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REVIEW

104

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Contents

ISSUE 104 – SEPTEMBER 2019



FEATURES

- 39 **The Apprentice**
Benedict Viertelhausen talks about his experience and learnings in the workshop of a Japanese master craftsman.



EXHIBITIONS

- 86 **Gesture of Balance**
Grant Vaughan's recent exhibition marks new directions in his work.

PROFILES

- 66 **A Sense of Place**
Bryan Cush designs and makes furniture that reflects his many interests and his preference for native species. Story by Linda Nathan

WOODCARVING

- 72 **Like Geppetto Did**
Axes, whittling knives and rasps are the tools Jeff Donne uses to carve his character filled puppets from green wood.



PROJECTS

- 26 **Triptych Boxes**
Making these small, curved and lidded forms was an exercise in small parts handling as well as surface decoration techniques. Story by Kelly Parker.
- 52 **Making a Cigar Box Guitar**
Vic Tesolin shows how to extend your woodworking and musical repertoires in a project with scope for improvisation.

TIMBER

- 90 **A Tree Emblem for Australia**
Local members of the International Wood Collectors Society say it's high time there were species to represent this country, its states and territories.
- 96 **The Technicalities of Wood Bending**
Jugo Ilic explains why and how wood can be elastic, and also how some species bend better than others.

WOODTURNING

- 58 **Woodturning Deconstructed**
Andrew Potocnik thinks outside the round by creating wall art from segmented turnings.

REGULARS

- 6 Editor's Letter
- 20 Product News
- 34 Subscription Offer
- 44 AWR Student Awards 2019
- 88 Wood Diary



TOOLS & EQUIPMENT

- 8 **Machinery & Tool Reviews**
- Lake Erie 2X Wood Vice Premium Kit
 - Katz-Moses and Veritas Dovetail Guides
 - Blue Spruce Fretsaw
 - Blue Spruce Layout Tools
 - Ellipse P3 Dust Mask
 - Veritas Shooting Board and Fence



66



46

36 Saving Our Skins

New sawblade safety technology looks at preventive rather than reactive systems.
Story by Philip Ashley.

46 The Biscuit is Back

A range of joinery applications are good reasons to keep this power tool in your kit.
Story by Raf Nathan.

62 Elegant Tools

Duncan Nisbet shows how beauty of form can derive from time proven effectiveness in function.

80 A New Saw Story

Upgrading to a new tablesaw was about safety as well as performance. Story by Kerry Carter.



72



26



96

Editor's Letter

Safer saws

Safety could be the most important thing about woodwork that can often be ignored. Learning best practices and using guards, jigs, pushsticks and personal protective equipment are all recommended – and then there is the human element to avoid – tiredness and distractions.

Flesh sensing sawblade technology was invented around 20 years ago and became accessible to Australian woodworkers in 2010. In recent years safety sawblade technology developed by other brands has emerged. In contrast to the first-seen SawStop technology which activates on contact, new technology employs cameras and scanners to detect a 'hazard' and cause the blade to drop below the table...and here is the game changer, without a braking unit or damage to the blade. This new technology is slated to reach Australian buyers in higher priced professional grade machinery in 2020. Hopefully this will filter down to lower cost machinery in the near future. Philip Ashley gives us a rundown on these developments from p.36.

Outside the square

US maker Kelly Parker is shown on the cover this issue. With a love of woodworking that started in high school, Kelly went on to gain a degree in biochemistry and then work as a corporate chemist before coming back to designing and making on a fulltime basis. She writes about the complex process of making her Triptych boxes, from design and prototyping, through to jigmaking, small parts handling and surface treatments.

Outside the round

Andrew Potocnik is one of the most creative woodworkers I know, always experimenting, always seeing 'design opportunities' even when things don't go to initial plans. When segmented, textured and thoughtfully arranged, turned wood can move out of its circular world and present an incredible range of possibilities. I hope the article on p.58 inspires new directions in your work.

Different strokes

Diversity is a concept we see promoted in all walks of life, not least in the realm of woodworking where there really is scope for all attitudes, influences and tastes. On the one hand this issue we show the impossibly fluid lines and finely carved surfaces of some of Grant Vaughan's new work, while on the other there is the expressionistic approach of Jeff Donne who breathes life into his puppets with the brush strokes of his whittling knives.

Valuing our local

Do you know what Australia's tree emblems are? No? Well that's because there aren't any. There are national and state emblems for fauna, flowers, gemstones and more – but not for Australian native species. Read how one group of passionate tree lovers is making a push to rectify that on p.90.

