

WORKING WOOD BY HAND

SEPTEMBER/OCTOBER 2022 QM14
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Quercus

Thomas
Lie-Nielsen
Yesterday's
tools today
& tomorrow

PLUS
Fish Glue
Paring Chisels
Chisel Planes
Marking Out
Tusk Tenons
Sliding Dovetails
Skew Honing Guide
Through Dovetails



ISSN 2634-212X





Last making is one craft
to be nominated for the
Woodworker of the Year award

ON THE COVER

04 Thomas Lie-Nielsen

The past, present and future for the toolmaking pioneer

FEATURES

09 An Antique Saw Set

Henrie van Rooij is puzzled by setting

10 Winding a Watch

Justin Emrich designs a clever gadget

11 Woodworker Award

The founding of a new contest

18 Making Chisel Planes

Robin Gates on making simple tools

23 Paring Chisels

John Lloyd on the value of long tools

28 Skew Knife Honing Jig

Germán Peraire on sharpening knives

32 Piano to Workshop

Martin Sturfält becomes a tools fan

36 Through Dovetails

Derek Cohen on assembling a drawer

38 Horses for Courses

Ethan Sincox takes to the learning curve

41 Euclid Foundations

George Walker & Jim Tolpin on marking

46 King of Protein Glues

Bill Ratcliffe argues for fish adhesive

50 Moravian Woodwork

Christopher Wilson on tools & techniques of a religious style

56 Making a Router Plane

Justin Emrich tests a Paul Sellers kit

58 A Classic Eclipse

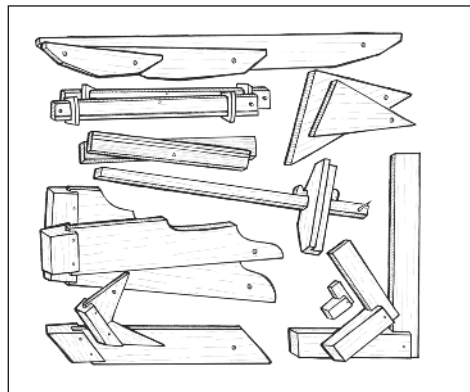
Robin Gates studies an early multi-tool

62 Alternative Holdfasts

Charles Mak offers various hold-downs

27 How to Subscribe

ILLUSTRATION BY OMI GATES



Jim Tolpin & George Walker write about the key tools for marking out (above, p41)



Robin Gates considers chisel planes, and makes his own version from recycled tools (above, p18)

Quercus

Fame precedes Thomas Lie-Nielsen, so it was fascinating to interview him recently. There were so many questions to ask, particularly about the American toolmaker's path to success, and the challenges his eponymous company is facing now in a time of global change.

There are other features about toolmaking this issue, including Robin Gates' doubts about chisel planes, and attempts to make his own rather. As a corollary John Lloyd promotes paring chisels, and the value of long tools. Justin Emrich tests a Paul Sellers Router Plane Kit and Germán Peraire offers detailed instructions from Spain on how to make a honing jig inspired by David Charlesworth. Derek Cohen from Australia concludes his Charlesworth drawer making by outlining his approach to through dovetails.

There's more from Sweden. Professional pianist, Martin Sturfält is transformed by his introduction to woodwork. Christopher Wilson reveals the tools and techniques of Moravian woodwork. Bill Ratcliffe introduces fish glue which he considers better than hide glue and similar adhesives; in fact the King of Protein glues. To end Charles Mak has variations and upgrades on standard holdfasts. On it goes.

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Co-Founders: Nick Gibbs & John Brown

Sub Editor: Robin Gates

Front cover illustration: Lee John Phillips

Front cover original image: Lie-Nielsen

Back cover image: Nick Gibbs

Inside front cover image: Stephen Lowe

Printing: Warners Midland

Digital & Print Sales: Warners Publishing

Subscriptions: www.mymagazinesub.co.uk/quercus

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Cowes, PO31 8HA, Isle of Wight, UK

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Thomas Lie-Nielsen

The toolmaker from Maine tells *Quercus* about his Toolworks and about moving on from Covid

Tom Lie-Nielsen was born in 1954, and grew up on the coast of Maine, USA, his father being a boatbuilder. It is well known, as documented by an impressive piece of reportage by Scott Gibson in a 2002 issue of *Furniture & Cabinetmaking Magazine* (a back issue now impossible to buy), that Thomas started his toolmaking career selling tools for Garrett Wade, the mail order retailer in New York, founded by Garry Chinn. 'By the end of three years,' Scott wrote, 'Lie-Nielsen was tired of New York. He started thinking about moving back to Maine.' According to Scott (and posterity), Tom planned leaving Garrett Wade by setting up a toolmaking enterprise himself, embracing the skills of machinist Ken Wisner, who was about to retire from making his own adaptation of the Stanley No.95 edge-trimming block plane.

According to Scott Gibson, Thomas Lie-Nielsen started his toolmaking career in a small woodshed on his 50-acre farm in West Rockport, 350 miles north east of New York. 'With a lot of tinkering and some outside help [from Ken Wisner], he delivered his first tool to Garry Chinn in the autumn of 1981.' A few years later toolmaking moved to a 384-square-foot workshop also on the farm (where Tom and his wife kept a cow, some sheep and a few ducks, and overgrown blueberry fields). Tom told Scott: "The whole period was one during which I was learning a lot but not producing a lot."

In his *F&C* article Scott Gibson recorded how Lie-Nielsen found a local art foundry to cast the growing number of bronze bodies he needed. "I'd make the moulds for as many castings he had room for," Tom told him. "I'd do that in the morning and then I'd go away and he would pour them. But he would pour them whenever the hell he felt like, which usually meant a week or two later, so he helped set up a foundry in my shop." He was, Tom told woodworkersinstitute.com recently, one of only a few 'boutique toolmakers' early on. "I started with the bronze edge

plane, then the low angle block plane. No one was making any of those tools then. Collectors were driving up the prices. I felt that people should be able to get their hands on tools that worked the way they should." Scott Gibson adds that part of the Lie-Nielsen success comes from 'nurturing a relationship between toolmaker and tool-user.' Now Lie-Nielsen Toolworks is based in a much larger building Thomas L-N bought in 1988, in the nearby town of Warren. And it was from there that we had a Zoom call with Tom to learn more about his business's past and future.

QM Are you a natural woodworker?

L-N I grew up around boatbuilders who could make anything, wood or metal, to a very high standard. I started out sweeping the floor, and did a lot of painting and finish work. And, then, of course, I went away to school and didn't keep going with that. I have renovated several houses, not something I do for pleasure.

Where did you study?

At Hamilton College in upstate New York, studying English and History. My first wife was going to graduate school at NYU. And so we moved there. I didn't have a job. But we got an apartment, and I spent a long time looking for a job. Then I saw a Garrett Wade advertisement in *Wooden Boat* magazine. And I'm like: "These guys are in New York City. They're right here." So I called them up and they gave me an interview and it was perfect because I've always loved tools. Although they had a little showroom, it was 99% mail order, which was really awesome. Because you could reach out with a mail order catalogue. It was a small company with a national reputation. When I came back here to Maine, I knew I couldn't really make a living very easily selling to my neighbours. You know, in Maine, you have to reach out beyond the borders. And fairly early on, I started advertising and trying to develop my own retail business,

And you became a toolmaker?

At the time, it was nearing the end of the great decline of quality tools. There were still some decent tools coming out of England, Record, mostly, and Stanley UK. There were some nice German tools. The sawmakers in England were very good. But things were declining and customers were complaining all the time about quality, and especially in the USA that they couldn't find tools that Stanley used to make. After the war Stanley eliminated most of their specialist tools. If you were somebody who needed a particular tool for a job, which wasn't a common tool, you were out of luck. You had to buy it on the antique market and were lucky to find one, and of course there was no eBay then. Specialised tools were hard to find.

There were guys who were making boutique tools on a very small scale. They usually did very nice quality but weren't so good at delivery. So I was thinking, why can't I make tools at a high quality level and do it as a real business, and deliver on time. There was a man [Ken Wisner] who was making a small, bronze edge plane in New York, on Long Island. And he was a mad scientist, engineer-



The Low Angle Adjustable Mouth Block Plane is Lie-Nielsen's most popular tool



Thomas Lie-Nielsen in the
machine shop in 2010

type guy who was brilliant. But naturally he didn't like to do production work. So I took over his business.

In a recent interview with Woodworkers Institute, it was said that 'few people have had a larger hand in the renaissance of hand-tool woodwork than Thomas Lie-Nielsen.' How do you feel about that?

People have said that. And to a certain extent, I agree, especially in the sense that when people buy tools that work well, then the tool is no longer an obstacle to proceeding in their hobby or craft. When I started a lot of people, a little older than myself, were writing about woodworking, and one of their favourite things was to write an article about how to tune up an old hand plane. You still see these articles out there now, but not as much. The first thing you did then was to teach somebody how to tune up an old plane, or a new plane.

Plane manufacturers had figured that they could get away with selling kits, instead of actual tools. They look like tools, but they don't work like tools. It's not a tool unless it works like a tool. From the point of view of the design of the tool and from the point of view of the manufacturer, a good tool means that you can remove a whole series of problems for people and so woodworking can be approached successfully.

You're sponsoring our Young Woodworker of the Year competition. What about new generations of woodworkers?

Yes. My favourite thing is when a teenager comes into the showroom and wants to learn about the tools. I am not sure what we can do to attract younger people, except make people feel welcome when they visit and try to teach them something and get them excited, no matter how young or old they are. We are close to the Center for Furniture Craftsmanship here, and they have a lot of younger students, especially for their longer courses. Some parts of the country, like New York, seem to have more younger people involved in the craft than others. We like to go there.

Are there any apprenticeship schemes in the US at all?

No, it's just a disaster. And it has been like that for decades. There isn't even High School vocational school training anymore. It's really, really, really rare. I get people my age telling me: "Well, when I was in High School, I learned so much about



Finishing a butt mortise plane in the early 1990s, when Lie-Nielsen had three or four staff

woodworking." There are whole generations that have not been exposed to any of that.

Is that one of the reasons it's so difficult for you to recruit engineers after Covid?

Yeah, I think so. I think there are a lot of people in the United States who might have been better off learning a trade. And they'd probably make more money. The whole Covid nightmare thing is coming to an end, but it doesn't change fast. I lost a whole lot of people and it takes time to train people. You can get some people doing productive things in a few weeks. And you can get people doing more productive things in a few months. But it takes years for them to get really good. You know, I mean, really good. So I've got a young, and extremely strong group with a lot of potential, but it's taking time to build this back up. We've always trained people who were not necessarily experienced. A couple of my first and longest-serving employees were lobstermen. So I look for the right person, not for experience. We're in Maine, in a really small town in one of the least populated States in the country. So we don't have a lot of people around as a pool to hire from. We have to be patient. But the Covid situation has brought some local people to us who would not ordinarily have come and that's a good thing. I think we're in good shape right at the moment. Over the last six months, it's been a lot of hiring, and a lot of people coming and going, and training, all of which is expensive and consumes a lot of time and energy. In the meantime, of course like everybody else, we've had problems with supply, problems with costs rising and now of course with the economy, and the war in



Lie-Nielsen's incredibly versatile Low Angle Jack Plane



From Boat Boy to Father and Toolmaker

In his formative years Tom would be working in his father's Maine boatbuilding business, sweeping, sanding and finishing (above). Working on a Bridgeport milling machine (right) and an early Lie-Nielsen foundry c1994 (bottom). Pouring bronze by hand (below), and (below right) with his wife Karyn and daughter Kirsten, who now works for Lie-Nielsen



Ukraine and whatever else is going on in people's heads. But now we can start making a bunch of tools that I haven't been able to make for two and a half years. Demand for the most popular tools was so high that we just couldn't keep up.

Are you looking forward to shows again?

Yes! We get emails from customers asking when we are going to have the shows again. Well, hopefully *Quercus* will be coming over for Handworks in September 2023 at Amana, Iowa. That's where brothers Father John (who is a Greek Orthodox priest) and Jameel Abrahams live and run Benchcrafted. They're very interesting guys and hopefully we'll see you there.

And of your tools, which is your first choice?

I think the low angle jack plane that we've made for a long time is the first tool you should get because you can do so much with it. And it's not complicated. As long as you can sharpen it, you're going to be fine. It's got this very, very thick blade, and a heavier body. And we're using ductile iron, which is not breakable. The traditional approach was a regular bench plane. When people were apprentices that was what was taught. It was just unimaginative, traditional stuff. Except for the one-handed block planes, low angle tools didn't catch on. But they've caught on now.

What about honing guides?

I've always advocated using a honing guide, primarily on the basis of the techniques that David Charlesworth advocated, especially regarding secondary bevels. So if you want to do a 35° bevel, as a micro bevel or a secondary bevel, without having to polish up the entire bevel of the tool, which is a waste of time, the easiest way to do that accurately is with a honing guide, because you can set the angle accurately, you can maintain it accurately, you can get an excellent result. This is especially useful teaching beginners to sharpen, because what I really want is to have them learn to get a razor sharp edge. The easiest way to get a really sharp edge, time after time, is with a honing guide. The whole thing about sharpening is you should touch up your blade regularly, not throughout the day, but regularly. Beginners often wait too long. So, if you can put it back in a honing guide and get exactly the same angle again and re-hone it, then it is going to be fast and accurate. And you are going to get great results. So, I think a honing guide is an important tool, especially for beginners. And, it does not make you less of a craftsman, less of a woodworker like some people want you to think. We were buying the Eclipse guide for a long time and selling them. And then we couldn't get them



In the showroom, in the early 1990s, demo-ing a plane

anymore, and there were just knock-offs. They were hard to get and the quality wasn't that great. And so I started thinking about making a honing guide. I like the side clamp style. So we went with that idea. And then I started thinking about if you redesigned it, and made the jaws removable, so you have other jaws for special tools and angles, or mortise chisels or actual chisels then the honing guide could be much more versatile than the original.

Do you do much woodworking yourself?

I do have a workshop, where I do tool testing, troubleshooting and various things. I do stuff around the farm. It's farm woodworking: barn doors and windows and greenhouse furniture. We use wood for heat a lot. A big part of my woodworking is being good at cutting, splitting and stacking wood.

So you're an amateur farmer?

Well, at this point, it's reduced. We have a large veggie garden, which is half in a tunnel, an unheated greenhouse, and then outside and raised beds. I used to have an enormous garden. And chickens and geese and horses. I had a cow for three or four years at one point, and I milked her. She was in a room attached to the house, and if I didn't get up early enough in the morning, she would shake her head and make noise and get me out of bed. That was fun. I had poultry and sheep and bees. I keep bees occasionally. Right now what I'm trying to do is figure out how much we can grow in Maine, all year round and stretch the seasons with an unheated greenhouse.

How else do you spend your spare time?

I like to cook. And I like to read. I read a lot of history and I read some fiction and a lot of magazines. My favourite author is John McPhee. He's American, and, what you might call an essayist. He wrote a lot of books and stories about obscure things that he made fascinating for the average person. He's just a really interesting man and he got me interested in geology.

I'm very fond of Guinness when I can get it in the British Isles. Guinness in the United States isn't quite the same. I'm not a big fan of American beer. I like small breweries. There are a lot of small breweries around here. Odd Alewives does a nice job. Why people have now become more interested in artisan beers in recent years, I think a lot of it has to do with the interest in the sense of craft and interest in quality, and unique, individualised expression of whatever it is you're interested in, like woodworking.



Lie-Nielsen Honing Guide for simple, precision sharpening

Foreign Setting Saws

Dutch woodworker, *Henrie van Rooij*, is offered an antique saw set to view

A little while ago the editor asked me to have a look at this antique-looking saw set. It is always enjoyable to figure out how something should work just by looking at it. I began by trying to identify the tool. My example had no brand name except for the word 'foreign' stamped on one side. Google showed many examples of identical-looking tools, some with 'Garanto Fein' imprinted. I wonder if that Fein part of the name relates to the modern brand of power-tools? These particular tools seem to be more common than you would first expect, with many similar examples being offered for sale on the various platforms like eBay or Amazon.

Such beauty! The tool is a work of art, with many finely-detailed decorations. I particularly like the little sailing boat stamped on one side. All the surfaces are beautifully moulded and textured. Our one differs from most of the others by the more common knurled nut (which fixes the depth stop in position) replaced by a hefty wingnut. The reason for this can only be guessed at. Either the original item got lost in the shavings on the floor, or the owner wanted to have more leverage to tighten the depth stop really securely. If it would move, even a little, halfway through setting the saw, it would make a bit of a dog's breakfast out of all your diligent efforts to bring the saw back up to scratch. The small screw opposite the wingnut, the one which is connected to the spring, controls how far the handles can be squeezed together and how far the tooth to be set is bent over. As with all saw sets the biggest problem tends to be to over-setting the teeth. This tool would need to be adjusted carefully too, to avoid this problem.

Chickened out

I chickened out of using the tool in earnest. Unlike a modern saw set, which grips the saw blade securely and precisely, there seemed to be just too much play and lack of precise control. Maybe it would be better on a much bigger saw. Rightly or



Fascinated though he seems, Henrie hasn't dared test an antique saw set on his lovely saws

wrongly, there are so many opinions on this subject, I tend to use my saw set tool after I have levelled and filed all the teeth. With this tool the point of the tooth is forced to scrape over the depth stop surface, which could blunt it again. Close observation of the depth stop surface shows a small groove scraped into the surface from all the previous use.

So there we are. A beautifully-made, very pretty antique saw set sits on my bench, but I am reluctant to use it. I will stick to my trusty Eclipse saw set for the normal saws, and the Somax, which can set very small teeth, up to 20tpi. There are many attractive looking vintage saw sets on the market, and not expensive, I would say. There will be those who would be tempted to start a collection. Rest assured, I will not be competing.

Feedback



Inspired by your Young Woodworker of the Year Award (and by a cardboard box showing its age), I knocked this up out of foraged laburnum recently. Sadly I am ineligible for the competition, being aged 76 and having used a bandsaw for the timber and routers for the joints. However the lettering was hand carved. Thank you for your magazine. My quest to become an off-grid craftsman is ongoing.

Malcolm Simms

We all go but some departures hit home hard. I cut my teeth learning how to sharpen plane irons and chisels from David Charlesworth's first-edition videos from Lie-Nielsen. I have found his methods to be brilliantly simple, flawless, foolproof, and exceptionally effective. As I pottered in my shop I would fondly imagine his jovial face and inimitable voice each time I whisked a blade over an 8000 waterstone. David became an icon to me, and since he made an otherwise mediocre craftsman a reliably capable sharpener, he grew over time into a hero for me. I was his only student for a week in January 2019 at his Hartland workshop. What I learned that week was that David was the benevolent soul you see in his videos, generous with his knowledge and patient with my shortcomings.

Bob Jones

Watching Time Spin

Driven by a son's passion for timepieces, *Justin Emrich* devises a neat wind-up solution

My son Jamie loves expensive things, anything from fancy cars to really smart watches. I guess it's the James Dean or James Bond look.

Anyway, what I didn't appreciate when we started contributing to his watch collection (one is never enough by the way), is that, according to Jamie, as well as a watch case to show off your prized timepieces, you must also have a watch winder. What is that I asked him?

There are three types of common watch movements: quartz (battery operated), mechanical (hand-wound) and automatic. Automatic watches are similar to mechanical watches, however, rather than being hand-wound, the spring is wound by a weight or rotor attached to the mechanism which rotates as a result of movement and gravity as it is worn. In essence, as long as the watch keeps moving it will remain wound.

If you have one watch, then keeping the watch ticking is no issue, however, once you introduce new timepieces into your rotation, suddenly the automatic watch isn't moving as much and is becoming unwound. Some may argue that it's not a challenge to wind the watch and adjust the watch hands if it becomes unwound. However, watches with a date complication make this a bit more complex.

Watches with date complications operate on 24-hour cycles to show the correct date, but will only show 04:00 rather than 16:00. If the time is adjusted when the watch is in the early hours, it risks damaging the date mechanism, which one wouldn't commonly do, unless the watch has been sitting idle and become unwound, showing say 40'clock. To alleviate the risk



of damage to the mechanism and ensure the correct time and date are shown, a watch winder can be used. A watch winder is a sort of watch stand that rotates, allowing the rotor to spin with gravity and therefore winding the spring, and keeping the watch ticking.

Buying a watch winder is not a cheap affair. You can easily spend over £100, which seems rather expensive for such a simple gadget. So, I turned to a well-known search engine and looked for DIY watch winders. Well would you know it, there was a video of someone cutting up an old watch box and inserting into it a small circuit board, motor and some wires. "This looks like a fun challenge," I said to him, remembering his penchant for all things expensive and nice. "Dad, I don't want my lovely watches sitting on top of a piece of Blue Peter cardboard and sticky tape."

"OK, but let's see if we can source the electrical components," I said to him. He didn't look convinced, but that wasn't so hard – 10 mins and about £10 spent in fact. Bingo, we had one of those little round motors that you might remember from Meccano sets, a small circuit board similar to a Raspberry Pi single-

board computer, and some programming instructions. The instructions were really simple, telling the motor to turn x revolutions one way, stop, and then turn y revolutions the other. That was it, about five lines of code that someone had written for us. We just needed to input x and y.

Wooden movement

So we had the movement sorted, we now needed something to sit it all in. This is where wood comes in. First up we need to make the cradle for the watch to nestle in. That was simple enough. Carve out a small semi-circle rather like a half horseshoe, but if you've ever seen a watch in a box, the strap sits wrapped around a tiny pillow. Oh lord, where were we going to get one of those I thought? Let's go shopping and start a search through the charity shops. Nope, no chance. Then we stumbled into a sewing shop. That was a laugh. Picture this, middle-aged man jabbering on about a tiny pillow to some amused but helpful staff with a highly embarrassed and uncomfortable son looking on. Five minutes later we emerged with a patch of blue felt and a small bag of wadding. All we needed to do was sew it into a



A watch winder (left) keeps an automatic watch going, calling for the sort of ingenuity we love at *Quirkus*

pillow, and that turned out to be really easy too. Mind you, it was the first and probably the last time Jamie will pick up a needle and thread.

