforming my favorite vintage Bedrock—perhaps because of the new plane's thicker iron.

You can't use the Lie-Nielsen right out of the box, but your gratification won't be delayed very long. Ten minutes of lapping, and the sole was dead flat. The iron, about half as thick as a standard Stanley iron, lapped flat and honed sharp in about half an hour and held a good edge. The cap iron took 10 minutes to tune. Less important but useful if you want to use the plane on its side as a shoot plane, only one of the sides was square with the sole. (Of the planes I tested, only the Record had both sides square to the sole.)

Lie-Nielsen (800-327-2520) also makes a low-angle smoothing plane, the No. 164, which sells for \$235. Stanley originally devised the No. 164 for cutting end grain, and the Lie-Nielsen version I tried handled that job well. It also planes well on face grain that is well behaved, but when grain gets tricky, the tearout is terrible.



**Excellence all over.** Superb workmanship is evident everywhere you look on the Lie-Nielsen, with its solid bronze castings, precise machining and careful finishing. It planes beautifully, but the aesthetic ride is just as smooth.



**The Bedrock is better.** The frog of the Lie-Nielsen (right), based on the Stanley Bedrock design, mates in a long, flat plane with the plane body. This solid mating produced better cutting stability compared with the two-step contact on the frog of the Stanley (left).

# E.C.E. PRIMUS NO. 711 (\$190)

Weight: 2 lbs., 8<sup>3</sup>/40z. Length: 8<sup>3</sup>/4 in. Blade thickness: 0.112 in. Made in: Germany

uropean-style wooden planes have all but disappeared, but fortunately the German Primus is helping keep the breed alive. With a tough lignum vitae sole joined to a pear body with dozens of tiny fingers, it is patterned after traditional horned planes. Quite modern, however, is its unusual blade adjuster, its tough chromevanadium iron and its movable toe piece for fine-tuning the throat opening. Together, the old and new features result in a plane that is very comfortable to grasp, feels wonderful to use, is easy to

The Primus No. 711 is quite light but planes extraordinarily well. The thick iron is well supported, bedded not against a separate frog but against the body of the plane. The nicely shaped horn and a groove around the back of the plane that fits your thumb and forefinger make for a firm grip and great control.

maintain and performs almost as well as the best.

The Primus has a unique blade adjuster as sensitive and positive as rack-and-pinion steering on a sports car. I found it awkward at first-and it didn't help that I cut myself getting the iron out-but I soon got the hang of it. A heavy spring pulls the iron against the bed of the plane, and an adjuster screw works the iron up or down. Far less elegant is a regulator attached to the cap iron that levers the iron side to side to align it with the sole.

The iron lapped flat quickly and held an edge very well. The cap iron needed a little more work to smooth its leading edge and to hone it to fit the iron. As for the sole, it was flat. Had it not been, a pass or two with a finely set jack plane would have trued it up in seconds. And whereas sole wear opens the throat of most wooden planes over time, the adjustable throat of the Primus allows you to keep it set as fine as you like. If you have never experienced the wonderful feel of a wooden plane, try this one. David Warren Direct (800-724-7758) imports the Primus and all other E.C. Emmerich tools. Primus planes are cheaper in some catalogs.







Keeping body

er. The Primus' hard-wearing

lignum vitae sole

is bonded to the

with an unusual fingerjoint. The

sole's adjustable

to take the finest

of shavings.

throat enables one

plane's pear body

and sole togeth-



#### New, but nice.

The grip required for a traditional horned plane like the Primus is quite different from that for a typical castiron plane, but the Primus is so comfortable that the change comes naturally.