Age is no barrier

As Australian Wood Review's Student Awards enters its sixth year it's safe to say that age is no barrier to or predictor of fine work. The evidence for this can be seen in the galleries of student entries on our website. The 2019 competition is open for entry now at www.woodreview.com.au/student-awards. If you know a younger woodworker who might like to enter please pass this information on.

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US maker Kelly Parker in her workshop.

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Lake Erie 2X Wood Vice Premium Kit

Reviewed by Robert Howard



The US made Lake Erie 2X Wooden vice is fast to operate at 25mm per turn. There are two separate threads on the main screw, with the second starting a half turn after the first. The supplied components are shown.

This is a well packaged, beautifully presented, wooden vice screw. All the surfaces, and especially the handle, are silky smooth to the touch. The threads are cut without any blemishes, which I expected of the main screw itself as it is relatively easy to machine, but this was also true of the internal thread of the nut, which is not so easily achieved.

Attention to detail is evident everywhere. The end caps of the handle are also attached with wooden screw threads, and a rubber O-ring is fitted at each end to cushion the sound and the force when the handle drops through the hub of the screw.

The diameter of the main thread is three inches (around 75mm), and the threaded section is 19 inches or around 475mm, long. The 2X in the name refers to this extra large size, and does not mean that you get two of them for the price.

The main selling point of this screw is that it is extremely fast, opening and closing at the rate of one inch or about 25mm per turn of the handle. There are two separate threads on the main screw, with the second starting a half turn

after the first. The pitch of each is one inch so the second one is, in a sense, in between the threads of the first one, and both advance the screw at the same rate of one inch per turn.

It has been unusually humid here in Brisbane for the past few weeks, but I was pleased to see the nut has remained comfortably free on the thread, which eliminated one of my main concerns with wooden threads, especially those manufactured in a foreign country with a very different climate.

I found the installation instructions for using this thread in a leg vice on the Lake Erie website, and whilst these are quite thorough, they did contain references to a 2010 issue of Popular Woodwork magazine, and another to one of Christopher Schwarz's books on making workbenches. Luckily I have both of these and found they mainly concerned the design of other aspects of a leg vice, such as the shape and dimensions of the front jaw, and the installation of the bottom parallel arm in the front jaw.

Please note also that this type of vice requires the edge of the bench

top to be flush with the leg it is to be installed on.

A well made brass garter in two halves comes with the vice screw, and with the necessary 14G steel screws. The instructions for installing these are clear and comprehensive, but provision has also been made (a second square section groove has been cut around the screw near the one provided for the brass garter) for installing an invisible, wooden garter instead, through a mortise cut into the side of the bench leg.

If you like the idea of a wooden vice screw you will not find one better than this.

Robert Howard is a woodworker and woodwork teacher who lives in Brisbane. See www.roberthoward.com.au

The premium kit reviewed here costs US\$329. The basic 2X vice kit (screw and nut) sells for US\$239, while a standard kit (screw, nut and handle) is US\$275.

Review vice supplied by www.lakeerietoolworks.com



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Dovetail Guides

Reviewed by Richard Vaughan

Dovetails tend to be a criterion by which a woodworker is judged and it does take a fair bit of practice to routinely get good results. For recreational woodworkers this can be a challenge that results in too much disappointment in an activity that should bring joy.

There are those who may dismiss magnetic dovetail saw guides as 'cheating', but I have to applaud a jig that enables excellent results for even complete beginners and encourages them to keep extending their repertoire. You can think of them as training wheels that allow muscle memory to develop.

I recently acquired two popular versions for my students to experience, although I don't intend to substitute them for working on their unassisted hand skills during class time.

The Katz-Moses dovetail jig (**photo 1**) was ordered online from overseas while the Veritas guide (**photo 2**) was obtained locally from Carbatec. The high standard of manufacture of these jigs is really satisfying and both come with clear instructions.

It takes little practice to get a good sense of where to position the jigs to make a saw cut that needs no chisel work for a snug fit. The primary difference is that



the Veritas can be locked in position for both tails and pins whereas the Katz-Moses depends on being held, and as the surface is very smooth this is a bit of a knack, though not a write-off issue. Another minor inconvenience with the Katz-Moses is that the board needs to be reversed to cut the other angle of the tails and pins, unlike the Veritas.

Once the tails have been sawn and the pins marked both jigs enable accurate cutting of the pins, and this eliminates another chance for a sawcut that needs tuning.

Although the instructions recommend clearing the waste before marking out the pins, I favour using the kerf before clearing the waste as there is no chance of a slip away from, or into the tail, especially when cutting fine pins. I have made up a simple tool for this with a piece of extinct Japanese sawblade so a good fit in the kerf is guaranteed (**photo 3**).

I claim no credit for the jig also shown in photo 3 that makes accurately marking the pins from the tails easy – I came across it on YouTube but don't recall where. It's simple to make and highly recommended. Note the use of tape to make the gauge line clearer.