Pillow made, cradle made, turning mechanism sorted. We Just needed something for it to all sit on and hold the turning cradle. This ended up being the hardest part of the whole project because the watch had to be held at a 45° angle so gravity could do its thing, and it was quite heavy. If we wanted to hide the circuit board and motor but have the spindle long enough to hold the cradle, we needed to be clever.

Model 1 sort of worked, but not well enough. We hollowed out of lump of oak (much hammer and chiselling), but we couldn't really get a snug enough fit between the motor and cradle. Model 2 was much simpler and more effective.

You should see the pure joy on Jamie's face when we finally assembled it all and it worked. Silently his precious watches are kept gently rotating. The final step was working out how to turn it off so it only came on for an hour or so a day. He rather cleverly simply plugged the whole arrangement into a smart plug which he has on a timer coming on at short intervals through the day.

Woodworker of the Year

A new HCA award launched with the support of Axminster Tools, who are celebrating their founding

Heritage Crafts Association and Axminster Tools have been launching the inaugural Woodworker of the Year award (in the UK) as part of their new partnership, with a £2000 prize for the winning entry, presented at a gala reception this winter. This award celebrates a heritage craftsman who has made an outstanding contribution to woodworking over the last year. It recognises a contribution that is far beyond the ordinary, based on a proven dedication to a particular woodworking skill.

The award is open to practitioners of any craft that uses wood as its primary material. As well as carpentry, furniture-making, and wood carving, other crafts might include boatbuilding, timber framing, marquetry, guitar-making and so on.

To be eligible, the objects that the nominee makes must be primarily made of wood that has been worked using skilled techniques. Makers of composite objects have been eligible as long as over half the material used is worked wood. Anyone, including the maker themselves, has been able to nominate themselves for this award, and nominations have already closed early in September. Judges include toolmaker Robin Wood, Alan Styles, who is MD of Axminster Tools, and traditional wood carver, Sarah Goss.

Happy coincidence

The award coincides with a celebration of Axminster Tools having been founded 50 years ago. The tool retailer began life in the rural market town of Axminster, East Devon, in 1972, when jobs were done manually and before the age of computers.

The early years were hard; hours long and at times it was difficult to make ends meet. A passion for craftsmanship and a job well done got them through, and before long the family business earned a reputation as a trusted tool shop run by friendly and knowledgeable experts. Moving into selling by mail order turned the small-town ship into a global retailer.

"My family taught us the value of hard work and never giving up your goals," says Axminster Tools MD, Alan Styles. "When you work together anything is possible."

Visit axminstertools.com to learn more about the story.



PHOTO PAUL FELIX

Nominees include cooper Alistair Simms (above), boatbuilders (below) and last makers (bottom)



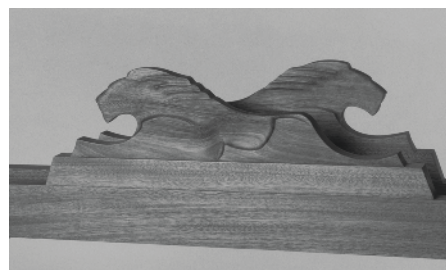
PHOTO PAUL FELIX



PHOTO STEPHEN LOWE

The Art of Forgiveness

Woodworking author, *Gary Rogowski*, reveals his approach to 'failure'



Standing on his head, in the Northwest Woodworking Studio (left). Carved Deco mahogany lions (above), part of a large standing work table. Shaped mahogany box for Weaton's Mom (below)



Years ago I worked in a large building that had been converted into storage and some few work spaces on its second floor. This old furniture factory sat on the east side of Portland, Oregon in a gully. At eye level, on the second floor, we could see the freeway and at ground level the train tracks headed out of town. At one time boxcars must have rolled into the courtyard/ parking lot because you could see actual tracks just poking through the pavement in one spot. Lumber rolled in, furniture rolled out. As I understood it, their products consisted mostly of hotel and hospital furniture. The building owner had worked there as a kid and had bought the place and rented it out for old times sake I suppose.

When I moved onto the second floor a wide variety of makers worked there. Products from fishing nets to high end cabinetry and doll house furniture got built there now. Across the hall from me was a manufacturer of wooden folding massage tables and then there was my custom/ bespoke furniture. In this group, I felt myself to be the one least dependent upon electricity when the power went out during

a storm. I could grab my hand planes and keep working. It gave me a small sense of control in a world clearly beyond anyone's influence. But the economy influences every maker, try as one might to avoid believing that. I saw my home town growing more expensive faster than I could buy bigger machines. I decided that instead of working harder I would use my other skills to write for some different woodworking magazines. I published a few books and videos on joinery and went on the road to teach. In that time as I ran more classes to help subsidize my woodworking habit, I learned several important lessons.

One was that I had to be extremely self-motivated as nobody cared if I did this work or not. This is true of any passion that one may have. It is done first for ourselves. Then if we can get paid something for it that's a bonus. Furniture at the level and price I charged for it isn't a burning need. It is an indulgence, a satisfaction, a reward to the client for whatever queen- or kingdom they ruled over. Over time I slowly realized that I did this work for my need for precision and control of a small world, but

also to be quiet with myself at the bench. The fact that clients paid me at all was a blessing, if a small one.

Second, if I wanted to be extra persnickety about fitting, say my hinged inset doors with a perfect reveal around its edges, I wasn't going to impress my clients much. They had no idea how much effort fine work took. Most of them believed, I think, that the tree grew itself into dovetails. [There are some I am sure I could convince of this.] What I would in fact be doing with this extra precision was to allow me to sleep better at night. I would know that I had done my best work that day. The clients wouldn't really care that much unfortunately.

Jump forward to some years later and my woodworking school, The Northwest Woodworking Studio, had close to 15 years under its belt teaching students. And at one gathering and lecture for a local guild, someone at the end of the night asked me what was the most important thing for a woodworker to learn. I'm sure he expected me to say practice or economy or making better jigs. I looked over at one of my Mastery students and knew the

answer immediately. It was as right for this student, an ex-military man who was extra hard on himself, as it was right for me.

I answered the question with this simple truth, "The most important thing for a woodworker to learn is forgiveness."

Try as I did every day to be perfect at this work, I never was. Because that is what I learned as a kid. Strive always for perfection and when I failed, I could use the words of my father to berate myself for being such a failure,

And yet God was never offended by my work. I tried again harder to be better the next day and when I failed again as I inevitably did, I worked myself over again for my inadequacies.

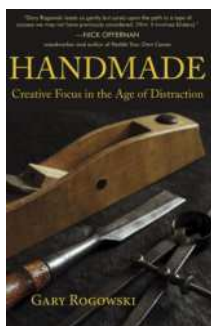
Tough way to treat yourself. But I looked at my student Patrick that night and I looked at myself and I realized that we were so hard on ourselves probably for different reasons and it was worth it to lighten up on us. Forgive both ourselves for being human.

The loudest woodworker

My book begins with this line: 'I am one of the loudest woodworkers there is.' That about sums me up. When I make a mistake, I am all over myself, because oughtn't I be perfect? Alas, no. Yet I still carry the vestiges of that need for perfection. It has taken me some time to learn to walk away from my current problem at the bench to let it shrink to its normal size. Then I can fix it quickly because I know exactly how to get back to this point in the project. It takes less time to do so than lamenting my stupidity.

Some people quit this work because of their mistakes. Our focus can get very small when we are at the bench. We have to remember that it's just wood and we are just humans. I think if we can forgive ourselves our mistakes, then it makes for a better time in the shop when we make a cut on the wrong side of the line, again. What's the phrase? Good judgment comes from experience; experience comes from bad judgment. Trying to stay level headed as we garner our experiences is sometimes difficult. It takes forgiveness for me to manage this. In time, I have learned to take it a little bit easier on myself when I screw up. Even when I measure three times and cut it short each and every time. Human, all too human, that's me.

Handmade, by Gary Rogowski is published by Linden Publishing.



Studying the Castle Joints

Dylan Iwakuni reveals the secret of an ancient locking joint



The original joinery on a post at Osaka Castle (left). The bottom part had become rotten, and had to be replaced with a new piece using this joinery. It was only in 1983, with the use of X-rays, the assembly was made clear.

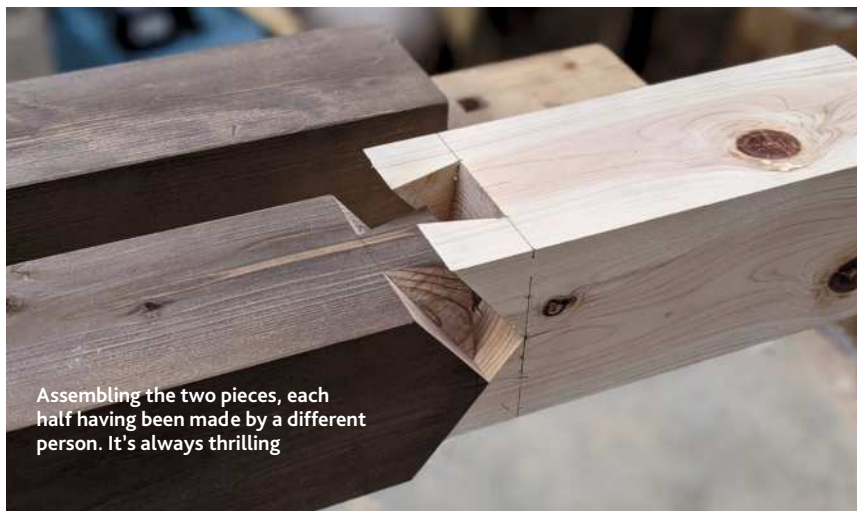
The joinery slides in diagonally, with both dovetails angled in opposing directions (above), making the assembly possible

For some reason, one of the posts was too short. Without any extra posts, the post inevitably had to be spliced. A fellow woodworker, Takuya Aoki (@aoiaua), and I both have an obsession with joinery. He jokingly suggested we do the 'Osakajyo Ootemon Hashira Tsugite'. This joinery was discovered on one of the posts at Osaka Castle, the assembly of it a mystery. It was only in 1983 with the use of X-rays, the assembly was figured out. Other than small-scale models, neither of us had made a proper one before.

Visualising the way it works and the shapes required some time and thinking. Once I had the shape in my head, I marked both pieces using a mix of marking gauges, bevel gauges and squares, tools to keep the lines as consistent as possible. Once I had marked both sets of lines, this was where it got interesting. Joinery made of two pieces, each half made by a different person. Takuya Aoki cutting out the female piece and I, the male piece. As each of us was cutting the opposing half, it meant both of us had to cut precisely according to the lines.

When the time to test the truth came, we were both nervous, double-checking every part of our work. As we slowly fitted the piece in, it got tighter. A moment of hesitation - whether to play it safe and readjust or continue hammering, hoping it goes in all the way. "I think it should go in", we both agreed and got out the hammer, carefully tapping the piece. To our pleasant surprise, the assembly fit perfectly on the first and only try, both of us jumping with joy, amazed at the work we did.

Once the 'Chair Library', a resource centre with several hundred chairs from around the world displayed, is open to the public, you'll have to come to visit and spot this special post!



Assembling the two pieces, each half having been made by a different person. It's always thrilling

Objetos de Viaje

Chilean designer/woodworker *Carlos González Salazar*, expounds the value of archaeological finds

Much of what we know today about the Chilean Diaguita culture is thanks to archaeological finds, and it is mainly on this aspect that I will focus, especially with regard to objects. Although the objective of mortuary offerings, from the spiritual point of view, was that the deceased person could use them in another life and perhaps in another place, for us this gesture becomes a source of information about their culture, which perhaps was never their purpose. These objects have travelled in time with their evidence of a past culture.

Obejtos de Viaje (Travel Objects) is inspired by Diaguita art, especially its decorative patterns which - in my opinion - represent the most beautiful and sophisticated of Chilean indigenous cultures. Selected patterns have been transferred to wood - they have travelled, if you will, to another supporting medium; creating a new object carrying a detail of this culture to another time and place for future rediscovery.

The patterns are built using a variation of the Japanese Yosegi Zaiku technique (wooden sheets joined to create patterns), in which the objects are made by hand using traditional carpentry techniques. This aims to create an enduring object which honours the priceless cultural information in its onward journey.

In their book *Arte y Cultura Diaguita Chilena, Simetra, Simbolismo e Identidad* the Chilean archaeologist Paola González Carvajal explains the patterns and construction of Chilean Diaguita objects while also making hypothetical connections to Shamanic art in other cultures. This has been an inspiring and valuable resource in my work. The form of each object is directly influenced by the pattern decorating it and, in a nutshell, we could say that the pattern and the object are the same thing. This invites the viewer to look at the work with different eyes, to see how shape and pattern complement one another.

Follow Carlos González Salazar on Instagram @tolentino_taller.



Carlos González Salazar in the workshop (left). Diaguita ceramics (above & below) from the Museo Chileno de Arte Precolombino (museo.precolombino.cl)



Zigzag (above left) is made with mitre joints for the triangle, with reinforcements, with 45° mitre to the base. It is made from lenga and American walnut. Cadena (above right) is made from lenga for the body, MDF for the door, padouk for the wedges, dowels and handle



Ondas (left) is made with an inverted dovetail at one end and a 45° mitre at the other, with a visible plug reinforcement and box and tenon joints to form the container for the drawer. The wood is lenga for the body, American walnut for the inlays and rauli for the front and back of the drawers

A Patch for Vintage Tools

As a confessed administrator, *Shrenik Savla-Shah* looks at an online group for old tool collectors

Over the last few years, the second-hand tool market appears to have attracted more interest online. The Vintage Tool Patch was born out of this, with the intention of making both sales and purchases fairer.

The Vintage Tool Patch (or VTP for short) is a Facebook group, and is 'a vintage hand-tool (all trades) direct sales and auction tool selling community'.

So where does one normally turn to get second hand tools? The first suggestion that comes to mind always seems to be eBay. I don't know if the regular eBay scavengers have noticed, but in recent years prices have shot up! Furthermore, sellers fees have increased in recent years and sellers can no longer receive money via PayPal. Sellers are now moving towards alternative places to sell, without those hefty sellers fees, and being able to receive money via PayPal rather than straight into their bank account. This is where the Vintage Tool Patch was born.

I became an administrator of this group over a year ago, with the intention of sharing my passion for getting tools for a fairer price, without sellers fees and meanwhile helping others. Hosting auctions every weekend, and allowing sellers to list items as a 'Buy It Now' listing outside of auction hours gives us plenty of work to do! As admins, we do all the work voluntarily, with just the passion for helping others that keeps us going.

International Ethos

As a team, we aim to maintain an international ethos. This is incredibly important to us as our team itself is based across the world. Our admins and moderators cover North America, Europe and Australia.



Our 'Foraging Day' post, when we ask our members what they are looking to purchase. The Vintage Tool Patch logo (below)

Not only this, several of our admins and multiple sellers aim to support international purchases through bulk shipping routes, reducing the cost of shipping by sending boxes across borders in bulk.

Auctions

Hosting weekly auctions means that we have an established routine. Preparation for our auctions begins on a Tuesday, with our 'Foraging Day' admin post. Buyers are encouraged to state the tools they are specifically looking for. This is then followed by our 'Harvest Day' admin post. Sellers are encouraged to show sneak peaks of what they plan on listing. On Fridays after 6PM sellers begin listing and buyers begin bidding! After the auction



ends, buyers and sellers work in Facebook messages to sort out shipping address and payment. Our admin team helps to clear out old posts and keep the focus on tools for sale.

Buy It Now

Outside of auction hours, we allow our sellers to list items for sale at a fixed price, for sale on a first come first served

basis. This works well, as sometimes the auction items that did not sell are converted into BIN listings by sellers, and vice versa.

Buyer protection

This is probably one of our most important elements. Whilst buyers and sellers may agree to use one of any range of payment methods, our sellers must offer and allow buyers to use PayPal's 'Goods and Services' payment method. While this means PayPal takes a 3% cut, they then offer the buyer protection if the item doesn't arrive as described or is damaged in transit and the seller doesn't respond. Some sellers request that the buyer covers this 3% fee so they are not left out of pocket.

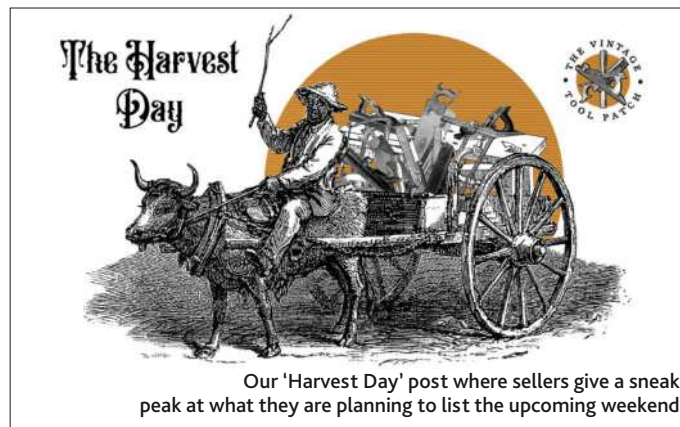
Challenges

There are challenges being an administrator. I think we as admins spend a lot of time removing old auction listings that sellers haven't cleared, having to deal with incorrect listings, people attempting to bid outside of auction hours... etc. On the rare occasion we have larger issues, where we revert back to asking for support from the rest of our admin team.

Our other groups

Alongside our main selling group, we have created a 'spare parts store' where people can list their spare parts for sale, or even ask if anyone is looking to sell the part. We also have a 'Sellers space' where we as an admin team can provide support to our sellers, which might include valuing items or guidance on how to list.

You can find our group via: www.facebook.com/groups/thevintagetoolpatch. Follow Shrenik on IG @s.savla.shah.



Our 'Harvest Day' post where sellers give a sneak peak at what they are planning to list the upcoming weekend

Quality & Efficiency

Canadian furniture-maker, *Pascal Teste* recalls his path from power-tools to hand-tools

At seven years old, I watched my parents build their own kitchen cabinets, and helped my dad build a small wooden sailboat in the backyard shed. I was impressed by all of the tools and was amazed how a few pieces of wood could be combined to allow us to float and travel across the lake. However, I didn't initially wish to become a woodworker; it would happen much later in my life. After high school and a bout of travelling, I moved to Vancouver, British Columbia, and found a job as a carpenter's helper. After a few years of learning from very skilled journeymen, I became a carpenter. The wage was good, but I was uncertain about pursuing a career in the trade.

I was considering other options, and one of them was furniture making. I made a visit to the Inside Passage School of Fine Cabinetmaking and considered registering to their program. I hesitated, and in the end I decided instead to do a university degree in Kinesiology in the hope of becoming a physical education teacher. While earning my degree, I kept working as a carpenter, and ironically found myself much more interested in building things with wood, so I decided to start my own contracting business in residential renovations, rather than continue my academic studies.

The projects I worked on involved doing everything from forming, framing, and siding, to the interior trim and millwork, and occasionally building a piece of furniture. Looking back at my contracts over the years, the ones that I enjoyed the most were those that required building a custom built-in or piece of furniture. So after close to 15 years of carpentry work, it was time for me to switch to what I truly enjoyed the most; making furniture. My decision coincided with my wife and I moving into our house seven years ago. The first thing I did was to set up my workshop in the 380sq.ft garage.

Rented workspace

The space had no windows, or insulation, but allowed me to build furniture without having to rent a workspace. For three years, as I renovated our house, I honed my skills as a furniture-maker by building pieces for our own use and slowly taking on a few orders. Already having good carpentry skills and experience, I learned from many books, magazine articles, blogs,



and various YouTube channels. The key in steadily progressing was to make as much furniture as I could. It worked. Most of the pieces I made then were reproductions of existing designs that I took from the Shakers and various early American furniture designs.

The book *American Country Furniture Projects From the Workshops of David T. Smith* by Nick Engler & Mary Jane Favorite, became my 'mentor' in a sense. It is a fantastic book for anyone who wants to learn how to build solid wood furniture. Another great learning resource that helped me better my skills was the publications of Lost Art Press and the writings of Christopher Schwarz. His philosophy "To build rather than buy," (see his definition of anarchism) struck a chord with me. As my skills improved, I started making my own designs, and the reception from my clients has been positive. I also started making and designing chairs, partly influenced by Curtis Buchanan's educational videos on the making of Windsor Chairs, and Mr Schwarz's contagious love for stick chairs made almost exclusively using hand-tools, I found them to be a joy to build while also, requiring a good deal of patience and skill.



Cabinet on a stand with drawer and shelf in mahogany (left). Small side table in Douglas fir stained brown (above)

I'm looking forward to making many more chairs in the future.

Currently I offer my clients a variety of types of solid wood furniture. To produce the work, I like to use a combination of power-tools and hand-tools. Typically the lumber preparation is done with power-tools, while most of the joinery is done by hand. This allows me to produce quality furniture in an efficient way. Using hand-tools is important for me because they provide more control and instant feedback allowing me to adjust quickly and finesse things. One of my favourite hand-tools is the Veritas Large Spokeshave. It excels at cleaning up and refining large chamfers like the ones under a chair seat.

Last year I launched my website and drew up plans to build a proper workshop. It's a 760sqft. addition to my existing shop space, and once completed the combined space will be 1100sq.ft. I have allowed room for a few extra workbenches, with the intention of offering woodworking classes. I'm happy to announce that my new shop is now complete and operational. I could not be happier: a perfect size for what I do. As planned I was able to fit four workbenches in the space, so I am now ready to receive students and pass on my knowledge and hopefully get them excited about woodworking.

Follow @pascalteste or visit pascaltestefurniture.com



Shaker settee in hard maple painted black (above). Leg details of a small keeping box (right). Interpretation of John Brown Cardigan chair in red oak (left)



Testing the shop-made chisel plane,
made from spalted beech



Access All Areas?