# RALI BLACK NICKEL (\$90), BLUE CRAFTSMAN (\$45)



Weight: Length: Blade thickness: Made in: **Black Nickel** 2 lbs., <sup>1</sup>/<sub>2</sub> oz. 8<sup>3</sup>/<sub>4</sub> in. 0.029 in. Switzerland **Blue Craftsman** 1 lb., 3<sup>3</sup>/4 oz. 8<sup>3</sup>/4 in. 0.029 in. Switzerland

Compared to Stanley-style bench planes, these Rali planes are as different as they could possibly be. The Rali plane bodies, made with Swiss precision, are plastic-and-steel space-age versions of traditional European horned smoothing planes (like the Primus). As different as they look and feel, however, the biggest departure is at the cutting edge: Ralis use small, replaceable blades instead of the traditional iron. Looking like thick razor blades with two cutting edges, they pop easily and securely into place and—get this—*never require honing*. (Replacement blades cost \$7.50 for two.) The blades are foolproof: A blade fits into its holder only one way and, when locked into place, is perfectly aligned with the sole. Along with an intuitive depth adjuster, this arrangement enables a novice to leap over the learning curve associated with tuning a plane and get right to work.

And in the right wood, the work will be fun. I found that the Ralis cut nicely when the wood and the grain were at their most compliant: planing the edges of pine and poplar boards, for example. But at the slightest hint of difficulty in the material, the Ralis were out of their depth.

There is a big jump in performance between the two models. The Black Nickel has a vertically laminated sole (80 laminations and quite flat) that adds needed weight to the plane, and its adjustable throat is a plus, although even at its tightest it was four to five times wider than I would have liked for taking fine shavings. The Blue Craftsman has a pressed-steel sole (quite warped) and a gaping, nonadjustable throat, which encourages tearout in all but the most easily worked timbers. While I appreciated their foolproof usability and comfortable grip, the Ralis are better suited to a carpenter trimming a door than to a furniture maker smoothing a panel. Rali planes are available through Woodcraft Supply (800-535-4482).



**Perfect placement.** Rali's two-sided replaceable blades never need honing and drop into place easily and exactly on tiny metal posts. Once locked in and swung down into cutting position, a blade is perfectly aligned with the sole of the plane.



**Open wide.** Both Rali models have throat openings too large for good smooth-planing. The Blue Craftsman's thin sole (right), made of sheet steel, was quite warped; the Black Nickel model (left) has an adjustable throat and a much heavier sole laminated from nickel.

#### ST. JAMES BAY NO. 51 (\$470)



have always appreciated the quality and superior performance of infilled British smoothing planes, especially those made by Thomas Norris early in this century. They are heavy, with thick irons and comfortable handles—all of the important virtues of a smoothing plane. So it was with great anticipation that I waited months for one of St. James Bay Tool Co.'s custom-made smoothing planes (the No. 51) based on a Norris pattern.

Arizona

There's no doubt this plane looks good and feels good, but it in no way measures up to the quality of its namesake. Take the iron. Sure, it's thick, but it took more than an hour to lap it flat and even more time to regrind the bevel to 25°. Once it was tuned, I took a stroke on curly maple, and it produced a fine shaving—superior to the work of the Lie-Nielsen. But after just a half dozen strokes, the iron was dull.

The adjuster works well enough, but because of the way the handle is made, the adjuster controls only depth (it should also

regulate lateral alignment); at one point the adjuster fell apart, and I had to make a repair to continue planing. The screw cap is a handsome casting, but it employs a loose foot (similar to the pad jaw of a C-clamp) to clamp the iron in place. This was one essential part sure to get lost in a pile of shavings. The quality of the finish on the rest of the plane showed that hours of handwork went into making it, but I would have preferred it look a little less flashy and work a whole lot better.

St. James Bay (800-574-2589) also sells raw or machined castings for this and other planes, and the company offers its planes in a variety of bed angles. My advice would be to buy the company's castings and make a plane yourself. I know a craftsman who has done just that, and he's extremely happy with the results. He points out, however, that although the finished plane works like a dream, making one is not a matter of snapping together a kit: He bought machined castings and spent some 40 hours building the plane. The castings and all other parts he needed came to \$250.



Jazzy, but can it carry a tune? The St. James Bay is a dead ringer for the Norris plane it emulates, but the author was disappointed in the details of fabrication and performance. The channel for the depth-adjuster rod is too narrow to permit lateral adjustment, and the screw cap's separate foot is difficult to insert and easy to misplace.