A wind-thrown tree and a lost shoe lead *Robin Gates* to investigate the chisel plane

Returning across the chalk downs one blustery autumn day, my way blocked by a wind-thrown beech lying smashed across the road, I was dramatically reminded of the old adage, 'You never know what you've got until you lose it'. For years this magnificent specimen, crowning a high point of the downs, had been a familiar waypoint along my route inland, signalling the changing seasons. It was a place I'd been meaning to stop, look around and think awhile, as great trees somehow encourage us to do.

Even then, as I backed up and sought an alternative route, I suspect the manufactured routine of modern life stirred more annoyance at the delay than grief for two centuries of arboreal splendour wiped from the landscape. Days passed before I remembered that tree, returned to its violently vacated spot and tried to imagine what it must have been like the week before. By now the Highways department had sliced up the veteran beech and carried it off, leaving only torn roots and offcuts from the chainsaw behind. Still, I rummaged about and found an odd piece to take home as a memento, attracted by black lines meandering through it like contours on a map. I later discovered these jazzy lines called 'spalting' marked the frontiers of advancing fungal infection which – over many years – may have contributed to the tree's eventual downfall. Seeing as it was so pretty I wondered if I might make something of this spalted beech that would be useful as well as meaningful.

Beech is the traditional timber for wooden planes in Britain, and since I had yet to try my hand at making one this seemed a timely opportunity. That said, the physical characteristics of beech recommending it to a structural role are hardness and consistent grain. The fungal decay indicated by spalting would seem to weigh against success. Still, a thorough prodding with the bradawl revealed no worrying soft spots and I pressed on regardless, meanwhile finding reassurance in a Dorset timber merchant saying that "Spalting doesn't affect the durability". But what sort of plane should I attempt? Reckoning that a chisel plane looked the most straightforward, and unlikely to experience heavy wear, I settled on that.

Structural simplicity

Structurally the chisel plane could not be simpler. Attach a firmer chisel bevel-up to a door wedge and you've got it, more or less. Its key feature is the fully exposed cutting edge. The plane has no toe; nothing to prevent it creeping up to the very foot of a perpendicular. But although the blade projects beyond the bed its cutting edge lies in precisely the same flat plane as the sole, so that as the tool slides forward it cuts anything standing above the surrounding plateau and no deeper.

The first of the type made commercially was the cast iron Stanley No.97 originally called the 'piano maker's edge plane', but also hoping to attract the eye of cabinetmakers whose furniture work found them struggling in tight corners where even a bullnose plane failed to reach. The Stanley 97 is now a rarity attracting collectors' prices to match. Secondhand prices for its modern counterpart the Lie-Nielsen 97 – now discontinued – appear likewise unsuitable for anyone with high blood pressure, but the chisel plane lives on in its smaller stablemate the LN97½ at around £200 or there's Lee Valley's own version, the Veritas Cabinetmaker's Trimming Plane at around £169. Both strike



Two faces of the souvenir chunk of beech roughly squared with the axe (right) and flattening the sole with the Stanley 9½ block plane (above)



me as extravagant purchases for tools whose significant uses today are trimming plugs or dowels (use a flush-cutting saw) and removing dried glue (use a chisel). I've yet to hear of a 21st Century maker of pianos using a chisel plane, but if that's you I'd love to be proved wrong. Anyway, excited by the super-duper specs of modern tool steels urged upon us by high-end manufacturers I almost bought a brand new chisel plane blade for £80, then remembered I was starting out with a potentially rotten piece of timber, had little idea what I was doing, and the fiver paid on eBay for a new-old-stock No.4 blade felt more appropriate.

While aiming to maximise use of my precious lump of spalted beech the dimensions of the chisel plane would be influenced largely by the two-inch wide No.4 blade which not only determined the plane's width but, bearing in mind the low angle bed characteristic of the species, also required that the body be relatively long. Experimenting with how low I could go with

the bedding angle before the edge of the bed looked too fragile I settled on 17° , which is a couple of degrees higher than the original Stanley 97 and modern Veritas, five degrees higher than the Lie-Nielsen $97\frac{1}{2}$, but one degree lower than the versatile Clifton 3110 when in chisel plane mode. Turning to the design – as much as a ‘door wedge’ of a plane can be designed – I was aiming for the faceted appearance of a stealth fighter, the kind of plane which sneaks below radar.

Having noted from my old beech wood smoothers and jacks that the tough sheets of medullary ray should stand perpendicular to the sole, I roughed out two faces at right angles using my carpenter’s axe, eventually moving to the Stanley $9\frac{1}{2}$ block plane (more of which later) to establish the flat sole as a reference surface. From there I sawed the sides of the piece square and marked the angle of the bed before cutting that as close to the line as I dared. My old Disston panel saw sailed through the job without incident. Working by a combination of rule, eye and luck the plane body finished up at $8\frac{1}{2}$ in x $2\frac{1}{8}$ in, rising to $1\frac{3}{4}$ in at the highest point before sloping rearwards to $\frac{1}{8}$ in at the heel.

Thinking lagged behind acting that day as I moved swiftly to shaping a shallow beech wedge for clamping the blade to the stock, then stood about wondering how these three key components might be joined. After much fiddling I settled on the simplest solution – a couple of $1\frac{1}{4}$ in No.8 bronze screws.

This arrangement allows for lateral and lengthways adjustment of the blade before a quarter turn of the screwdriver clamps all solidly; a little leeway in the clearance holes enables the corner of the blade to peep slightly proud of the side of the plane for reaching into the corner of a rabbet. I chiselled stopped chamfers around the edges, then applied a couple of coats of tung oil to protect and glorify the wood.

If previously I’d been worried about a chisel ‘digging in’ while removing glue or stray fibres – and I’m not sure this had numbered among things keeping me awake at night – then the length and bulk of the chisel plane’s body certainly guarded against that possibility. The rearward slope behind the blade is a great help in getting my hand on the heel, making for a firmly horizontal push. Regarding the geometry of the blade, adding its 25° bevel to the 17° of the bed gave an effective cutting angle of 42° . This is significantly steeper than the bevel of a paring chisel yet the plane works well for the kind of trimming and cleaning up where a chisel might be used, so long as there’s room to manoeuvre. In a confined space my new chisel plane did seem quite a handful, in fact too long and wide. Although a couple of inches shorter than the Stanley 97, I suspect my plane would be more at home in finessing the big boards of a piano than, say, cutting into the corners of a pencil box. What I needed – if I needed a chisel plane at all – was a smaller one.

Lost shoe

When the Stanley $9\frac{1}{2}$ block plane used in making my wooden chisel plane stubbed its toe on a bench dog and lost its sliding shoe I didn’t immediately rejoice at the opportunity of converting it to yet another. The cause of the disaster appeared to have been a weak weld between the shoe and its set screw, or at least a weld too weak for the kind of accidents I have. But there no doubting the 1960s Stanley has a more substantial flanged shoe-to-screw joint than this 2000s version. My repair using epoxy resin held for only a day or two before the shoe again fell off.

Anyway, in this broken block plane I clearly had the makings of a more compact chisel plane. All I had to do was cut away everything beyond the blade’s cutting edge which, although I haven’t seen it done before with a $9\frac{1}{2}$, seems to have been the fate of many a chippy’s No.4 bench plane and No.78 duplex bullnose-rebate plane that’s fallen from a great height onto a concrete floor.

Taking care with scribing sides square to the rear edge of the



Sawing a 17° bed for the blade (above) and cutting a slice of beech to clamp the blade (below)



Two bronze wood screws hold the cap and blade to the bed (above). The chisel plane in spalted beech from a special tree has a 2in blade (below)



Making a metal chisel plane

A wood block below the G-cramp prevents metal-to-metal contact and also aligns the hacksaw while cutting the end from the broken plane (right, Pic.01). Having lost its adjustable shoe the Stanley 912 prepares for its new life as a chisel plane without its toe (below, Pic.02). Using a cardboard template as a guide fair curves were inked behind the rough-sawn ends of the plane before rounding with a file (below right, Pic.03). Smoothing the filed curves on silicon carbide paper supported on a thick glass plate that was recycled from old bathroom scales (bottom, Pic.04). Cleaning glue and fibres from a salvaged oak board using the fully-adjustable 912 chisel plane avoids 'digging in' or damaging the surrounding area (bottom right, Pic.05).



mouth, I cramped the plane to the bench and disposed of the front end using my Eclipse Junior hacksaw guided by an oak block. I then filed one side to a fair curve and made a card template of that to mark side two for filing before further smoothing on silicon carbide paper. Finally I rounded the corners of the blade, partly to guard against leaving tracks but also to prevent me nicking my fingers, as I occasionally do on the protruding corners of rebate planes. Since the blade of this plane is significantly narrower than the body I'd never use it to reach into the corner of a rebate.

At 4½in overall this converted block plane feels satisfyingly solid and is also a nifty performer, requiring only a modicum of down force to take a shaving while also steering more easily. Not the least of its advantages are the separate adjustments for blade extension and lateral positioning retained from its former life, which is one up on the commercial chisel planes.

Of course there was no head-scratching this time over bedding angles and in practice I detect no difference in cutting efficiency between this and my previous effort, which isn't surprising. The metal block plane has a 20° bed which combines with a 25° bevel on the blade to give a cutting edge only two degrees steeper than the wooden plane. Perhaps there would be a difference had I converted a 60½ plane which has a 12° bed, but then again perhaps not if my next experiment is any guide.

The gnat's whiskers

Seeking even greater accessibility I used an old file as the basis of a cranked scraping chisel. For anyone prone to angst over bevel angles and methods of sharpening the efficacy of a 90° 'blunt' edge is sure to provide quick and soothing relief.

My first scraping chisel developed from a worn-down firmer chisel has proved invaluable for working close to edges and even cutting chamfers but its handle prevents working more than 3in from an edge or where the edge is raised. A new cranked scraping chisel made from a bent file has nothing to hold it back, working into just about any corner regardless of mouldings, fiddles, box sides or other obstructions. Its shape offers the privileged pass to 'access all areas'.

Using the hand-powered grinding wheel I ground away its teeth to make a smooth and level reference surface before finishing the end square with a perpendicular edge. Here lay the magical cure for sharpening anxiety, recklessly disregarding everything I'd read about fiddly honing guides and tiddly bevels while plunging the end of the tool into a coarse carborundum wheel as fiery stars of swarf illuminated the workshop. Don't forget to don the safety glasses if you follow suit, and enjoy the moment, then see how this defiantly bluff edge takes shavings wispy as a gnat's whiskers.



The cranked file came with two other bent old files (right), with just a hook at the end to use as a scraper you draw backwards, a bit like over-grown Skarsten scrapers. Grinding the toothed surface of the file (above) to make a cranked scraping chisel



Shaping the chisel's bluff cutting edge was brutally straightforward



Accessing all areas of a small oak box with the cranked scraping chisel

The Long or The Short?

As a corollary to *Robin Gates's* chisel planes, *John Lloyd* asks which length of paring chisel is best



Horizontal chiselling of a tenon shoulder (left) is where the traditional long-bladed paring chisel excels. A selection (above) of old and new paring chisels, and Lie-Nielsen chisels with standard and paring handles (below)



I think that it isn't such a bad idea, in life, to always keep an open mind; this is not meant in a deep, meaningful, philosophical sort of way, but it can mean that with this sort of attitude you might discover something new, and better, rather than just blundering on in the same old way, just because, 'that's how you've always done it!' A case in point is paring chisels; my notion of a paring chisel has always been something with an exceptionally long blade and an unexceptionally short handle, a tool that was typically used by pattern-makers before CNC technology came along and consigned this highly skilled trade to a rather lamentable end.

This slim, long-bladed chisel would never be hit with a mallet and could be used for fine trimming cuts, perhaps to the sides

of deep mortices, using the back as a register to keep things flat and true. I sometimes use one to trim up to a dead-end, where an ordinary bench chisel won't reach, or to level something that's a long way from an edge.

I have known for some time that there are Japanese 'Paring' chisels, these have short blades and long handles, but I always thought that something had been lost in the translation from their Japanese name into English, and I've never really got on very well with Japanese chisels anyway, so I've largely ignored them! I have also been aware that Lie-Nielsen chisels have a 'Paring handle' option for their splendid bevel-edge chisels, but have always held the view that a long handle couldn't possibly turn a standard chisel into a paring chisel, after all any fool knows that

the whole point of a proper paring chisel is that it has a long blade, a longer handle obviously isn't going to have the right effect at all!

However, I also knew that the long Lie-Nielsen 'paring handles' were something to do with the late David Charlesworth and despite him admitting to me one day that he was "not especially good at sawing," any woodworker who had taken the trouble to grow such a fine beard and long mane of hair surely had to have given a chance to explain himself. The ensuing telephone discussion established that, for my part, I don't actually use my traditional, English, long-bladed chisels very often, after all, having to reach into mortices that are deeper than a standard chisel could deal with, is not something that crops up very often in my life; it also established that the



A paring chisel is not designed to be hit (above left), as is a standard chisel. Once the chisel is securely located on the gauge line (left), firm downward pressure is applied with your thumb. For paring a tenon shoulder the handle sits snugly in the palm of the driving hand (above) and transmits the pressure from the body and legs

long Lie-Nielsen 'paring' handles are indeed David's 'fault' and they're modelled on Japanese 'paring' chisels. I also discovered that David's contention was that a long chisel is definitely better for 'horizontal paring', for example trimming things like dovetails and the shoulders of tenons, than a standard length bevel-edge chisel. Why?

Well, we decided that the main reason is that it's possible to have better directional control of the chisel, any relatively coarse movement of the end of the handle of a long chisel is going to translate into a much finer change in direction at the business end, meaning that finer adjustments to a chisel's direction of cut are possible with a longer chisel. We couldn't, between us, come up with any other concrete, scientific reason for using a long chisel for 'paring', so I decided to go and dig out one of my old long-bladed paring chisels and have a go at some horizontal paring. I also asked David to send me one of his spare Lie-Nielsen paring handles so that I could do a direct comparison between the same blade when

fitted with a standard, or a paring handle. The result of my 'test' left me rather bemused, but with the benefit of the 'open mind' policy I had to accept the assertion that a long handled chisel just 'feels' better when paring horizontally, I still haven't worked out why exactly this should be the case, could it be that it forces you into a slightly more upright position which is just more effective for this sort of work? And why hadn't it ever occurred to me to try a long paring chisel for paring work other than into deep mortices and dead ends? I don't know, but I do know that it definitely does feel better! And on that bombshell, it's time to look at chisels in a bit more detail, with a bit of technique for using them safely. After all this is a vital, basic skill that allows you to accurately shape components and cut joints, ideally in a way that doesn't put more pressure on the, already overstretched, A&E department at your local hospital.

Chisel types

There are four main chisel types, not

counting curved chisels: Bevel-edged, Firmer, Mortice and Paring. Firmer chisels are the ones with the square sides and are designed for coarser work, so they're not generally the first choice for fine woodworking. Mortice chisels also have square edges, but are chunkier and very strong, allowing them to be used to lever the waste material from a mortice.

Bevel-edged and paring chisels are in general quite similar, both having bevelled edges, but as mentioned earlier, paring chisels are longer. The traditional English paring chisel has a long, fine, slightly flexible blade, whereas a Japanese paring chisel, or a Lie-Nielsen chisel fitted with a paring handle, has a shorter rather more substantial blade and a long, straight handle.

Bevel angles

I have no intention of getting into deep involved dissertation on the relative merits of old steel versus new, but it is necessary to have a brief look at steel because it does have an effect on the bevel angles



Paring a shoulder (above left) can be a better option than using a shoulder plane on a tenon. Paring the sockets for a lapped dovetail with a long paring chisel (above right) gives her finer directional control of the business end of the chisel. Using the Lie-Nielsen bevel-edged chisel with long paring handle (left). For very fine paring work (between dovetails, for instance (right), a short chisel with a short grip and fingers touching the wood gives maximum control



that are possible. Don't allow yourself to get all misty-eyed about old chisels and old steel being the best. Some old high-carbon chisels are indeed pretty good, but the alloying of modern steel is likely to be much more accurate and consistent than old steel, although not all of it will hold a good edge.

In general, the steel used in Japanese and 'A2' chisels will be more brittle than 'O1' and will therefore need a higher bevel angle, particularly for chopping. For paring it should be possible to go for a lower angle for all steels. I've heard people claim to use bevel angles of less than 20° for paring, but I personally won't go below 25° because I find that any edge ground close to 20° is just too fragile. Also, if you're using the Lie-Nielsen chisels with either the standard or paring handle, you don't really want to be re-grinding to a different angle every time you change the handles over. So I would stick to somewhere between 25–30°. A bit of trial and error will help you to home in on an angle that will work well for any particular chisel.

Chopping

There are two main types of cut that can be performed with a chisel: 'Chopping' which generally involves hitting the handle with a mallet, and 'Paring', which is a fine, slicing cut – no hitting involved here – it's all to do with fine trimming and accurate adjustments. This might infer that chopping is a rather crude operation, but nothing could be further from the truth. Accurate chopping into a knife line is critical for producing crisp dovetails.

People have different methods of holding a chisel for chopping; I like to hold the blade of the chisel quite low down, but for this to work successfully the chisel must not be too long, otherwise it will waver about, making it very difficult to maintain an accurate angle. Some people like to hold the handle of the chisel, but the common feature of both holds is that the elbow is in contact with the bench, this creates something of a triangle with the bench, bracing the arm and keeping the chisel steady.

The low grip means that I can have my left hand in contact with the work which

can give a little more control, I think. I generally don't cramp the work-piece down for chopping, I prefer to lean on the workpiece with my left elbow, this could perhaps be seen as being a little precarious but it is a little quicker because no cramps are involved. Positioning the work-piece over the leg of the bench is also helpful as all the force will be transmitted into cutting the wood rather than turning the bench-top into a trampoline.

'Paring', as we've already discovered, can potentially be easier and more accurate with a long chisel, but a standard chisel will work too; after all, I've managed to do most of my paring with a standard length chisel for over 20 years! For all work with chisels the grip is important, and to prevent the chance of any bloodletting during paring activities, just remember one thing, keep all soft, squidgy, pink bits behind the sharp, shiny, pointy bit. The thing you're working on must be either cramped down to the bench, or held in a vice, because both hands will be required to control the chisel.

As soon as you start using a chisel one-



Using a chisel to trim a mitre calls for a slicing cut (above). Using your body and legs to drive the chisel (right). A long-bladed paring chisel making a stopped cut (below)



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handed (with the exception of the method mentioned below), a visit to the First Aid kit will not be far away!

The main thing you need to know about paring is that you don't use your arm muscles to drive the chisel, the secret is to use your legs /body weight. A wide stance with the legs will keep you nice and stable, back leg straight, front leg bent; the hand holding the handle of the chisel should have a nice light grip, the end of the chisel's handle nestles in the palm of your hand with the elbow of this arm just tucked into your side. The other hand holds the blade of the chisel very close to the cutting edge, this hand is used to position the blade carefully against the work-piece with the thumb and forefinger pinching the blade and the side of the forefinger resting against the work-piece.

This pinching grip keeps control of the blade and prevents it flying forwards, potentially creating carnage on the far side of the work-piece. So, to make the cut you just need to position the blade and bend your front leg a bit, simple! The hand that's pinching the blade also has to apply pressure to the blade to ensure an accurate and even cut. For the horizontal

shoulder of a tenon this will require downward pressure from the thumb, but when trimming the vertical faces of dovetail pins one side of the pin will require pressure from the thumb, and the other side, pressure from the fingers. For paring a shoulder, having located the chisel in the scribe line, a slight up-hill cut can be a good idea, with subsequent cuts creeping down to horizontal. For the start of each successive paring cut it is important that the very tip of the chisel is sitting on the scribe line, which will show as a slightly lighter strip along the very edge of the shoulder, firm downward pressure is then applied to the top of the chisel as it is driven forwards, this will ensure that the chisel does not twist as the cut is being made. Do I need to mention razor sharp chisels being vital for success for all chisel work? Well, as always, they are!

Slicing cut

An alternative to driving the chisel forwards to make a paring cut is the slicing cut. This cut can be used successfully for things like cutting mitres, perhaps with the help of a 45 degree jig. A nice wide, standard length, chisel works

well for this sort of trimming. It's still a two handed operation but this time the chisel is moved laterally, pivoting around the thumb of the front hand which is applying firm downward pressure, to make a very controlled slicing cut .

One-handed cut

The exception to the two handed paring rule is for fine, delicate, trimming work, for example, between dovetails. In this instance a narrow, standard length, chisel is required, and this is held with a one-handed 'short grip', meaning that the chisel is gripped close to the end of the blade and driven forwards using the thumb and index finger, which have a pinching grip on the blade. To keep safe and accurate, the tips of the middle and 'ring' fingers must be in contact with the surface of the workpiece. I have heard people suggest that this grip is dangerous, but as long as it is done as described it is actually completely safe.

John Lloyd runs courses in Sussex, England and can be followed on Instagram @john_lloyd_fine_furniture or by visiting johnlloydfinefurniture.co.uk.

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SHARPENING & RESTORING Honed

Germán Peraire, Spain

Skew Knife Honing Jig

Germán Peraire expands on the making of a jig inspired by the late David Charlesworth from QM13



David's skew honing guide (left) is excellent for keeping marking knives sharp. Only spear-points without handles (left, above) can be sharpened in the jig. A student's knife shows signs of misuse (right)



David Charlesworth has been the most important influence on my work. I have long studied and practised the brilliantly explained methods in his books and DVDs. Although I never met him in person, he's always felt like a close friend. He sadly passed away on 22nd May; so recently.

As a tribute to David, I briefly offered my take on a honing jig he inspired, without showing exactly how it can be made, which I hope now to resolve with instructions, and overleaf a step-by-step photographic guide. Being a teacher myself, I can't rely on inexperienced students to bring quality tools as sharp as they can be. Hence, I provide them with all they need to begin

my courses and spend considerable time sharpening! One of the tools I've been most reluctant to sharpen is marking knives because they had to be done free-hand. Repeating the same bevel angles (which is essential for speed and consistency) was, at its best, guesswork. To make things more awkward, inexperienced users tend to snap off their fine points and rub the edges against the steel squares, which calls for continuous grinding. Tired of it, I set out to find a more convenient system.

In his YouTube video *Spear Point Marking Knife Grinding & Honing Jig*, David presented the device as the perfect answer. Since he never made an article on how to build it, I had to figure it out

by myself. I was astonished about its performance: since then, I sharpen most of my marking knives as easily as any chisel. The results are not only accurate but also look crisp and tidy. Thrilled with it, in December 2021 I asked him for permission to make a how-to article and he replied that he "would be delighted" about it.

A nice weekend project

Although it seems a bit cumbersome, making this device is an easy exercise in hand tool woodworking. To do it properly, we first have to look at its morphology.

The tool fits the upper compartment of an Eclipse-type sharpening jig. It consists of a top plate (115x48x8mm) screwed to

a bottom plate to clamp the knife in place. The bottom plate has a recess against which the knife registers consistently. Adjusting the tension of the screws will accommodate thicker blades to a certain extent. The grinding plate clicks in place by two indexing pins to provide support against my Tormek bar. I'm sure it can be adapted to suit many other grinders, man-powered or otherwise.

The starting point is a piece of stock dimensioned to 35x4.8x0.8 cm. I like to use a jack or jointer plane on its side to create a reference edge (that is an imperceptibly concave edge) without losing squareness. Then, I cross-cut it into two 12cm long components and keep the rest for later. Make sure to mark the reference edge in all three parts (Pic.01).

The marking of the top plate is based on a centre line and consists of the screw positions and the spear-point angle (Pic.02). This is marked from the reference edge with a bevel gauge set to 120°.

Next is drilling the screw clearance holes in the top plate (Pic.03). Then, I tape both components together (make sure to keep the reference edges on the same side) and mark the pilot holes with the same drill bit (Pic.04). Finally, countersink for the screw heads. Since the stock is narrow, the screw threads will have more purchase if we let them poke through the other side and file them flush with the plate (Pic.05). If we have worked carefully, the components should register reasonably well. A few shavings can correct a light discrepancy as long as the opposite edges on either side remain parallel.

Now that both plates are indexed, we can cut the spear-point with a tenon saw (Pic.06) and unscrew them to work on the bottom plate. I mark for a rebate along the spear-point, equally at 120°. Its width should be about 3-5mm narrower than the knife and slightly shallower than the knife's thickness. A chiselled step (Pic.07). protects the knife lines and a router plane is the best choice to remove the waste



leaving a flat surface. If we leave the bottom plate as it is now, it will rub against the sharpening stones.

That is why its tip must be cut off (Pic.08) and a shallow bevel imposed on the underside (Pic.09).

Now we can use the offcut we saved at the beginning to make the removable grinding plate. With one edge shot square, it is taped against the bottom plate as it will be installed (Pic.10). Its size relates to your grinding wheel rest, so it will need to be adapted. I found that 46mm fits my Tormek machine well (right).

David Charlesworth talked about using screws with their heads removed as indexing pins, but having tried that, I still prefer to cut two 15mm-long dowels from a 3mm brass rod (Pic.12). I glued those in place with epoxy. The final touch for this component is filing two fingerholds for more comfortable use (Pic.14).

With that done, it can be flushed with the rest of the guide.

Final touches and angle set-up

A strong, waterproof finish is required for this application. My choice is four thin coats of water-based varnish. You shouldn't rely on any finish, however, as water always finds its way into the wood. If you dry the jig after every use, I'm convinced it will last you a lifetime.

It's quite handy to record the 30° projection on the edge of the tool. This working projection is easily found with a

Creating a reference edge (above). The grinding plate provides support against a Tormek bar (below), but can be adapted to suit many other grinders, man-powered or otherwise



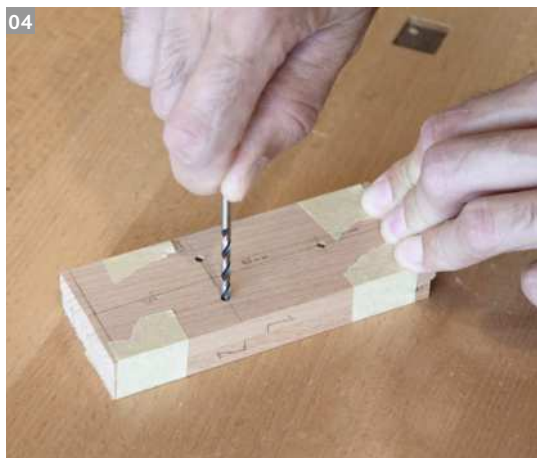
digital angle box or a bevel gauge, but the little device shown at the right of the jig is the most convenient solution (also Mr Charlesworth's idea). The knife must be always held in the same position to repeat the same projection. I always set it with the end of the sharp edge lined up with the symmetry axis of the jig, as shown in the photograph. Turn the page for your full step-by-step photographic making manual.

Since I made this jig, I take great pleasure in sharpening my knives. It is always an opportunity to pause for a moment and remember that brilliant man who greatly influenced so many of us.

Visit *Germán* at germanperaire.com or follow him @germanperaire on Instagram.

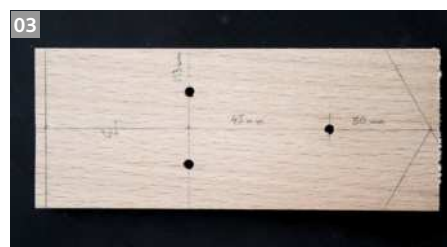
Making a Skew Honing Guide

German Peraire shows a step-by-step photographic guide



Making the Skew Guide

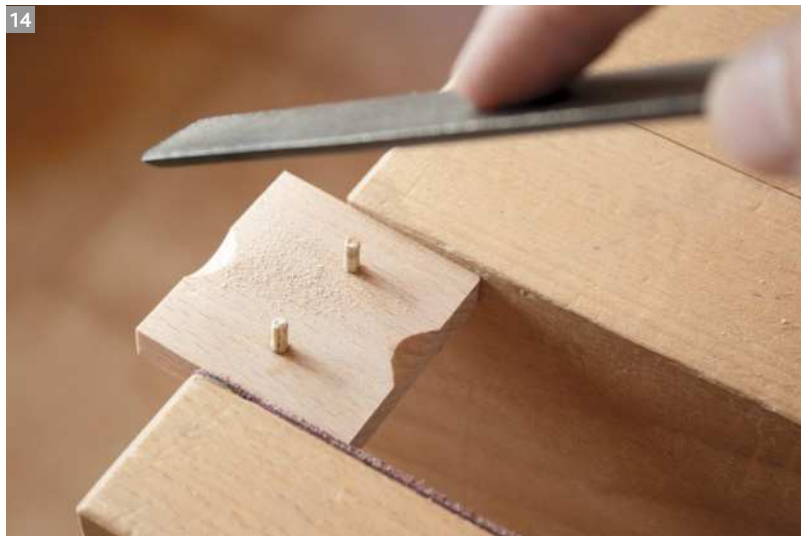
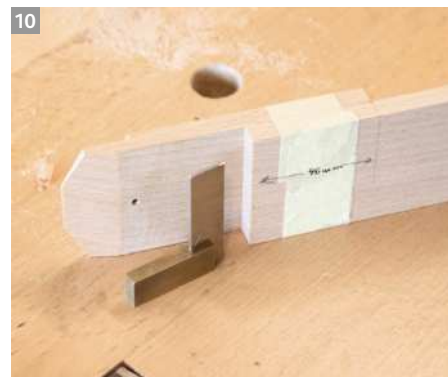
Anatomy of the disassembled jig (Pic.01, left). The marking is done with a few core tools (Pics.02 & 03 right). Marking for the pilot holes through the clearance holes (Pic.04, left). The protruding screws are filed flush with the plate (Pic.05, below). Cutting the spear point (Pic.06, bottom right) and chiselling the knife recess before removing the waste with a router plane (Pic.07, below left). The tip of the spear point is cut off and bevelled (Pic.08, bottom left)





Making the Skew Guide

Bevelling the tip of the bottom plate (Pic.09, left). The grinding plate is carefully attached to the bottom plate, drilling through both (Pics.10 & 11, right and below right). Gluing the brass pins in place (Pic.12, below, below right). The grinding plate is flushed with the rest of the jig (Pic.13, bottom right) and the finger holds are filed (Pic.14, bottom left). A waterproof finish will help maintain the tool in good condition (Pic.15, below, below). Marking out the 30° projection (Pic.16, below left). The knife must be installed in the same position for consistent results (Pic.17, below)



Finding the Keys to Tools

Starting a woodworking journey, pianist *Martin Sturfält* builds a kitchen and welcomes an obsession

I grew up in a small village in the countryside in Sweden. I loved building stuff as a kid; tree houses and wooden cars. My paternal grandfather was a school teacher and an organist. Back in those days, they did a lot of crafts in school, and he was really, really good with his hands, and he made all sorts of nice, Slöjd things, and whenever I stayed with my grandparents, I would make things with him. We had craft lessons in school too, of course, and I made an electric guitar, and hinged boxes and those kinds of things. You were taught the basics of planing and chisel work but after that, it was all music for me. I ended up in London for nine years, studying and working as a pianist.

Then I married Karna, and ended up moving from Highbury, straight to the middle of nowhere, 125km west of Stockholm, Sweden, near a little town called Flen, where we are now on a small farm. Once you're there, of course, sooner or later, you start tinkering with stuff. The first thing I did was to build a hen house. We were living at my parents-in-law's farm in those days, 11 years ago, and my father-in-law showed me how you do this and you do that, and that you build walls with 600mm between the studs, and so forth. It was quite rough, but I was working with my hands again.

Building a house

Eventually we bought our own little part of the farm and then we renovated a house so that was the first time I was building something which was with a little bit more precision, and it got me on to woodworking specifically. I built more and more over the years. First a workshop garage, and then we built our own house, the main part of which was made by highly-specialised builders from northern Sweden, making all the bespoke parts of the traditional log-frame structure by hand with axes and drawknives (and chainsaws). I spent a lot of time with them and helped them erect the frame.

All the big structural stuff was done by them, but I did the interior myself, building the inner walls and other things. Having now spent so much time with the log-frame craftspeople, and seen their skilled work up close, it seemed almost a crime to put a pre-fab kitchen into a house like ours. We realised that we'd really like a proper solid wood kitchen. But everything would



Martin Sturfält is a freelance pianist, was a novice woodworker in early 2019, but can now cut dovetails readily. One of the drawers for a kitchen cabinet in his new house became a tool tray (below) for his son because the layout was wrong



have to be customised and commissioned, which was out of our price range. We couldn't have done that, and I was keen to have a go.

We knew a friend called Anders Bergfjord who had done his own kitchen. So we went and had dinner with Anders and his wife, and he showed me what he'd done. Then he said, and this is what got me going: "You could look on YouTube, you know. There's a really interesting guy who teaches you extremely well how to use hand-tools, from sharpening them to straightening stock and all that." And of

PHOTO COURTESY OF BAVARIAN RADIO



Having started with very few hand-tools, Martin's garage workshop is full of vintage items



course, that was Paul Sellers. And down the rabbit hole I went. That's what really got me started.

At that time, I only had one plane. Not that I knew it then, it was a Bailey pattern No.4, maybe 1960s or 1970s, made by a Swedish company called Memo. I still have it for rough outdoor use, and it can be sharpened perfectly well. I didn't know about Bailey, but I found out soon enough.

Until then I'd been using mainly power-tools. Planing is not something that had ever really occurred to me. There are so many uses for a plane, but it's not something that you ever come into contact with unless you start doing finer woodworking, at least not in my sort of environment. I was using planes in school in Crafts class, but all cutting tools can be horribly frustrating.

Planing with anything but razor sharp isn't much fun, so I had never really got that sensation before I was watching Paul Sellers videos, but the sound that a really sharp plane made was enough to inspire me. I had a go at sharpening that cheap No.4 plane, and I was hooked. When you first get that feeling, you'll take out boards and plane them just for the sake of it, just because the sensation is so good. Yeah, I was frustrated, but by then the main incentive was to build the kitchen. However, there were 100 other things to



Building a house

Martin and Karna's house was built like a traditional Swedish log-frame. Starting the first level (above) with the first floor in place (below), and then the trusses added (bottom). The house before panelling and insulation (below right) and afterwards, nearly complete (bottom right). Work inside the house included a brick chimney stack made by a local stonemason (right)



do with the house that needed building and I didn't get going with the kitchen build straightaway.

We professional musicians, we practise and practise and practise. I've always thought that to teach oneself new skills is one of the best things one can do. It's so rewarding, isn't it, to notice that you get better. Musicians know that you practise to improve, so that's what I set out to do. I would just get wood off the firewood pile and straighten it; I was determined to make it square.

Learning a new skill is a lovely feeling, but it is also a little frustrating at first. I have been playing the piano all my life, and improving that just gets harder and harder (but always possible). You can improve so much when you are starting a new skill from scratch. That is the real driving force, wanting to improve. After a while you realise that you have got a lot better in a relatively short time.

I love the idea of having done something yourself and having been through the entire process, as I came to do with the cabinet doors for the kitchen. We would cut a tree down, on the farm, then I milled it, stacked it and let it dry. My father-in-law, Christer, happens to have a Jonsered mill and if an opportunity is there, I can't stop myself. I'm a bit obsessive with these things. I have a little bit of land myself so I can have the timber for free. I pay with the hours that it takes to mill it.

The mill is an electric model with a chainsaw blade and rip-teeth chain. The saw is fitted permanently in the jig, on a sled running on rails over the log. It is pretty basic, but surprisingly versatile and if you want to mill longer logs you can add extra rails. My father-in-law uses it a lot as he has nearly 100 acres of woodland. He fells his own trees and makes his own construction timber for building and for panelling. It's very good for that, and I've milled quite a bit of oak on it, though I did have to keep filing the chain fairly often.

Any old apple

I'm always on the lookout for apple wood, because I think the chocolate brown colours are just so nice. One day I was taking some rubbish to the local recycling centre, and as I was driving there someone driving in front of me had a trailer with what looked like a tree trunk. And I thought it might be a fruit tree.

So I followed them, got out of my car at the rubbish tip and asked: "Are you chucking that away?" They thought I was a loony. It was beautifully straight and rather big, the lowest part of the trunk of an apple tree. I took it home, and I milled it, and after I had sawn the first board I noticed there was a completely straight section inside. It is about 2in wide, right



down the middle, inside the tree. Perhaps that was the point at which the tree was grafted onto the rootstock some hundred years ago.

Mortise and tenons

Despite my love of milling, for the kitchen carcasses, I bought 600mm wide stripwood boards. These are 22mm thick and are good quality; you buy them dried down to 6-8%. I obviously made drawings, and built simple carcasses, each with two side panels screwed to the base, so you don't see any screw heads or anything like that. Then the face fronts were made, and that's when I began learning mortise and tenon joinery.

I didn't know there was such a thing as a mortise and tenon before I discovered Paul Sellers. One of the first videos of his that I watched was about the three common joints: the housing dado; the mortise and tenon; and dovetails.

I made the doors out of quite serious quantities of aspen, which we had milled ourselves, and then I used a jointer and a thicknesser for the panels, due to the sheer quantity I needed to process. I realised I needed a plough plane for the rails and stiles, and for the tenons I needed a router plane. And that's when I started visiting eBay. I bought vintage tools

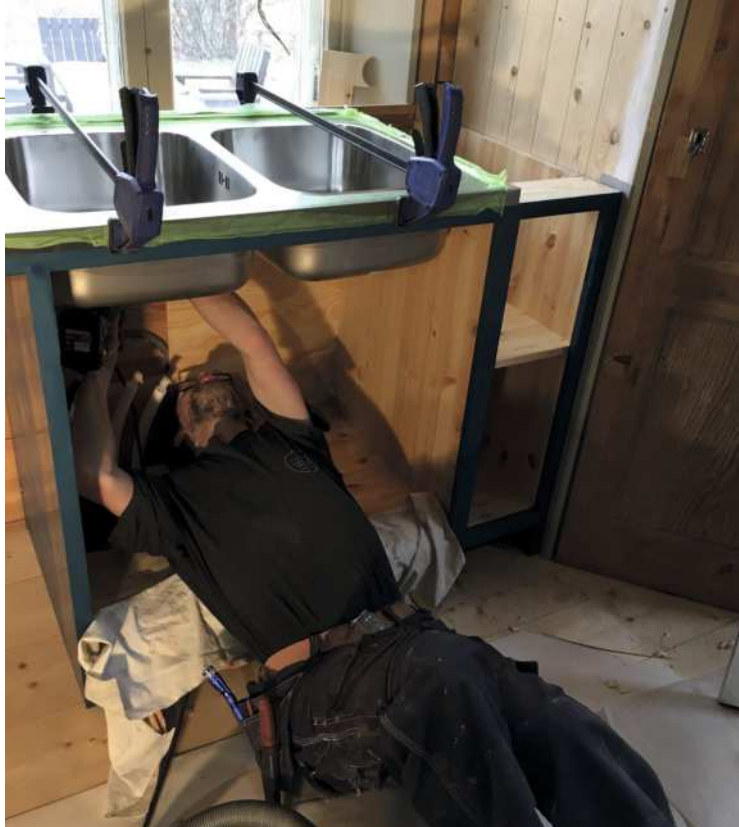


Martin has recently started to buy some wooden moulding planes (left). He also loves milling his own wood (above), and when recycling some apple wood he came across a trunk (below) in which a straight plank appeared



entirely; no new tools at all. My planes are mainly Stanleys, but I now have a lot of wooden planes as well, which I haven't ended up using much because I have to say that it is handier to use the adjustment wheel on Bailey pattern planes. I was aware of the Bailey pattern, certainly, but I wasn't aware of any specialty planes, and card scrapers, and all those things.

These days I have quite a large tool collection, but I still keep buying stuff. Recently I bought a box of planes because one of them was a rather interesting moulding plane, but I haven't opened the package yet. It's still waiting for collection in the post office in Flen.



From milling to planing

Freshly milled aspen ready to be stacked for drying in the barn (top left), which has then been resawn (left). When Martin decided they couldn't afford having the kitchen made by someone else, he started construction himself (above). More cabinets kept appearing as the kitchen was built (below). One of the first projects he completed after discovering Paul Sellers' videos was replacing the threshold on an old doorway (below left), when he had nothing but a very basic Bailey No.4 smoothing plane (bottom), bought for a fiver some years previously



Final Drawer Dovetails

Derek Cohen cuts through-dovetails the Charlesworth Way for the back of a drawer

The lapped dovetails for the drawer front were completed in the last issue (QM13). The drawer front is held in a sticking board and the groove for the drawer bottom is ploughed (Pic.1). Grooves are not ploughed into the drawer sides as these are only 1/4in (6mm) thick, and instead the drawer bottom will be held by drawer slips. The drawer front is put aside as we turn to the drawer back.

The drawer back is cut to size, which is exactly the same width as the drawer front. Its height needs to take into account the drawer slips, as well as being lowered 1/4in (6mm) below the sides. This is to aid in releasing air and creating space for a chamfer to ease entry into the case. As a result, the through dovetails at the back must be positioned to take these aspects into account (Pic.2).

After the tails are cut at the rear of the drawer sides, they are transferred to the pin board/drawer back. Once again blue tape is used to aid in visibility (Pic.3). In aligning the two boards, it is imperative that the bottom of the sides is square to the drawer back, as with the drawer front. Failure to achieve a perfect square here will lead to a drawer that rocks when placed on a flat surface. It will bind in the drawer case.

Once the marks have been transferred, and the pins sawn and their waste cleared with a fretsaw, careful chisel work needs to be done to ensure that the insides are coplanar and not bruised. The challenge, when chopping the last of the waste against the base line, is to avoid damaging the other side of the board with a chisel that shoots through. To do this, I have applied a technique of David's which he called 'tenting'. In this you slope the chisel away from the opposite side (Pic.4). This is done on both sides, and the centre of the socket ends up resembling a tent. To create a flat surface inside the socket, set the board in the vise and pare from each side. Control the depth of the chisel with a squeeze of the fingers. I also recommend working from the show side of the board last (in case you lose control and the chisel does shoot through). This way any damage will not be seen (Pic.5).

Once we are confident that all parts fit together, we are ready for the glue up. I add glue to just one side of the joint. This has never failed. The drawer carcass is clamped in a squaring jig pioneered by Andrew Crawford, boxmaker extraordinaire (Pic.6). Once dry, the drawer carcass is fitted to its case. Fine tuning/planing of sides makes use of a fixture for holding the carcass (Pic.7).

Only now can the slips be added. The slips are seen in the completed drawer (Pic.12). The purpose of slips is two-fold: firstly, to provide a groove for the drawer bottom, since the drawer sides are too thin for a groove; secondly, to add registration area to the underside of the sides, which are too thin on their own.

The easiest way to make slips is to first plough the groove for the drawer sides (Pic.8). David always liked to add a rounded top to the slip, which added character and a nice detail. I recommend a beading plane (Pic.9). Now simply rip away the slip section (Pic.10).

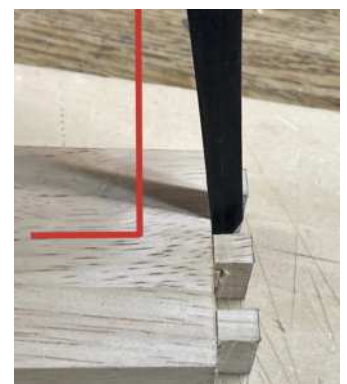
The notable features in the completed drawer (Pic.11) are the lowered drawer back, its rounded top, and the chamfered ends. Even for a drawer made of scraps for this demonstration, I think that David would approve. The rear view (Pic.13) reveals the extra width offered by the slips. This drawer bottom is made from 1/4in (6mm) thick ply. I usually build bottoms from solid wood, and the ply here has been treated as if solid wood – with the grain running side-to-side. This ensures that any movement will be towards the rear of the drawer, and not instead expand the sides (which would cause the drawer to stick). The far end of the drawer bottom is held with a round-headed screw. The drawer bottom was allowed to move around it via a slot (Pic.14). The completed drawer (Pic.15) is designed by David Charlesworth.