# **Replacement irons**

You can't make a silk purse out of a sow's ear. When applied to handplanes, this old adage held up reasonably well until several small manufacturers began selling beefed-up replacement irons. These thick irons are better able to hold up to cutting stresses, reducing chatter and letting a plane glide through difficult grain.

To see how replacement irons would af-

fect the performance of lower-priced planes, I got irons from Hock, Holtey and Clifton and tested them in the Anant, Record and Stanley smoothers. The results were dramatic. Suddenly, each one was planing far better than it had before.

Among the irons, I liked the Holtey (\$70; 0.110 in. thick) for its tough A2 steel, which stays sharp a long time. The Clifton (\$59.95; 0.117 in. thick) lapped flat in about a half hour and held an edge

Made in:

# HOLTEY NO.A 13 (\$3,800\*)

Weight:5 lbs., 12 oz.Length:9 in.Blade thickness:0.190 m.Made in:England

\*Depends on exchange rate

F orget for a moment about the price tag, equal to a few woodworking machines or dozens of other hand tools. Forget about the year or so wait. Just take a look: The Holtey Norris-style No. A 13 is one beautiful plane. That planes are still being made with such impeccable craftsmanship—in the grand tradition of the best British smoothing planes—is worthy of appreciation in itself. The price is indeed staggering, but it should be weighed against the enjoyment of using this plane and the many generations it will last.

Karl Holtey (pronounced HOLE-tie) builds planes largely by hand. Using a construction method once common for the best planes, he dovetails the steel sole and gunmetal sides together (no small trick—the dovetails are flared in both directions) and infills the interior with rosewood. Typical of his attention to detail, he drills the infill for oversized sleeves and rivets through the sleeves so that wood movement won't affect the bedding and stability of the iron.

The iron is made of superior A2 steel, an alloy with fine grain structure (to hone to a very keen edge) and abrasion resistance. It stays sharp a long time. It's bedded at 50°, which provides a slight advantage for planing the most difficult woods. The silky smooth adjuster, similar to a Norris' with depth and lateral movement, is extremely precise—it deepened the cut a tiny 0.015 in. for every complete turn.



**Handsome cap iron.** Faceted and burnished at the top and shaped to a smooth, chip-deflecting curve at the bottom, the Holtey cap iron is a blend of beauty and function. Befitting its stature as a collector's tool, the Holtey comes in a heavy, green baize drawstring bag.



**Sole mates.** Dovetails cut with the extraordinary craftsmanship typical of the plane lock the Holtey's gunmetal sides to its steel sole. With the throat adjusted extremely tight, as here, the plane will take gossamer-thin shavings with minimal tearout in the toughest woods.

There are many more details that Holtey has worked out in this plane, but let me just say that it works wonderfully, as well it should. Can it handle woods others can't? Yes. Once you have tried it, there might be no turning back. It's just a matter of rethinking that second car. Contact Holtey at (603) 362-6146.

very well. The Hock iron (\$28.75; 0.095 in. thick) came wrapped in excellent tuning instructions, and it tuned up easily. It did not impress me as much as the Clifton or the Holtey, but it is still an improvement over standard blades. Hock and Clifton irons are available through Garrett Wade (800-221-2942); Lie-Nielsen and Holtey are available from the manufacturers.

Too late to include in the wider test, I discovered that Lie-Nielsen also makes a

replacement blade (\$30; 0.095 in. thick) that fits Stanley-style smoothers. I tried it in a Record No. 04 and found it to be on par with the Hock in overall quality.

All four irons made a big difference, but the real turbo-charging came when I fitted Clifton's two-piece cap iron (\$23.75) to the Clifton blade. One part of the cap iron screws to the blade, and the other part lifts away for honing. The cap iron's weight and wide contact with the blade provide extra mass and stability. And the cap iron doesn't clamp against the blade with any pressure. Other cap irons do, which can bow the blade so it rocks (minutely) with every plane stroke. My initial skepticism was swept aside when I tried the Clifton blade and cap iron and found that even the \$27 Anant was suddenly performing in the same league as Lie-Nielsen's Bedrock smoother. Thus turning the old saying about a silk purse, well, on its ear.