While the drawer front is held in a sticking board, the groove for the drawer bottom is ploughed (above, Pic.1)



Marking up the tails with blue tape for visibility (above, Pic.3), with the tail positions transferred onto blue tape (left, Pic.2). Slope the chisel away from the opposite side when 'tenting' the sockets (Pic.4, below)



Drawer Assembly

Chiselling the sockets (left, Pic.5), working from the show side last to reduce the risk of damage as the chisel exits. The drawer is assembled in a jig (right, Pic.6) pioneered by the remarkable boxmaker, Andrew Crawford. Fine-tuning the drawer sides with the assembled drawer held on a jig in the vice (below left, Pic.7). The easiest way to make slips is to first plough the groove for the drawer sides (below, Pic.8). Derek recommends a beading plane to round the top of the slips (below right, Pic.9)



The slips can be seen in the completed drawer (below, Pic.12). The rear view (above, Pic.13) reveals the extra width offered by the slips



The notable features in the drawer (above, Pic.11) are the lowered drawer back. The completed drawer was designed by David Charlesworth (below, Pic.15)

Having beaded the slip you can saw it off (above, Pic.10). The drawer bottom is allowed to move in a slot (below, Pic.14)



Learning by Numbers

Ethan Sincox promotes taking woodwork courses, learning how to choose tools and techniques

For the last 15 years, I've made an effort to attend at least one woodworking class annually. There were a few years recently when that didn't happen, for obvious reasons, but for the most part I've successfully met this goal. The classes with projects have varied widely, including things like how to cut the dovetail joint, tuning up hand planes, making a dovetail jewelry box, building my very own backsaw, and building a boarded bookshelf from *The Anarchist's Design* book.

Weekend seminars or classes have covered topics as specific as how to sharpen a handsaw or focused on one major woodworking topic, like finishes. Others have been more general, like shop and equipment safety or an introduction to using hand-tools. Over the years, I've met and learned directly from some fantastic professional woodworkers, including Marc Adams, Matt Cianci, Megan Fitzpatrick, Jeff Jewitt, Frank Klausz, Thomas Lie-Nielsen, David Marks and Chris Schwarz.

This year, after a year of delays due to Covid-related travel restrictions, I finally got to attend Derek Jones' class on making a cricket table. It was originally something I'd purchased for myself for my 48th birthday in 2021, but it ended up being 49-year-old me who made the table. It was worth the wait. Because of Instagram and Bench.Talk.101, Derek and I have known each other for a number of years now, but this was the first time we'd actually met in person. The cricket table class took place in the Lost Art Press classroom in Covington, Kentucky, which is about a six-hour drive from my shop in Missouri. Normally that would seem like a lot of driving; however, having just completed 30 hours of travelling to and from Florida the prior week, this was but a drop in the hat!

Megan Fitzpatrick from Lost Art Press was on hand to make sure Derek's class went smoothly. She and I have known each other for about a decade now. Within the first five minutes of showing up on the first day, Megan asked me a question she's asked me before: "Why are you taking a class you could probably teach?" I don't think I've ever given her a really solid answer to that question, but if you'll let me bend your ear for a few minutes, I'll tell you! Hopefully Megan will finally get her proper answer as well, as I'm pretty sure she is a regular reader of *Quercus*.

Isolated hobby

Unless it's your profession, woodworking is typically an isolated hobby. We do have some outlets like social media, forums, and local or on-line woodworking guilds, but much of our actual shop time is solitary. While I often require that time alone to better focus on my projects, I also enjoy human interaction and input. What's more, I've found if I spent too much time working without evaluation from others, my work tends to suffer. This brings to mind the proverbial idea of working in a vacuum, where one's work isn't affected by any outside influences or information.

Life abhors a vacuum, and so do I. In fact, I deeply crave the feedback of my peers. This has been true ever since my days at university when I was working towards my BA in Art History. In pursuit of my degree, I ended up taking a large number of studio art classes: drawing I-II-III, painting I-II, design I-II, fibres, and photography, come to mind, but there were more. I took introduction and advanced classes in almost every medium I could. In truth, I did not require all of them for my degree program.



The 9ft-long French Roubo bench (left) was nice to use for a few days, but I really missed my Benchcrafted leg vice. Trimming the end of a baton. The green kilt is from Utilikilts (above)



Derek (second from right) demonstrating a step to the class

I just really loved taking art classes, so I managed to slip in as many as I could get past my academic advisor.

All those studio art classes had something in common, a peer-review process. The Fine Art professors agreed this needed to be a part of every studio art class. Every few weeks, all of the students in a class would gather their current work and meet up in the third-floor lounge, near our fine art classrooms. There, we conducted a peer review session where everyone would present their work in turn and receive some piece of constructive feedback from every other student in the class.

This show-and-tell review experience was received with varied reactions. I know some fantastic artists who dropped out of the Studio Art Degree program because they could not handle receiving or giving peer reviews. Most of the time it was the receiving of honest feedback from other students that they could not take, as you might imagine. A much larger group of students simply accepted it as something they needed to do. There was only a small number of students in each class who thrived on this experience as I did.

Those who stuck it out learned some great life skills they would carry with them into the real world. Being able to take and process criticism in a healthy way is something every person should be able to do, not just artists. In addition to learning how to receive comments, we also learned how to give proper feedback. Newer students quickly learned they would receive criticism at about the same level as they gave it to other students. So, if someone was just plain mean or obnoxious with their criticism, they would get that energy right back, sometimes

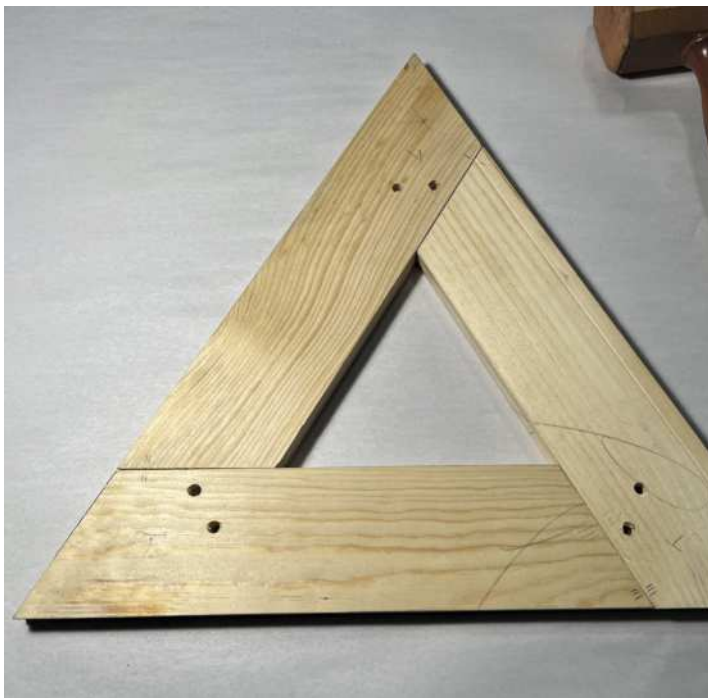
as much as 30-fold, from the other students. It never took long for that sort to either drop the class or try to provide constructive feedback.

Duplicating reviews

I have yet to find a way of successfully duplicating that peer review environment I loved so much in school, but I will always seek it out. The closest environment I have come to so far is in the small, somewhat formal, in-person classes I take. It's sort of "peer review light" if you will. It is a healthy environment where woodworkers can do small things to help fellow woodworkers improve in some way. In Derek's cricket table class, for example, I observed or participated in a number of instances where one of the students saw another student struggling with a part of the project or a tool and quietly offered an alternative idea or corrected an improper form. That is constructive criticism, in case you were wondering what it looked like. And in every instance, that struggling woodworker graciously accepted the help or input and became a better woodworker as a result.

Another reason I take woodworking classes is because I would eventually like to teach and pass on some of the knowledge I've acquired over the years. Teaching others is more than just having the knowledge and a willingness to impart it to others. Everyone learns things a little differently from others and you must be able to offer that information in a variety of ways. While public speaking and interaction with others is something I do quite naturally, I believe there is still a lot for me to learn. Attending a variety of woodworking classes, taught by a spectrum of teachers, exposes me to different teaching methods. I get to see first-hand what works and what doesn't work in a 'classroom' environment.

I quite enjoyed Derek's class and methods of teaching. He started off the class by laying out the three days and what needed to be done by the end of the first two in order to successfully leave at the end of day three with a fully-assembled table. It's so important to have the class goals clearly outlined. This makes them easier to achieve and ensures the class stays on track. As we started each step of building our cricket tables, Derek



The batons were a little complicated, involving 60° angles, half laps and drawbored joints (above). Making round tenons with a rasp (right)



would offer one or two ways of completing the task, depending on skill levels or tools you wanted to use or had on hand. What I appreciated most about this is that it gave me some options to do a task using a method I wanted to learn (if I wasn't behind on my project) or complete it using a method I already knew (if I was behind the others and needed to catch up).

And that brings me to the last (at least for this article) reason why I continue to take woodworking classes that I could probably teach. I always learn something new in these classes, whether it is a different method of making a joint, a new way to use a tool I own, or some important revelation. I'm always open to improving myself and adding a new skill set to my repertoire is a great way to do that.

One of the new skills I learned from the cricket table class was a quick and easy way Derek showed us for making rounded tenons using a rasp. We made these tenons on the legs, to attach them to the battens and top, and on the rungs, to connect the legs together. Begin by marking out the length of the tenon on all four sides of the leg, adding about $\frac{3}{8}$ in to the length to account for the transition, and a centred circle on the end grain that indicates the diameter. Use the rounded side of the rasp to file the four flat sides of the leg nearest the marked line, stopping just before you reach the tenon diameter. This is also when you should file most of the transition from leg to tenon. The easiest way to check if you are close to the desired tenon thickness is with an open wrench/spanner of that size. Present it to the tenon periodically as you rasp to make sure you don't take away too much wood. Once you get close to the spanner fitting around the tenon, shift focus to

the end of the tenon and rotate the leg slightly so you can file flats on the four corners. Continue knocking down the corners with the rasp until you end up with a round tenon. I periodically checked the diameter of the tenon with a test hole in some scrap wood to make sure I didn't remove too much wood. I found it to be a fun method and it was certainly easier than some of the round tenoning jigs I use with a brace. However, I think what I'll end up doing in the future is a combination of the two, where I start my round tenons with a rasp and then finish them off more easily and accurately with the round tenon jig.

I had a bit of time to reflect on my latest class experience during the six-hour drive back to Missouri and figure out what my take-aways were. Once I didn't need my Google Maps for a while, I used the voice memo app on my iPhone to make some lists. I dictated a list of mistakes I'd made (this is a good thing) and thought about what I could do to prevent those same slip-ups in the future. I did not share that list with anyone (this is a bad thing). I also came up with a list of lessons I'd learned the easy way (the hard way lessons were covered in the above sentence on mistakes). I made a list for teaching take-aways, a list of ideas for a better way to travel with hand-tools, a (small) list of tools I might consider buying that would be useful for making this table again at home, and finally I made a list of classes I'd love to take in the future!

Ethan Sincox. The Kilted Woodworker can be reached on Instagram (@thekiltedwoodworker) or via email (thekiltedwoodworker@gmail.com).

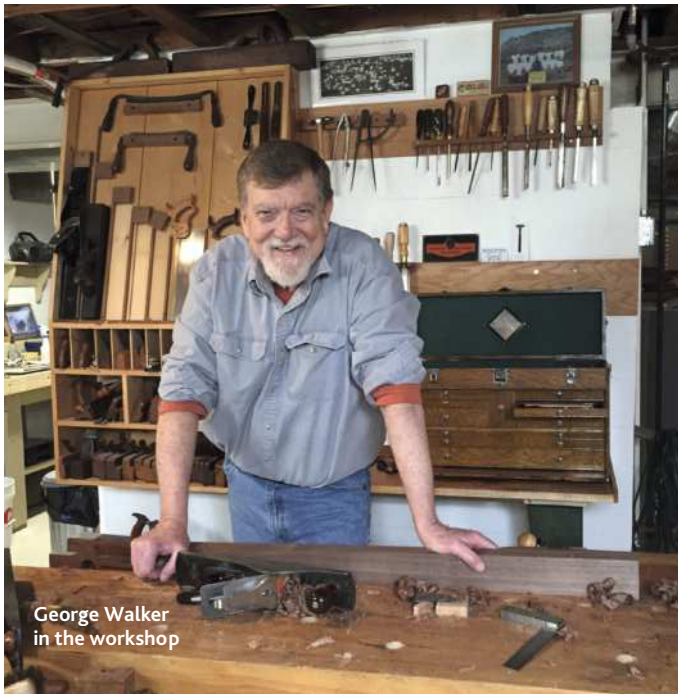


The 5/8in Wood Owl Tri-Cut auger bit (left) was borrowed from another student. This is one of the tools Ethan will be getting for his own shop soon. Refining the edge of the top (above) with Ethan's Millers Fall N.1 circular spokeshave. Breaking the edges on a rung (right) with a bronze No.101 block plane. Drilling by hand (below) and students showing the cricket tables (below right)



Euclid's Foundations

In the first chapter of their new book, *George Walker & Jim Tolpin* discuss the value of marking up



George Walker
in the workshop

In the 1984 movie *The Karate Kid*, Mr Miyagi schools his young apprentice in a roundabout way. Wax on, wax off. This book is like that. On the surface it may look like it's all about making tools, and on one level that's correct. We cover how to build a set of layout tools that are accurate and perform flawlessly. In truth, there's a deeper reason to build these tools and it goes back to how we as woodworkers learn our craft. Some learn best by hearing, some learn by sight or reading, some learn through their hands. This book isn't so much about the information it contains as it is about a journey with your hands. When Jim and I started on this project, we had fun watching the geometry open up before us. Then we delighted in the tools themselves and had fun exploring how they changed our work at the bench. Over time we realised that the real lessons were absorbed through our hands. They say it takes 10,000 hours to master a craft. These tool builds aren't anywhere near 10,000 hours, not even 40 hours. Yet Jim and I, with nearly 80 years of combined woodworking between us, found ourselves at a higher level after making these tools.

Yes we learn from books, but there are other paths to go deep. Ancient artisans had a grasp of geometry much more practical and intuitive than we have today. Knowledge that's more physical than mental. One way to think about it is how we learned to ride a bicycle. It's possible to read about how to ride a bike, but that's not how anyone learns. Words can't make the connection that lets you glide down the street almost as if by magic. And later, after you learn to ride, when your body and muscles become familiar with this marvelous thing, you take your hands off the handlebars and sail along. That's a fair picture of what it's like when we let the geometry get inside us.

A little warning. It's said that Euclid, known in the ancient world as simply 'The Geometer', was once asked by a king if there was

Fig.1 These humble tools hold the keys to unlocking the secrets of our craft

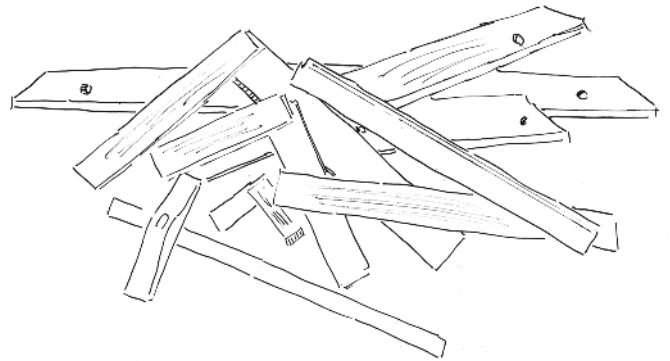
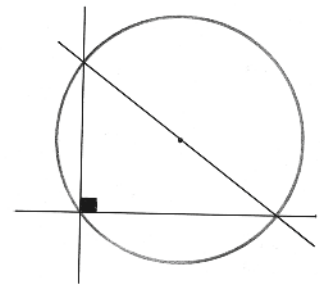


Fig.2 There's a geometric truth that you can't square the circle. However, that doesn't mean you can't easily pluck a right angle from the heart of a circle



a shortcut to learn the secrets of geometry. He disappointed the king by replying, "Sire, there is no royal road to geometry." These tool builds should stretch you. It's also true that geometry was practiced on many levels. Much of what we learn in these tool builds equips us with a basic "muscle knowledge" about straight lines, parallel lines and a bag full of useful angles. Depending on the craft, that knowledge can expand to encompass some mind-boggling sophistication. These baby steps you are learning can grow into the ability to design a magnificent arched ceiling on a cathedral, or train your eye to unlock a flowing line while carving a wooden spoon.

Yet it's a puzzle hidden in plain sight because it was baked into the historic building trades. We struggle seeing it for what it was because we think of geometry in terms of mathematics, theorems and numbers. That's a far cry from how our ancestors saw it. Geometry was a way to understand space and the world of solid objects. Jim and I both jogged our memories to recall what we learned in junior high geometry classes. Problem was, the knowledge was imparted through books and rote memorization of formulas, and it involved little or no hands-on lessons. Besides a few basics such as knowing a triangle from a square, I had little practical geometry knowledge that I could bring to my workbench. In fact, I often got my polygons mixed up. How many sides does a hexagon have and why does its radius equal its facet length? Yet it's clear this is important knowledge that forms a foundation we use to not only build with, but also to explore the unknown

Laying the foundations of woodworking

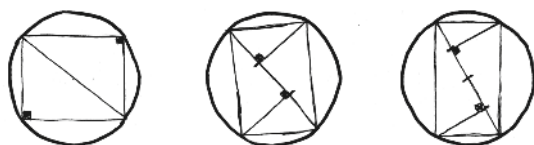
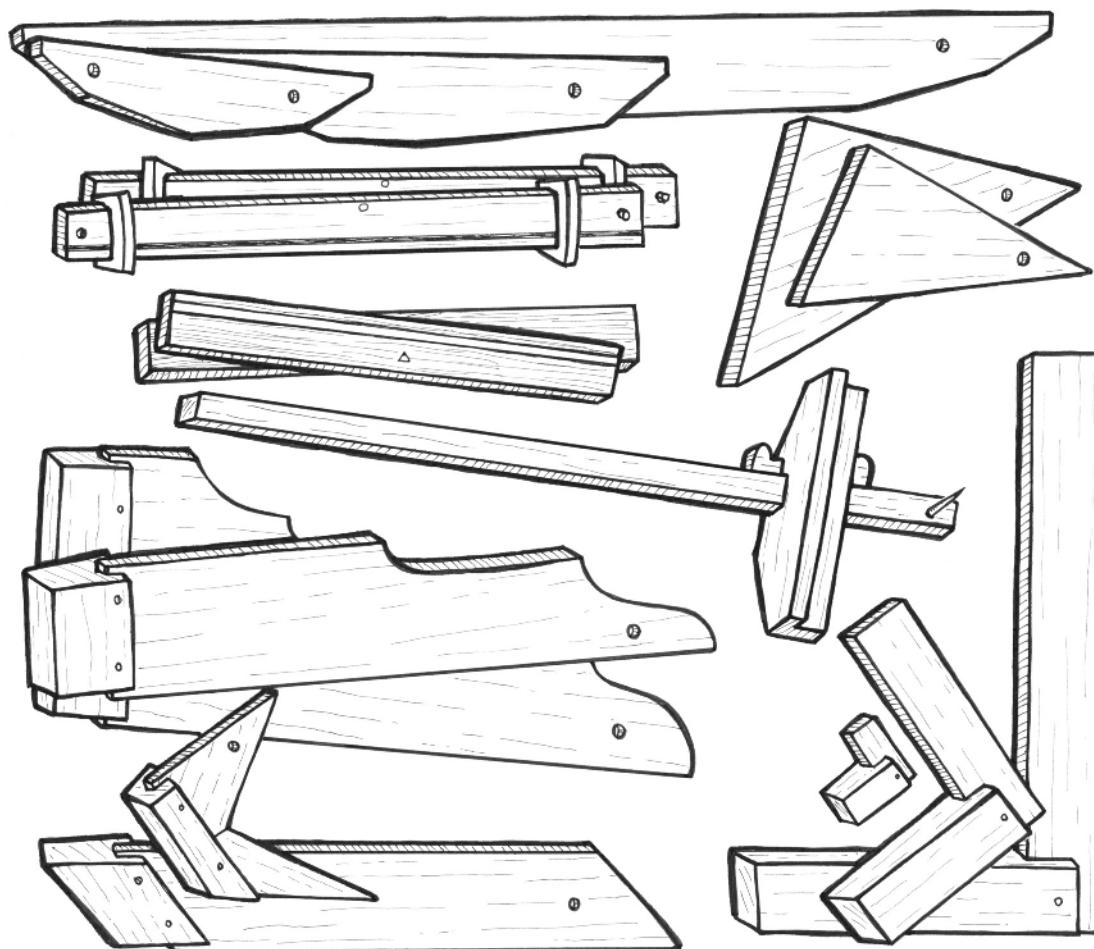


Fig.3 These simple layouts for beams on log ends were used for centuries by builders both East and West. It only required a chalk line, dividers and a carpenter's square

creative possibilities that lie before us. For that reason, we need to lay this foundation deep. Not just with book knowledge but with our hands. For a clue on how to make that a reality, just take a look at historic tool chests.

Looking for Clues

For more than a decade Jim and I explored historic literature about design. When possible, we attempted to put the lessons into practice at the workbench. Along the way we've held on to one assumption that has helped us make discovery after discovery: We took it for granted that there is purpose and intention beneath every stone we flipped over and every detail left behind. So we questioned why artisans often made their own kit of layout and design tools. Although woodworkers usually purchased tools

such as chisels and saws from specialty tool makers, they not only built their own tool chests, but they also often made their own layout tools (Fig.1). Then as now, making these tools will make you a better woodworker. These tool builds help you gain a working knowledge of artisan geometry. Not the stuff you learned in the seventh grade, but a deep dive into the world of points, lines, planes and solids. Like the mastery of perspective for an artist, geometry is the bedrock of our craft. These tool builds are also a master class in shaping wood. Not just any old shapes but surfaces that are flat, straight and true to a high level. We've all built things a bit off and relied on clamps and screws to hold everything together. These builds will push you to make parts that are dead flat, perfectly parallel and square. In many cases these tool builds are miniature versions of building a house where each layer must be plumb and true as it rises.

Abracadabra

What's unique about these projects is that each of these tools is created out of thin air using the truths of geometry to generate and prove each tool. You don't need a flat granite table or a precision engineer's square to check your results. In fact, those are more a hindrance than a help – sort of like never taking training wheels off a bicycle. You'll also notice there's a definite progression to building these tools. That's in line with how geometry was always learned. Most of the historic books about geometry begin with simple lessons about points, lines and

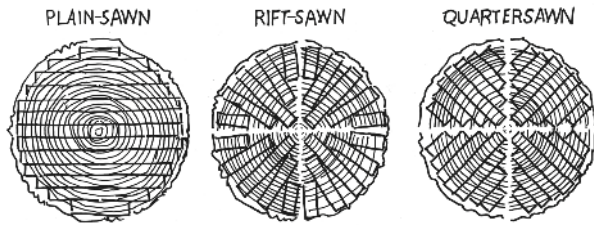
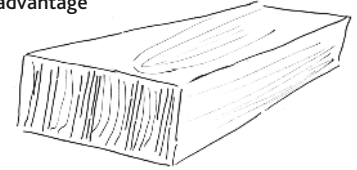


Fig.4 Even though plain-sawn lumber is the most common, it still yields a few planks in the centre with the grain orientation we are looking for

Fig.5 In a bin full of turning blanks, dig in and look for chunks with arrow-straight grain. Turners often scoop up the gnarly stuff, leaving the straight-grained stuff behind. That works to our advantage



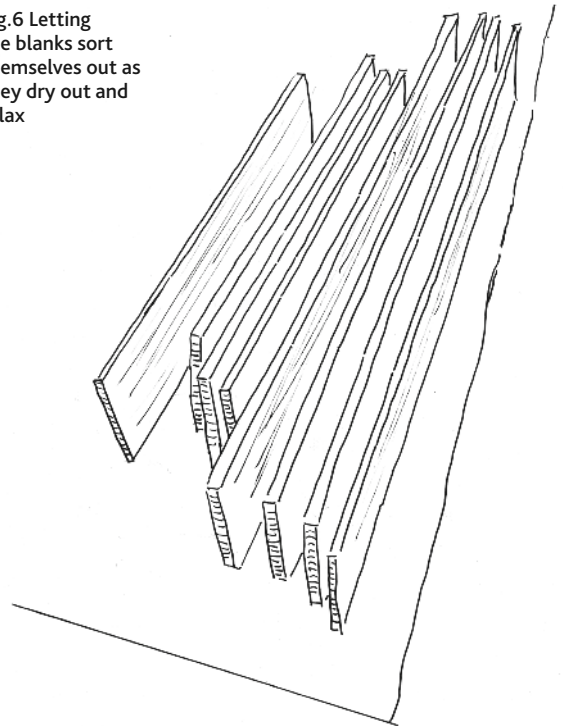
Co-author, Jim Tolpin in the workshop

planes. These must be understood before tackling a domed ceiling or a spiral staircase.

Jim and I want to be clear up front that we can't be certain if the techniques we are using are historically accurate. No one knows for sure how our ancestors made a square and trued it up. This has been an experiment of sorts – attempting to build these tools with a few hand tools and a rudimentary knowledge of geometry. To our delight we were successful in creating some incredibly precise tools. In fact, if there are any doubts we hold about our techniques, it's the steps we took to super-tune each tool. We wanted to see just how far these techniques could be pushed. Indeed, we were able to achieve results exceeding what a cabinetmaker or builder might require for everyday work. Yet the process of super-tuning offers solid lessons in hand-tool work that spills over into other projects, so we encourage you to take those extra steps. As to why we are unsure whether what we present was standard practice in the trades: The literature is silent in that regard. I can think of two reasons for that, which may apply to any knowledge that has been lost. It may have been kept under wraps as part of the secrets of the crafts and guilds. On the other end of the spectrum, craftspeople may not have bothered to document it because it was common knowledge, not thought important enough to write down. Regardless, we think the techniques and methods are solid and will make you a better woodworker.

All of these tools are a physical manifestation of a geometric construction. What do we mean by that? An example of that is a try square. Its DNA is literally built around a simple construction of points, lines and a circle that combine to generate a right angle (Fig.2). This construction is called 'Thales' Law', after the Greek geometer who wrote about it and explained the geometric truth behind it. In spite of Thales getting all the credit, artisans had been using this simple construction and variations on it for millennia. Somehow, they stumbled on the truth that if you

Fig.6 Letting the blanks sort themselves out as they dry out and relax



draw a triangle in a circle using the diameter as the hypotenuse, the other two sides always form a right triangle. Our ancestors used these simple constructions to do layouts, from laying out a foundation for a barn to squaring up log timbers. They also learned variations on the geometric relationship between right angles and circles to come up with quick ways to lay out timber beams with different cross sections (Fig.3).

Throughout this book we have short sections called 'Euclid's Notes' that unlock the geometric DNA behind each tool. In many cases, we'll use the construction to build the tool itself. These aren't the formal propositions from Euclid's original book on geometry from antiquity. The notes are more like the things a journeyman might have scribbled in a little notebook and kept in an apron pocket. In fact, many of these notes probably pre-dated Euclid by many centuries. These constructions were part of the simple language that artisans used to build whatever they might imagine. The beauty of these constructions is that they work on any scale. Our tools might be sized for furniture-sized projects, but these geometric constructs work if we are building a barn or laying out a basketball court at the local playground. Yes, the tools we make are functional and a pleasure to use, but the geometry behind the tools is the hidden gem.

Our tool builds begin with simple lessons for simple tools such

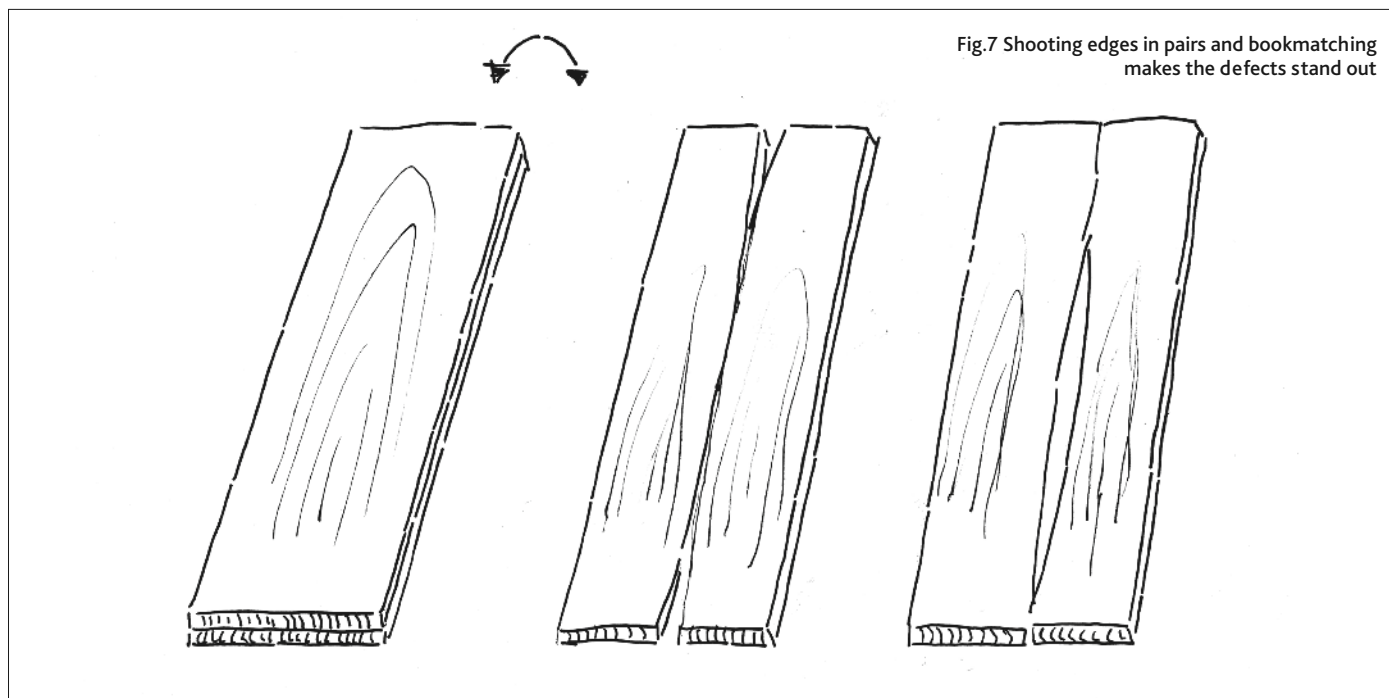


Fig.7 Shooting edges in pairs and bookmatching makes the defects stand out

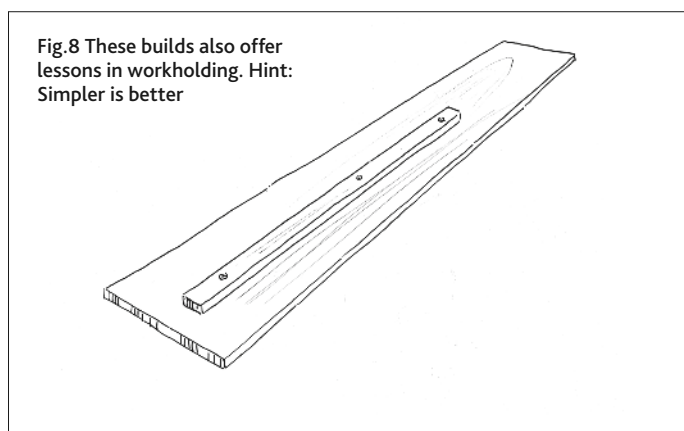


Fig.8 These builds also offer lessons in workholding. Hint: Simpler is better

as straightedges before moving on to more complex tools and lessons. Don't skip over the simple builds even if you already have those tools (you can always give away your old store-bought layout tools). It's more about gaining knowledge and skill.

Others have written at length about building these tools, often documenting how to replicate historic examples. Our approach differs from that in two ways. First, as mentioned earlier, our emphasis is on the geometry behind the tools. We consider this the primary lesson these tools impart. Taking it a step further, we look at these tools as teachers. Each build has lessons that form a foundation of knowledge woven into your hands and eyes. Second, our designs are stripped-down functional versions of these historic tools. That was intentional on our part. Once you've mastered the skills necessary to make an accurate, functional tool, feel free to jazz it up. Or not.

A word about scale and dimensions on these tools. We are not attempting to clone any specific historical examples. In fact, if you look at collections and historic images of these tools, one thing jumps out: Artisans scaled these tools to the work at hand, and that work could vary a huge amount. Carpenters and stone masons worked on an architectural scale and made use of a tool set scaled accordingly. Scores of other trades used the same tool set, from wagon builders to makers of small tea caddies and spice

boxes. The geometry doesn't change but the scale of the tools could vary dramatically. For this book we describe a set of tools that are typical for most of the work we do building furniture. We jump at the chance to buy lumber with wide, clear boards. Yet the reality today is that we seldom find boards wider than 15in, and most are 12in or less. These tools reflect building with solid wood. If you work with sheet stock, the tools may need to be up-sized. Feel free to scale your tool set up or down to suit your needs. Another bonus of learning the geometry behind these tools is that if you do stumble into a project that may require a jumbo straightedge or square, you should have the wherewithal to pull one together with little trouble.

All these tools can be made from common hardwoods from your area. No need for exotics (which are often less stable than Northern hemisphere hardwoods anyway).

By the time you complete your layout kit, your confidence with hand-tool skills will be on the rise. Fitting a drawer or that final keystone won't seem so intimidating.

Getting Started

Let's talk about what you'll need in the way of tools and materials for these builds. The good news is the tools themselves can be made from small bits of wood. Often the historic user-made tools were made from special chunks of timber the artisan had squirreled away. A word of caution: For your first attempts at making these tools, you might want to stick with wood that is user-friendly. That means using straight-grained hardwoods that are free of knots or figure of any kind. The species of wood is not that important. Most domestic hardwoods will work splendidly. In fact, many historic tools are sort of like old timber-frame barns: made from whatever trees were close by. What's most important is to select well-seasoned rift-sawn material with the grain as straight as possible. We are looking for boards with grain orientation that gives the least chance to move or warp. Quartersawn boards are sometimes sorted at your lumberyard for special projects and often reflect it in the price. But, what passes for quartersawn material can be on the margins of what we are after in terms of grain orientation. Not a problem. Even logs that are flat-sawn at the mill will have a couple of boards that have what we are after (Fig.4).

Because these tool projects require small bits of wood, I always take a few minutes and dig through the bin (Fig.5). I look for clear, straight-grained pieces with rift-grain or quartersawn orientation. When prepping material, for a straightedge as an example, rough-cut a half-dozen blanks slightly oversized. Plane the faces and edges to remove saw marks and expose freshly planed surfaces. Stand the blanks on edge on your workbench, spacing them so they can acclimate (Fig.6). Let them sit for a few days; a few weeks is better.

After drying, select a pair of blanks that remain straight and true. Most of the tool builds are made in pairs. One reason for this is that several of the important geometric properties are proved in pairs. Making them in pairs means that our blanks become mirror images of each other. This means if we bookmatch the edges and they have a high spot or hollow along their length, they will mirror each other and exaggerate any flaws (Fig.7).

That's part of that dialing in out of thin air we talked about. Also, many of these tools are made in different sizes. For example, when making straightedges we start with two long blanks. We process them as identical blanks until we get the edges on both blanks dead straight. Then we cut down the second blank into a couple of shorter tools. We end up with a long, medium and short straightedge. This repeats on several other builds.

In addition to the materials for the tools, we'll use a couple small boards as fixtures, and for proving our tools. You'll need one board we refer to as a sacrificial board. We'll attach it to our bench and use it for workholding. It's going to get a variety of small battens screwed to it for holding our tool blanks to the workbench while working (Fig.8).

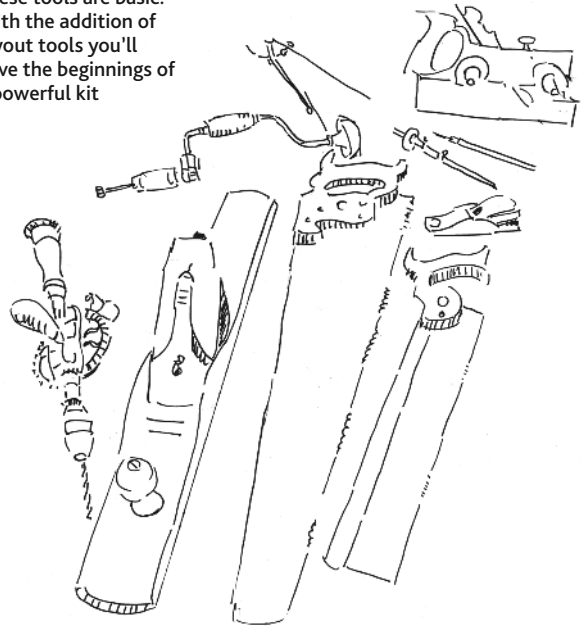
We'll also cut a few pieces from it to use as temporary gluing fixtures. Use any board that's flat and free of twist and approximately 8in wide x 4ft long. I prefer 1/2in-thick material for this sacrificial board. Another option can be found on our website www.byhandandeye.com, where Jim published drawings and a booklet for a universal workholding jig that's ideal for projects like these. Build the jig and these tools, and you will definitely have a tricked-out workshop.

In addition, you'll need what we call a proving board. It's simply a piece of pine we can secure battens to and lay down sheets of blank newsprint to test our tools. It's used alongside our sacrificial board. Often, we jump between both boards to tweak and test our tool blanks as we sneak up on that true surface we are chasing. This proving board also needs to be flat and free of twist, and of the same dimensions as our sacrificial board. You'll see as we go along that we will be tacking small battens on these boards. You should be able to snag these out of your scrap bucket. Before tacking a batten to our sacrificial or proving board, give the edge a swipe with your handplane to make sure it's straight.

Tools to Get Started

You could use machines to execute much of the rough preparation of stock. Yet for each build you will reach a point where you need the precision and control of a finely set handplane. At times you will be sneaking up on a fit with a file, removing just a whisper of material. Even if you are primarily a machine-focused woodworker, I'd encourage you to use this as an opportunity to perfect your hand-tool skills. You'll need one handplane. A No.7 or No.8 jointer is perfect. We'll be doing a lot of precision shooting of both long grain and short grain. But because the parts are often small, you can even get away with a shorter plane such as a No.6, or even the ubiquitous No.5. For those of you who love the feeling of a razor-sharp handplane slicing thin shavings, these builds should make you smile. Making tools like straightedges or squares is fussy work. Getting that precise edge often calls for light cuts. This is that chance you've always waited for to set up your handplane to take gossamer-thin shavings. Have fun with it. You'll also need a panel saw and a backsaw – the panel saw for roughing

These tools are basic. With the addition of layout tools you'll have the beginnings of a powerful kit



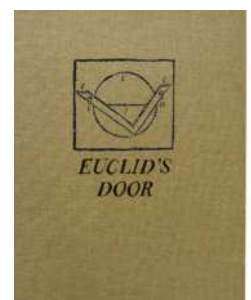
out blanks and the backsaw for executing joinery. Anything sharp will do. A router plane is helpful, but not required. You'll also need a drill and a few drill bits, several sharp paring chisels, and a few files for fine-tuning. If there is a 'specialty tool' on the list, it is the plow plane. Oddly enough, in traditional tool kits, a plow plane wasn't a specialty tool. Ploughing grooves was bread-and-butter work for cabinetmakers building raised panels or making drawers. If you don't have a plough plane, there are machine methods to plough grooves with a dado set on a table saw or an electric router. But this might be just the excuse to finally acquire a plough plane, and these tool builds are a great chance to perfect your techniques with this tool.

"When you are most frustrated you are actually learning."
(Unknown)

Depending on the skill level you bring to the workbench, you might breeze right through the straightedge or even the winding sticks. Perhaps not. If you dive into this as a serious learning quest, at some point you'll probably find yourself frustrated and challenged. At least we did the first time through it. Even though I felt confident in my hand-tool skills, these projects – especially the try square build – pushed me. It's supposed to be that way. That's how we get better; that's how the geometry gets inside us. Frustration is followed by learning, which is followed by reward. All those surfaces combine to form a bit of a poem consisting of straight edges, parallel lines and right angles. So why go to the trouble and write this poem in wood? Because we want to get better. Our ancestors saw a mystery reflected in the secrets of this artisan geometry. You can walk in their footsteps and explore these mysteries with them. We begin by building a set of wooden straightedges. Remember, it's not about the tools but about the knowledge and skill gained along the way. So wax on, wax off.

P.S. You will end up with a killer set of tools.

Euclid's Door is published by Lost Art Press and will soon be available from Classic Hand Tools in the UK, plus Dictum, Lee Valley, Rubank Verktygs AB, and others, and LAP in the USA.



The King of Protein Glues

Arguing the case for reversibility and easy application, *Bill Ratcliffe* discusses the value of fish glue

There is a glue for every material and every occasion. One type is often referred to as 'traditional' but I consider it better to class them as 'protein' adhesives. These glues are hide, bone and skin glues which are collagen based, collagen being a protein contained in animal skins and bones. I will narrow the focus further within protein adhesives, to fish glues and some necessary comparisons with hide types.

The earliest evidence of the making and use of 'hide glue' is in ancient Egypt, where stone carvings depict their preparation and use as early as 1500BC. The prime period for protein glue use in furniture making was between 1750 and WWII. Post-war, saw modern PVAs and aliphatic glues gain popularity.

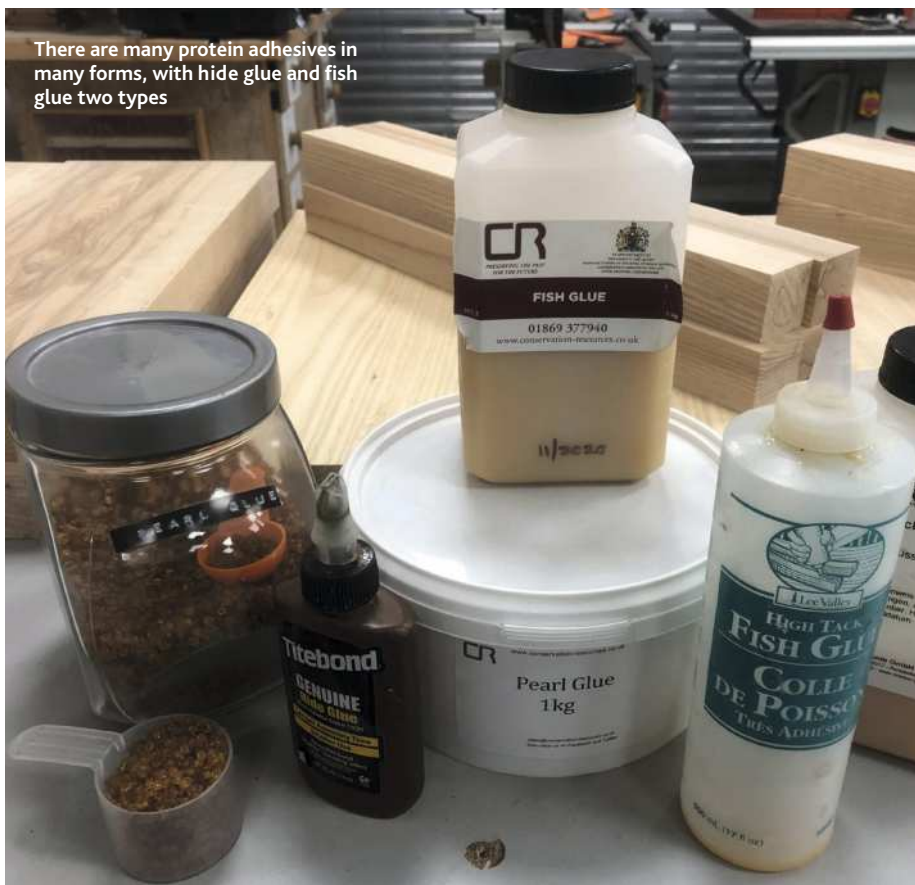
As a conservator & restorer, I am often governed on my choice of materials and/or techniques by considering reversibility. Any professional restorer should be the same, but I do not use fish glue only for that reason. The glue is excellent and easy to use, and I argue that 'makers' should consider the restorability of the items we make. Surely, we want our items to be well made, made to last and not to make them hard to restore with a built-in shelf life.

I often see what I consider as over-engineered projects, made with non-reversible adhesives, items containing hidden fixings then covered with timber or veneers. Hidden fixings have their place when appropriate as do waterproof adhesives for exterior items. Take some of the principles, skills and materials from conservation and apply them to your making, and have the two words reversibility and appropriateness in mind. Sometimes in an age of image and social media, we can all put aesthetics over practicality. Build in reversibility to make your product easier to restore.

Synthetic glue & baby bottles

There are many issues linked with synthetic glues, making them unattractive to furniture makers. Often these issues are ignored in favour of the perceived convenience of other products. One of the most overlooked issues is that lack of reversibility. Most makers today do not consider the problems that synthetic glues will create in the future. Most furniture gets damaged in its life and needs to be repairable to survive. Synthetic glues cure

There are many protein adhesives in many forms, with hide glue and fish glue two types



by catalytic conversion and are irreversible. This means that to take the furniture apart you may need destructive intervention and mechanical removal of all glue before repair. We will not discuss toxicity of some modern glues at this point.

Some readers may not be familiar with protein adhesives, their pros & cons. Some think of these glues as messy, smelly, needing lots of preparation. They imagine the typical old cauldron-like double boilers and consider it not convenient in these days of immediacy. However, the truth is far from that.

In my workshop I use a baby bottle warmer to either cook hide glue or to gently warm liquid fish glue. I use a domestic steam cleaner to reverse glue, where appropriate. Both can be picked up second-hand very cheaply.

The Prince of Glues

The type of protein glue most people remember is the one with more aliases

than the artist formerly known as Prince (the symbol, squiggle etc). The Prince of Glues is known as Scotch glue, pearl glue and animal glue, but I prefer to refer to it as hide glue. It is excellent, but it needs preparing in advance, has a limited shelf life once mixed and has a shorter open time than fish glue as it cools.

If hide glue is the Prince of adhesives, fish is the Elvis. It is assumed that Elvis loved glue, singing: "I'm gonna stick like glue, because I'm stuck on you." I rest my case your honour.

The most obvious advantage of fish glue is that no preparation is required, and the shelf life is better and the open time when a glue typically remains liquid and workable is longer.

What about PVA types and other synthetic non-reversible glues? PVA or other modern glues may seem the quick convenient choice but are they the best choice? I see too often on TV 'restoration' programmes, the PVA comes out and is



Bill also uses a Thermostatic Drink Coaster (above), powered via USB from the back of a DAB radio. The weight of the bottle switches on a gentle heat just hot enough to warm a pot of fish glue on a cold day

used in joints and under veneers, this is not appropriate. I say that partly tongue in cheek, many modern glues are excellent when selected for their appropriateness and not out of ignorance, particularly when 'restoring' items. Using adhesives is about having a selection of glues with different properties available and then choosing the most appropriate for the task.

There are modern versions of hide glues made by various companies but many of these have additives to keep them in a liquid state and fungicides to extend shelf life, by preventing mould. That said, the recipes for liquid fish glues remain secret and there will be similar additives for the same reasons. The only way to really know what is in your protein adhesive is to prepare the ingredients yourself. In conservation this is more appropriate and essential but as a maker just start off by considering any form of protein adhesive to make it reversible. In most cases these modern modified 'genuine' products also



Bill uses fish glue for his stick chair courses. In this case Ben (right) found a passion for woodworking, and doing a PhD in Theology. Philip (on the left, and a QM subscriber) has a five-acre woodland in Sussex and gave Bill a 'wild service' sapling, the species being relatively rare



A baby bottle warmer with fish glue full strength and diluted. The syringes are of assorted sizes. The pale blue is 0.7mm and used largely where access is limited, while the pink is 1.6mm, used when access is easier and you can use a stronger mix

work out expensive by volume, when compared with preparing your own protein adhesives. Buy liquid fish glue or some hide glue in pearl form and mix it yourself.

Fish can be made less viscous with water added. At colder temperatures, winter workshop time, the glue becomes a more viscous gel and needs to be warmed. I would recommend warming before use all the time anyway as it helps with glue flow and adhesion.

You'll feel less stress during glue-up with an open time of 1½-2 hours, and excess is easy to clean, as even after it has dried it is reversible. It doesn't leave sealed shadow patches around joints which cause finishing problems later. Fish glue can even be diluted and used with a syringe to access joints or under veneers.

Once hide glue is cooked it has a limited lifespan. Water can be added and it can be reheated, but this will gradually reduce its potency and it will start to become mouldy. Once mixed and cooked, you can refrigerate or freeze it in batches and heat when required. This can be kept cooled for months. However, fish glue in its liquid form can be stored in the workshop without an issue for months/years and heated when required.

These protein glues can have open times easily extended with the application of heat, for example, a hot air gun carefully used. Hide glues starts to hold very quickly as it cools but fish glue can be open for an hour or more depending on conditions.

Wooden surfaces

In the 18th Century, workshop stoves and fires were used to pre-heat wooden surfaces to extend the opening times of hide glue. Later there were specific heated rooms for assembly. I restored a chair 10



years ago and the frame needed taking apart to then be re-glued. I found the tenons were all showing signs of a bit of overheating, in fact let's just say they were all burnt. I imagine the maker popping them on the stove and then getting distracted like me with the toast in the morning, or maybe that charred look was what he was aiming for?

When I re-glued the chair frame, I could understand why as the angles involved and the timescales for clamping and adjusting were tight. The fact I was able to take it apart, make repairs and then re-glue, with the same adhesive is testament to the glue. The chair now sits in the corner of my bedroom. I also made the paint finish, milk paint, but from a packet of powder, from a milk bottle and pigmented to the colour.

This was not intended to be an exhaustive academic study of protein glues, but hopefully it will make you reconsider your adhesive options, think



Using a steamer to reverse protein glue (above) and a charred tenon (left) on a 19th Century chair rail. All the tenons on this chair were burnt like this

about restorability in the design process and this may spur you to do your own research. Making an informed glue selection should be no different than the choice of other materials or tools: what is best for the project, not what is easiest to get hold of or at hand. Liquid fish glue is a great entry material into the use of reversible protein glues.

Preparing and using protein glues is satisfying. You have control of your materials, and the glue will outlast most modern glues. The strength and longevity of protein adhesives are impressive when you consider so many pieces of furniture remain secure after centuries of robust use. Balance that with seeing more modern furniture with degraded PVA, which is only a few decades old or even less.

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Instagram @cravenconservation.*



David Cracknell (left) using fish glue for the first time on Bill's chairmaking course. David (@cinque.ports.woodworks) is vice-chairman of Woodland Heritage and a director of Whitney Sawmills. Using a syringe (above) to fix a loose piece of veneer

The Fishy FAQs that Make Application Simpler

Bill Ratcliffe answers the most common worries about using fish glue and other hide options



Fish glue glues available in the UK (left) include Kremer fish glue from a few suppliers. Kremer, with a 10-year shelf life, supplied by AP Fitzpatrick Art Supplies, and CR glue from Conservation Resources as used in Bill's workshop (above)

What is the best way to apply fish glue?

What do you use?

Apply it any way you want: brush, syringe, spatula, coffee stirrer and even your finger. The joy of the glue is its ease of use and ease of cleaning up.

What cloth do you use to remove excess?

Use a damp cloth. Soaked in warm water but squeezed out so excess water does not run into the joint. You want to clean around the joint not weaken the adhesion inside it. Obviously not a fluffy linty cloth. Just a piece of lint-free cloth, old tea towels, old t-shirts, mutton cloth are just a few examples.

How do you judge how much to use?

Experience and trial and error, of course, but you judge it the same way as other glues, enough for coverage but not so much it is running everywhere. If no glue seeps out when clamped, then perhaps it was a touch light. If a lot comes out, then adjust for next time. As with all woodwork, a tight well-cut joint needs less glue than a joint with gaps.

How thin does the glue need to be for a syringe, and what sort of syringe do you use?
I use a 10ml syringe with needles from 0.6mm to 2mm. The level of viscosity depends on the size of syringe needle and is common sense really. If the smallest diameter needle is used, then you will thin the glue and try it, if none comes out then thin it more to get the optimum mix. If a large diameter needle, it needs barely thinning.

Is it best to remove the excess damp or dry?

Either works but it is much easier to use a damp cloth as it negates the need to introduce a blade, and depending on your level of tool control, you may leave damage on the wooden surface. The advantage of this glue is that you can wipe it off and reverse it with a damp cloth the next day as opposed to PVAs etc... so best to use a damp cloth. Protein glues will not leave an invisible shadow patch that will show up when surface finishing is carried out.

When you say a hot air gun carefully used can improve open time, what do you mean by carefully? Is that distance, heat or what?
Carefully, as depending on the type of gun you have, you may scorch the wood. This again should be common sense to a woodworker as hot air guns are mainly used to strip and bubble paint.

A gentle waft with the gun from a distance, changing the setting on the gun to prevent burning is OK. You can waft and then remove the heat source, then put a spare hand on the wood to see how warm it feels, then adjust heat setting and/or distance, and repeat. This process would sometimes be needed with hide glue but the whole point of fish glue is the long open time, so it is exceedingly rare to have to do this, but the option is there.

In summary careful = distance and heat setting. Please note that if you are restoring, the joint is likely surrounded by polished surfaces so be even more careful than when making a new item.

How long does this glue need to be clamped?

Ideally clamp for 24 hours but I regularly remove clamps after 12 hours without any issues. Welsh stick chairs are assembled with fish glue on my five-day courses, and we glue up the end of day four, and on the morning of day five everything is ready to continue working.

Who makes fish glue? How much does it cost, and what is the best way to buy it?

This depends on where you live. Prices also change and vary across countries. The photo array shows Lee Valley, Canada and Kremer adhesive. I use Conservation Resources so I can provide a current UK price.

They do two sizes:

300g: £13.74 inc.VAT

1kg: £31.74 inc.VAT

This can be bought easily online from their website conservation-resources.co.uk/products/hi-tack-fish-glue?variant=31117028425797

Finally, does it smell fishy?

No, to me it smells pleasant and a bit sweet. I will post some videos and supplementary images on my Instagram account @cravenconservation over the next few weeks to demonstrate some of the uses of fish glue. These will be hash-tagged #quercusmagazine so please follow both.

Moravian Woodwork

Christopher Wilson asks who are the Moravians and what do they make

When describing something as 'Moravian', it is important to first understand there are two meanings of the word. Moravian could be referring to someone or something belonging to the ethnic peoples of Moravia in the modern-day Czech Republic, or, it could also refer to the Moravian Church which is a protestant Christian denomination originating in Bohemia, but later spreading across Europe and much of the world. The context of this article is the latter. The Moravian Church, originally known as the 'Unitus Fratrum', or Church of the Brethren, was born out of the very first Christian Protestant reformation that took place in Bohemia in the 15th Century.

This context is important because the Moravian Church migrated to what is modern-day Herrnhut, Germany in the 18th Century and developed the structure of a collectivist, theocratic society. As people from across Europe joined the Moravian Church, the influences on their woodworking became more and more diverse. When the church later branched out to the Americas, the diversity only grew, and the woodworking styles ultimately were determined by the ethnic origins of the shop master and the relevant market trends.

An Approach, not a Style

Unlike woodworking styles such as 'Shaker', 'Art Deco', 'Modern', or 'Windsor', it is not easy to nail down 'Moravian' as a particular style of woodworking from an aesthetic



Aligning the fence to cut sliding dovetails

perspective. What makes a piece Moravian is simply the fact that it was designed and constructed by a member of the Moravian Church. Moravian woodworking finds its uniqueness in the ingenuity and spirituality of the makers as well as the approach that they have to craftsmanship. It is a belief in Protestant Christianity that you should perform your work to the best of your ability as an offering of faith and dedication to God, so, we see many Moravian pieces where even the bottoms of drawers and the undersides of tables are nearly as refined as the visible portions of the piece.

The Moravian craftsman would have lived and worked by these ideals, and they would have reflected them in their

woodworking as well as many other forms of craft. One example of their ideals is the fact that many historic Moravian pieces do not have the maker's name on the workpiece since it was believed that the work belonged to God and the community as opposed to the vanity of claiming it for yourself. Combine this spiritual mindset with Germanic ingenuity as well as an ethnically-diverse congregation, and you truly have what I would call Moravian Woodworking.

Most craftsmen of the Moravian Church in the 18th and 19th Centuries would have been German, so we see a trend in pieces that have two of the mainstays of continental European joinery: the sliding dovetail and the mortise and the tusk-tenon joints. If you want to replicate Moravian woodworking, these two joints are critical to learn and master.

To create this joinery, Moravian craftsmen would have utilised Germanic tools such as the sliding dovetail plane (Grathobel), sliding dovetail saw (Gratsäge, and the router plane (Grundhobel), in addition to other traditionally-continental European forms of tools such as the horned plane, bow saw (Spannsäge), and the shoulder knife (Schultermesser). There are quite a few educational resources available both online and in book form that cover the sliding dovetail as well as the tusk mortise and tenon, but I have found that there are as many approaches as there are woodworkers. Some readers may recognise the Gratsäge from my report in QM10, but here I would like to share some of my techniques for using the traditional German and continental European hand-tools for cutting these two quintessential joints when making Moravian furniture pieces.

The Dovetail Plane

I always start my sliding dovetails by ensuring that the dovetail board, the piece that will have the dovetail geometry, is as square as it can possibly be. For a cross-grain joint where the dovetail is cut across the width, I utilise a shooting board to square up the end-grain, and, for a dovetail that is cut with the grain, I will use a jointer plane in conjunction with the longest straight edge that I have. This is crucial because any variation in the straightness will translate into the fit of the joint and can cause issues later. Once the workpiece is square, I adjust my



Christopher's workbench features mortise & tusk tenon joinery for the frame and a wooden leg vice



Chair Joints

Two modern, Moravian-inspired back stools (above), also known as board chairs or Bretstule, beneath a Moravian Star in Old Salem, North Carolina, USA. Mortise and tusk tenon joinery connecting the back of the board chair to the seat bottom (left). A traditional wooden-bodied router plane being used for cleaning out the bottom of a sliding dovetail (right) track



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Grathobel (dovetail plane) fence as well as the iron depth and I plane away. Some dovetail planes have depth stops, but I often remove that and plane the dovetail to be slightly tapered along the length so that it essentially becomes a 'tapered sliding dovetail'. We can easily match this taper when we lay out the track that the dovetail will slide through, but we have to be careful not to create a dovetail that has a hump in the middle, so be sure to check it with a straight edge as you go.

This method works well for longer sliding dovetails by cutting out the friction that occurs during installation; allowing for a tight-fitting joint that is not impossible to install. Many Moravian furniture pieces utilise long sliding dovetail joints including table battens, drawer dividers, and shelves. I almost always taper my sliding dovetails when replicating these joints longer than 12in.

Another important note is that in cross-grain applications the dovetail plane may blow out the fibres on the far end of the dovetail board. Keeping the nicker sharp and engaged will mitigate some tearout, but I find that in certain wood species it is unavoidable. I account for this by making the board 1/16in- 1/8in wider than the target width so that it can be planed away later. Another effective method I have used is to glue small, sacrificial pieces of wood to the edges that can be sawn away after planing the dovetail.

Layout the Track

Now that we have our dovetail board complete, I prefer to lay out the track by sitting the dovetail board atop the mating



Traditional tools, including (left to right): sliding dovetail planes, moulding plane, bowsaw, router plane, dividers, sliding dovetail saws, bench planes, and a marking gauge

board, allowing gravity to balance it in place, and I use a marking knife to make a small tick mark at each outside corner of the dovetail (the wide corner, or top of the dovetail). I use a square to pull a knife line from this tick mark down the edge of the track board, and I set my marking gauge to the exact depth of the dovetail that was previously determined by the dovetail plane fence setting. I pull the marking gauge line between the two vertical lines denoting the outside corners of the dovetails, and I then set an adjustable bevel gauge to the angle of the sole of the dovetail plane. I then insert my marking knife point into the crosshairs where the vertical line from the dovetail corner and the marking gauge lines intersect. I slide the bevel gauge up to the knife and I mark this knifeline denoting the boundary of the track for the dovetail. Now that I have locations for

the four inside corners of the dovetail, I use a straight edge or ruler to pull a knife line across the top surface of the track board, connecting the inside corners of the dovetail.

For a 'through' sliding dovetail where the dovetail passes fully through the track board, the next step is to saw the edge boundaries of the dovetail track. However, for a 'stopped' sliding dovetail where the dovetail does not pass fully through the track board, my next step is to mark a knife line perpendicular to the dovetail track denoting the end or the 'stop' of the dovetail. Next I cut a mortise starting at the stop line and extending approximately two-thirds the length of my saw blade in length and I cut down to the full depth of the dovetail track. I first cut the mortise with square walls, then come back with a firmer chisel guided by a bevel gauge to



Laying out the track for a shoulderless sliding dovetail that will connect the bottom of a table top to the frame (left). The leg vice nut (above) attached to the bench with a sliding dovetail. The three primary tools for sliding dovetails (right): the router plane, the sliding dovetail saw and a sliding dovetail plane





Chiselling away the waste on a long table tenon

clearance. Third, the Gratsäge comes in two forms: a crosscut version for cutting across the grain, and a rip cut version for cutting with the grain (less common). I have historical examples of the rip-cut variety and I have cut sliding dovetails with the grain using the rip version. Many people ask why I do not just use a regular joinery backsaw such as a tenon saw filed crosscut or a large miter box saw, and the answer is that I do often use those for through dovetails, but they are not able to efficiently clear sawdust for stopped sliding dovetails due to their length and fine teeth. There are many resources on cutting a through sliding dovetail with a backsaw, and I will stick to covering the lesser-known methods of using the Gratsäge since it can cut both the through and stopped sliding dovetails effectively.

The Gratsäge is designed to be used with the wooden body of the saw referenced on a separate, stand-alone fence, but I have also used it free-hand for shorter dovetails less than 6in long. So, when using a fence, my next step is to set up the fence along the dovetail track board. I like to eyeball the placement of the fence, tighten it down just a little, and then hold the Gratsäge firmly against the fence while tapping the fence with a small hammer until the saw teeth are perfectly aligned with the knife line on both ends of the track. A few small notes on this: first, I do not apply saw set to my Gratsäge teeth. I have found that I don't need it, it leaves a rougher edge, and it only makes alignment of the fence more difficult. Second, I am right-handed and I always flip the workpiece around for through dovetails so that the Gratsäge is

cut the angled edges to make the mortise dovetail shaped. This angle does not have to be perfectly accurate, but it needs to be sufficient for providing clearance for the saw to clear its teeth of sawdust, this is the reason for the two-thirds rule mentioned previously.

Gratsäge: Sliding Dovetail Saw

Now it is time to saw. This is the point where there are numerous techniques being taught by a variety of sliding dovetail practitioners, but I have found a process that works great for me in my shop, so I would like to share how I cut them when making Moravian-inspired pieces. I use a Gratsäge (Graht-Say-Guh) which is a traditional German sliding dovetail saw. This saw is often mistaken for a 'stair saw', a carpentry tool for cutting stair dados, but there are a few distinct

differences that set them apart: first, the stair saw cuts on the push stroke in most historic examples I have come across, and the Gratsäge cuts on the pull stroke. I believe this is because the Gratsäge typically has coarse teeth for sawdust clearance. It is easier to cut a stopped sliding dovetail with pulling momentum rather than pushing and potentially ramming your saw into the wall at the end of the dovetail track where we cut the mortise, damaging the saw or your fingers.

Second, the Gratsäge has bevels on the sole at the base of the saw plate that typically match the angle of the dovetail plane it was intended to be paired with. Matching the plane angle is not crucial, just a nice-to-have feature, but the bevels are necessary to provide clearance when cutting at an angle. The stair saw cuts square dados and does not need this



Using the frame of a dial indicator (above) to hold a pencil for marking cut lines for levelling chair legs. Using an auger bit and brace (right) to remove waste for the sawbuck table leg





Sawbuck mortise and tusk tenon joinery (above) on a dining table frame. Spiral shavings spilling from the sliding dovetail plane (left), cutting with the grain

on the left and the fence is on the right. It is very awkward to cut the other way and my hand often hits the fence while sawing. Third, if you make your fence too tall, you will interfere with your hand, and, if you make it too short, it will not be able to reference on the wooden body of the saw. There is a sweet-spot for fence height in between the two. I also make my fences with one angled face and one 90° face so that I can use the 90° face to make a relief cut down the middle of the dovetail track in order to help clear wood chips when chiseling the waste from the track. I will touch on the chiseling later in the article.

Sawing is fairly straight-forward, I just use two hands with the non-dominant hand applying lateral pressure to keep the saw body referenced on the fence, then I stop cutting when I have reached the baseline on both ends of the track board and even depth in between. I do not use a Gratsäge with a depth stop like some modern versions. I have practised stopping at the appropriate depth and the depth stop is just one more thing that could slip out of place or slow me down along the way. I have not come across any historical examples of depth stops on these saws, but some may exist that I am not aware of.

Another note is that in crosscut scenarios, there will often be a small amount of tearout in the corners where the saw exits the workpiece. This is because of the coarse teeth and I always plan for this by leaving an extra 1/16in-1/8in of extra width on my track board that can be planed away later.

For across-the-grain dovetail tracks, the process of chiselling the waste is simple: I use a chisel with the bevel down and I

simply work up and down the track until the bulk of the waste is removed. You will find that these bits are not easily extracted without the relief cut in the middle that I mentioned earlier. This is because of the angled walls and the fact that the waste chips are wider at the bottom than the top. For tracks that go with the grain, this process would not work well, so I use an auger bit and brace to drill a relief hole down to the base line every 1-3 inches or so (depending on the wood species) that will allow me to split out the waste. It is crucial to pay attention to grain direction, because splitting against the grain may cause your cut to dive below the baseline of the dovetail track.

Grundhobel: The Router Plane

Finally, to bring the floor of the dovetail track down to the final depth, I use a traditional wooden-bodied Grundhobel, or router plane. I try to take light passes and I set the iron for the final pass by dropping the edge into the marking gauge line that I pulled during layout. For tracks that go with the grain, be mindful of grain direction, and in situations where there is difficult grain, I will often use a shoulder plane or rebate plane to clean up the bottom of the track if the router plane is causing tearout.

Fitting and Adjusting

If all of the prior steps were performed flawlessly, the sliding dovetail will fit together at this point, but we know that doesn't always happen. If the dovetail is too tight, I first check to see if the depth or the width of the track is the issue. Often, it is the width because of the user

error involved in lining the saw fence up with the knife lines, so I will first check to see if any little bit of debris is clogging the corners of the track, then, if not, I will use the dovetail plane to take an extremely light pass on both sides of the dovetail until it fits. If the track is too loose, there is not much that can be done, and I will scrap the dovetail board and start over. I'm sure there is a way to get it to fit with wedges or shims, but I could not sleep at the thought of such a thing.

If the depth of the track happens to be the issue, I will use the router plane to deepen the track or take a few passes with a shoulder or rebate plane only in the middle of the track (leaving the visible ends alone). The best method of determining if the depth or width of the track is the issue is to begin hammering in the dovetail and looking down the track from the far side to see if there are any gaps. Gaps on the sides (angled faces) of the dovetail means the depth is the issue, no gaps on those faces means that the width is the issue. There are many potential issues that could cause a bad fit: surfaces out of square, a hump in the middle of the dovetail, cup in the track board, and the list goes on, but, if adjusted correctly, the joint will be structurally sound even without a perfect fit. It has taken me much trial and error to master this joint, so patience is a must.

Mortise & Tusk Tenons

The mortise and tusk tenon joint is extensively covered by other sources, so I won't elaborate on my method too much, but I do have a few techniques that I have come up with while creating Moravian-



Using a card scraper to clean up the bottom of a chair (above) and using sliding dovetail plane to shape a joint (right)



influenced pieces. One design seen in historic Moravian woodworking is the 'sawbuck' style table where the legs are crossed with a tusk tenon passing through the intersection of the two legs which is a half-lap joint. This form is definitely an influence of Scandinavian woodcraft since I have come across many pictures of these tables originating in Sweden, and there were Moravian craftsmen, including the better-known shop master here in Salem, North Carolina, Karsten Petersen (born in Denmark), who were of northern European origin. So, this style of mortise & tusk tenon joinery is not unique to the Moravians, but it definitely speaks to the ethnic diversity of their woodworking, and I have learned a few things while replicating this joint.

I am partial to a larger tenon for this joint, especially for heavy duty pieces such as a workbench or a large dining table. For smaller tenons, it is easy enough to use a tenon saw or even a rip panel saw or hand saw, but I find that this can be difficult for a tenon wider than 6 inches or so. For example, the tusk tenons on my primary workbench are around 8 inches wide and about 10 inches long. This can be done with a hand saw, or even a frame saw as used in resawing boards, but I found that sawing a series of crosscuts along the tenon cheek, down to the mortise gauge line is most effective. I make a series of crosscuts down to the gauge line about 1 inch apart with a crosscut back saw, and then I use a chisel bevel-down to remove the bulk of the waste. I then come back with a low-angle jack plane to plane down to gauge line. In order to get the corners, I employ a shoulder plane to reach the

area that the jack plane cannot reach. I find that this method is quicker for me, especially in hardwoods, but I have also cut them with a 4-teeth-per-inch rip hand saw with success.

The Sawbuck Joint

The variation of the mortise & tusk tenon joint that I call the 'Sawbuck' joint is found in tables of Moravian and more commonly Northern European origin. This is a joint where two boards are half-lapped with a mortise & tusk tenon passing through perpendicularly to pin them together. This is an exceptionally strong joint that requires no glue, and can be broken down if needed.

When creating this joint, I cut and fit the half-lap first, then I mark the true center of the "X" shape as a reference point for laying out the mortise. I then draw a vertical and horizontal line from the center origin to the corners where the two boards intersect for the half-lap. These are my true "X" and "Y" coordinate systems that I can then use for figuring out where the mortise should be located as well as the cut for aligning the feet with the floor. I then lay out the mortise and I chop it with the half-lap still assembled as opposed to cutting the two pieces separately. For this purpose, I make my half-lap a very tight fit, but you could clamp them together to chop the mortise if it ends up being loose.

Once the mortise is cut, I assemble the tenon into both mortises and I use long clamps to clamp the entire assembly together in order to mark the location of the wedge mortise for the tusk tenon. I hold the wedge up to the side of the tenon and use a pencil to mark the wedge angle as well as the intersection between the

sawbuck legs and the tusk tenon. I chop the wedge mortise for the tusk tenon, and then do a final assembly of the joint. If the wedge needs adjustment, I will plane the flat edge (side facing the sawbuck joint) until the wedge is at the desired depth into the mortise.

Conclusion

To recap, Moravian woodworking in the context of this article refers to the Moravian Church, a protestant Christian denomination, and the church has a congregation that is of diverse ethnic origin. Historically, most Moravian craftsmen were of German descent and their work shares the most similarity with traditional German woodworking.

The sliding dovetail and mortise and tusk tenon joinery are not unique to the Moravians, but are a staple characteristic of their work. Across the globe, Moravian woodworking will look different, but it all shares one thing in common: the devotion of the makers to their God influenced the approach that they took, and, ultimately the quality and craftsmanship displayed in their work. They were truly "joined" by faith.

You can follow Christopher M Wilson on Instagram (@thewilsonwoodshop). He is currently beginning to start making acoustic guitars and teaching traditional furniture-making at Sawtooth School for Visual Art in Winston-Salem, NC. He has temporarily shut down his furniture work (@moravianfurniture) to focus on making some pieces for their art gallery!

Making a Router Plane

Having been drawn into woodworking by Paul Sellers, *Justin Emrich* tries out his Router Plane Kit

Years ago whilst in my mid-20s I found myself saying to a group of friends: “I came late to piste skiing”. Believing myself to be somewhat of an off-pister at the time, I was trying to explain why I wasn’t that sharp at skiing on piste. The laughter lasted all evening and my wife has never let me forget it. However it really is true to say that I came late to woodworking, in my mid-50s to be exact.

I’d always enjoyed making things with a particular love of those wooden model boat kits with all the thin strips to make the hull that you need to bend, pin and glue. But as for grown-up woodworking, well I was more at home with a hammer and nails than a chisel, so it amazes me that I now find myself writing an article for *Quercus* about the making of a router plane.

I was sent the metal parts for the Paul Sellers Router Plane Kit after I shared the story in QM13 of how I fell into woodworking during Lockdown, so I quickly watched Paul’s two videos. It all seemed straightforward enough until he brought out the blowtorch and started heating and then shaping the cutting iron. “Oh dear,” I thought to myself, “not sure I’m brave enough to do that.” As luck would have it, I was delighted to see that when the kit arrived the iron was already cut and shaped so I could just concentrate on working on the wood and assembly. For those of you who have not seen Paul’s Router Plane Kit, you can search online for his videos. It really is a beautiful piece.

The key is finding a really special piece of wood. I’m lucky enough to have Surrey Timbers nearby and they stock a massive collection of hardwoods, so it was there that I found an ideal piece of wild mango, which was really rich in colour and grain.

The first step was to measure and cut the two pieces of wood. You then cut the hole for the cutting iron, measure and cut the angle for the top rest. This was really the only tricky part, but thankfully Paul’s tip to fasten a clamp into the vice allowing the clamp to hold the piece of wood at any



Justin's compact garden workshop

angle was genius. I told you that I came late to woodworking: you all probably learnt that in nursery school! I cut the recess for the cutting iron, then assembled the components and finished with shellac.

The only awkward step was getting the angle of the cutting iron exactly aligned to the adjusting wheel so that the wheel would spin smoothly. If it’s off by just half a fraction, then the wheel simply won’t turn and you are stuck with a router that you can’t adjust, and one you can’t adjust isn’t much good to anyone other than to clutter my already cluttered workshop.

I’m really pleased with my first attempt and I’m now looking forward to getting stuck into my next project so I can take it for a proper test drive.

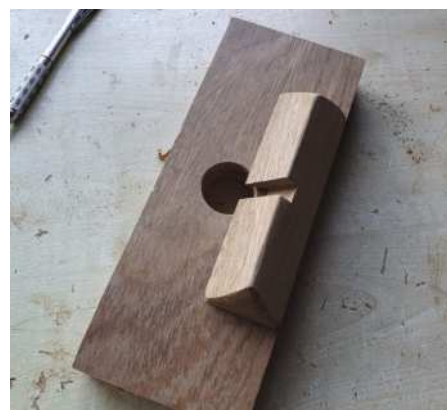
The Paul Sellers Router Plane Kit is currently out of stock, and costs \$46 plus VAT. Visit rokesmith.com to put yourself on the waiting list. Visit paulsellers.com for his latest blogs.



Cutting the mango wood from Surrey Timbers. Two pieces (above) prepped. The 50° angle for the rest (right)



Cutting the recess (above) for the iron



Justin Emrich, England



It is critical to get the angle of the iron right to line up with the control wheel (left). Justin's router plane has been finished with shellac



The Four-Way Eclipse

Seeking a pocket-sized tool kit, *Robin Gates* finds one that does what it says on the tin

For me the ever-changing multi-tool is a source of endless fascination. I can't resist investigating these baffling little bundles of complexity whenever one turns up, even in the supermarket where some new combination of miniaturised tools is positioned temptingly among the tins of beans and scatter cushions. The tool demands that I pull, push, squeeze and twist to find out what it does; or claims to do. Multi-tools are like the Transformer toys my son played with 20 years ago. Their mysterious bits and pieces open out in all directions until, quite magically, I find myself holding a range of Allen keys, scissors, magnifying glass, tin opener, sewing awl, whistle, package hook and pliers fanned out like a winning hand at bridge. But I can never quite bring myself to buy one. There's always something about it that isn't quite right: a too-threatening hatchet head seemingly added as an afterthought, or a marching compass confused by the magnetism of its own construction. I can't help admiring the almost surreal inventiveness of the multi-tool but it often strikes me as flabby with incongruous and overly ambitious features, destined to unfold with disappointment.

Single-purpose tools rarely suffer from such an identity crisis. True the claw hammer balances its most striking feature with a nail puller but that makes perfect sense, at least when I'm using one. You don't find a hammer hiding a spirit level or a fire-breathing ferrocium rod concealed about your block plane. Even the most



A 1932 advertisement for the Eclipse 4S

humble of hand-tools generally sticks to its brief whereas my difficulty with the multi-tool is that in trying to do a little bit more it falls into the trap of attempting too much. For years I'd been searching for a modest pocket-sized compendium of proper-functioning woodworking kit: sturdy scribing blade, practical saw, sharp chisel, hole-boring bit, strong screwdriver. It has seemed that every potentially useful device has been bulked up with a redundant set of box spanners or a toasting fork. Well

my search is at last over, my holy grail of the woodworking multi-tool is found: the Eclipse 4S.

My understanding of this tool has grown piecemeal since finding a bunch of its rusty blades, intending to clean and reshape them as cutters for a scratch stock. Fortunately I never squandered them in this role, for which any scrap saw plate would do, and meanwhile turned up the missing handle lying forlorn without blades in its original tin. Putting two and two together restored the Eclipse 4S to action, and it's proven even more versatile than I'd imagined.

Saws and handles

On the surface you wouldn't think this a multi-tool in the generally accepted sense or even that it was intended for woodworking, and you'd be right. It's effectively a sleekly ergonomic tool pad with flat-section blades attached singly. Pre-dating the modern concept of the multi-tool by some years, the Eclipse 4S Tool was launched in 1932 by James Neill & Co of Sheffield and aimed more particularly at the engineer or anyone requiring to use a hacksaw in a tight spot, with the patent originally filed under 'Improvements in, and relating to, Saws and Handles therefor.'

The first problem addressed by the 4S was that existing hacksaw frames were too big to operate in confined spaces, with handles failing to negotiate obstacles in the way of the work. It's a situation I'd encountered while woodworking below floorboards and around plumbing. Even if I do succeed in wiggling the saw around obstructions it often happens that the angle of the blade is wrong. Exactly as described in the patent application, the improvised solution is to use a broken piece of hacksaw blade with tape wound round as a handle but that often proves far from satisfactory.

Clearly the Eclipse 4S is suited to such tricky operations by its slender handle and blade, but the icing on the cake is how the blade is attached. The heel of the flat shank is Vee-shaped to fit complementary slots at either end of the handle and, depending which way up you choose to mount it, the blade can either be in-line with the handle or – in the jargon so typical of patent legalese – so that 'the hand gripping portion is upwardly inclined with respect to the longitudinal

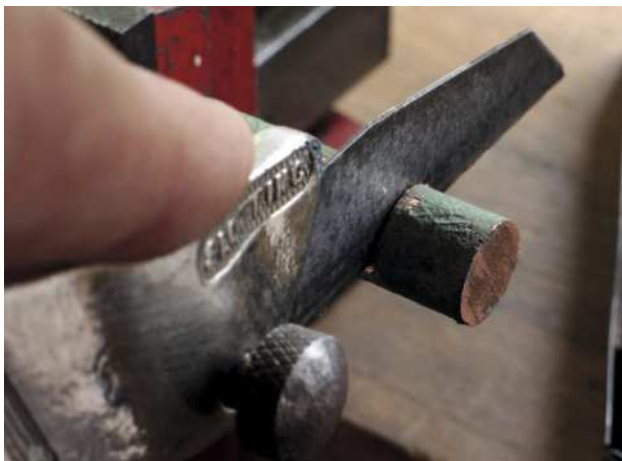


James Neill & Co's diminutive hacksaw expanded with numerous blades and uses



Sawing Wood and Metal

Scribing oak with a slotting blade mounted at 30° (above) and cutting small stuff with an in-line blade (left). Sawing 1/2in copper rod with an obliquely mounted hacksaw blade (below left), and reviving the slots of salvaged wood screws with a chisel-toothed slotting blade (below)



axis of the blade' states the James Neill's specification.

I'm not sure why they called this tool the Eclipse 4S because the makers hadn't marketed an Eclipse 1, 2, or 3, but I am considering the four ways of inserting blades (at either of two ends and at two angles) and the delightfully S-shaped handle. The up-sweep at its working end provides a secure landing for the forefinger directing the blade while the downturn opposite snugs comfortably inside the palm. It's a satisfyingly solid handle lending authority to the task – rather like the heavy brass-back of a tenon saw – and the originals were also nickel-plated. Tools produced under WW2 restrictions were not plated, less eye-catching and somewhat prone to rust but are still a joy to use when cleaned up.

Whatever the finish on the handle, its knurled set screw is vital; not being a captive screw it's easily lost and the handle is then useless. Somewhat perversely, different vintages of handle have screws with different threads so there's no guarantee of even finding a replacement. This particular Achilles heel isn't unique to the Eclipse, since the non-captive screws for the handles of my early Stanley 199 and 99E utility knives also have different threads, and are likewise prone to being mislaid while changing blades.

The company was quick to exploit the adaptability of its design to other tasks, launching the 4S with no less than 16 different blades. It appears the 'tin openers and corkscrews' mentioned in the patent didn't materialise and thank goodness for that, or the tool may have been diverted down more frivolous paths. The four main functions (another contender for the '4' in '4S') of slotting, sawing, scraping and slitting are shown in lettering reminiscent of old joiners' name stamps, but these only



Slotting blades are reversible and toothed along both long edges. Note the blade's second mounting hole and the large knurled set screw

hint at the tool's potential. Contemporary advertising of applications to 'a hundred and one jobs in engineering, electrical, plumbing, garage and general maintenance work' was no mere hype, but despite minuscule advertisements in woodworking magazines of the 1930s its usefulness for working wood has been overlooked.

Slotting salvaged screws

So let's put that right, starting with the single-bevel slitting knife which not only trims accurately to the line but is a nicely weighted tool for scribing. Being an Eclipse tool you'd expect hacksawing to feature prominently and the 22tpi and 32tpi blades are excellent for cutting small stuff in small situations such as inside cupboards, under tables or beneath chairs. The slotting blades were a new concept to me but now I'm hooked on their fine chisel-

like teeth which, having no set, make a tidy job of restoring the mangled slots of salvaged wood screws. In a complete set there were six slotting blades in three gauges, each toothed on both long edges of the parallelogram and with 'said blade being capable of reversible attachment by its ends to the handle' you thus had the choice of cutting either on the push or draw stroke.

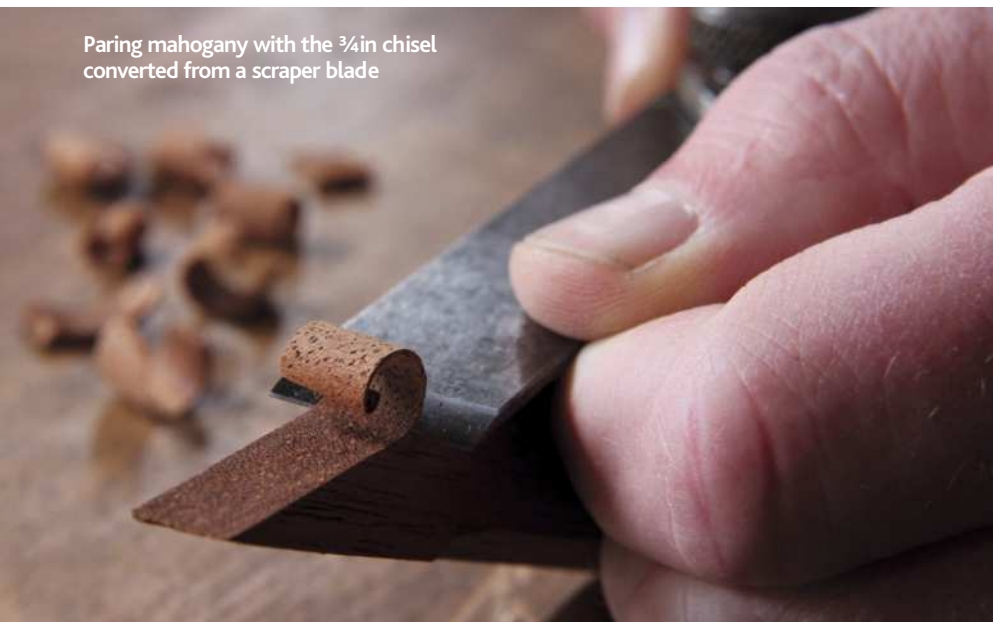
Two of the 16 blades are engineers' scrapers. One is an upwardly curved and tapering bearing scraper, sharp on both edges, which is effective at removing rust from any steel surface where you want to avoid inflicting damage; handy indeed for restoring vintage woodworking tools. The second scraper is straight with a convex tip. I reground a spare to make a $\frac{3}{4}$ in chisel and it cuts with the control and precision of a scalpel.

Other blades include a fine 'second cut' file with a safe edge that's good for taming a protruding fastening or the rough edges of hardware, and a broad-tipped screwdriver securely delivering torque wherever slippage is to be avoided such as the wide slot of a brass saw nut. Last but not least there's an awl resembling a brad point drill bit, very handy for getting screws started.

Ninety years ago the shapely Eclipse 4S and its unusual range of blades was supplied in a sturdy little tin about the size of a bicycle puncture repair kit and cost five shillings, which equates to around £12 today according to the Bank of England's inflation calculator. What a bargain that would be.

As we go to press you can buy an Eclipse 4S on eBay in an original tin for about £20.

Paring mahogany with the $\frac{3}{4}$ in chisel converted from a scraper blade



Filing and Driving Screws

Smoothing a sawn end of copper rod with the second cut file (right) for which the flat-section handle works horizontally with as much ergonomic ease as when used vertically. The broad-tipped screwdriver blade provides a secure purchase on the wide slot of a soft brass saw nut (below right), while a few twists of the centre-point awl bores passable pilot holes for wood screws in situations where a hand drill is too bulky to manoeuvre (below). The double-edged blade of the tapered bearing scraper is worked back and forth to remove rust from vintage steel without damaging the surface (bottom). A 4S blade can be changed for another in seconds



The Holdfast Variations

Canadian woodworker and author, *Charles Mak*, shares how he uses fast hold-downs

Holdfasts are not a one-trick pony, for holding work against the bench alone, as some may think. At about £35 a pair, some American-made holdfasts are affordable to any average woodworker, and, without a second thought, I constantly reach for them when I work at my bench.

Typically you hammer a holdfast directly on the workpiece to secure it to the bench or a fixture (Pics.1&2), but you can also use a holdfast on a jig or fixture instead of the workpiece itself, such as holding down a Moxon's vise, or supporting an assembly (Pics.3&4)



A single holdfast is never enough (above, Pic.1). Notice the wooden or cork pad stuck to the holdfast beak. Charles keeps two pairs by his bench. A holdfast works with a low-profile stop to provide a simple way of ploughing or rebating (right, Pic.2). The holdfast keeps the mating boards square in the alignment board for marking pins (below right, Pic.3).

A pair of mallets sits in the tool tray, ready for quick action (far left, Pic.4). The stand is partially supported by a batten held to the bench with a holdfast (above right, Pic.5). Charles stops the batten from falling out with an O-ring (below, Pic.6)



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Henrie van Rooij studying
the vintage saw set he
hardly dares test