Cutting the shoulder at each end of the tails board is often a source of error but the Katz-Moses jig includes a guide for this. Veritas does have a separate jig for square vertical cuts but having it in the one tool is very convenient.

Another point of difference is that the Veritas jig is too tall for most dovetail saws that have a back and so requires a backless version. However I found that my flush cut saw worked nicely. The Katz-Moses can be used with any dovetail saw but I have to say that a saw without set precludes the chance of damaging the jig.

Even though the shoulder cutting guide on the Katz-Moses is a big plus I tend to favour the way the Veritas can be locked in place, but both are very effective and the price difference is minor.

Photos: Richard Vaughan

Richard Vaughan is a furniture designer maker who also teaches woodworking. See www.richardvaughan.com.au

*Katz-Moses jig from www.katzmoseswoodworking.com
Veritas dovetail guide from www.carbatec.com.au*

1. The Katz-Moses guide is made from clear urethane.
2. Using the Veritas dovetail guide.
3. A piece of an old Japanese sawblade was used to make a tool for marking kerf lines. Also shown, a shopmade jig that makes marking pins from tails easier.





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Left: Carbon fibre provides lightweight strength in Blue Spruce Toolwork's new fretsaw.

Below: The blade holding, tensioning and rotation system is highly effective.

Blue Spruce Fretsaw

Reviewed by Robert Howard

Knew Concepts were the first to successfully revolutionise the design of these saws with their titanium framed coping saw. However, I get the impression that their emphasis was primarily on the saw frame, in an attempt to find a design that would be light enough to properly tension the blade, but inexpensive enough to succeed in the market. This they did, but for me the weak point of their design was their blade tensioning system. It did place a wonderful tension on the blade, and for that I loved it, but I have always yearned for a higher quality version of it. This we now have.

Blue Spruce Toolworks have built on the Knew Concepts revolution of frame design by introducing carbon fibre to provide lightweight strength, but have gone beyond by vastly improving the blade holding, tensioning and rotation system.

Everything about the Blue Spruce system is very high quality, and works beautifully. It is so good that, uniquely, it can be used as a scrollsaw, with the blade under full tension but totally free to rotate as the handle is turned to steer it.

Each stainless steel blade clamp is on the end of a short shaft that passes through a boss on each end of the



frame. One is threaded to receive the wooden handle, and as the handle rotates on the thread it applies the tension to the blade.

The really clever part is that a nut on the inside of the boss can be adjusted to allow the handle to lock up on its thread, applying the required tension to the blade, but at the same time remaining free to rotate in the boss. Bearings fitted to each shaft in its boss allow the connected system to rotate smoothly while under the applied tension.

Thumbwheels fitted above each boss control pins that allow the blade to be fixed in any of eight indents along each 360° rotation.

The saw can be bought as a fretsaw or a coping saw, but the names only signify two different methods of holding the blade. The fretsaw uses pin-less scrollsaw blades which are held by stainless steel thumb screws,

whereas the coping saw uses the traditional pinned blades. A conversion kit is available.

Finally, each saw can be ordered in any of 11 frame colours, two hardware finishes, and six handle woods (but two of these cannot be legally exported from the US).

Unfortunately, not everyone will be able to, or will allow themselves to, afford this superb saw. But if you love beautiful things as much as I do, I hope you will find a way. I know I will be repeating the mantra about long after the price is forgotten, the quality remains.

Photos: Robert Howard
Robert Howard is a woodworker and woodwork teacher who lives in Brisbane.
See www.roberthoward.com.au

Review tools supplied by
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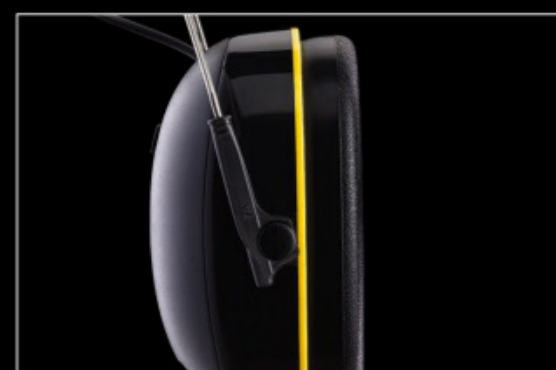
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Blue Spruce Layout Tools

Reviewed by Raf Nathan

This is a new take on wood tool design. Maker Dave Jeske of the USA has chosen an aluminium for the body of these tools with a hardened steel blade. The aluminium is superbly milled with an infill of curly maple to give the design a boost. In fact the attention to detail is excellent with all tools having crisp chamfers and everything looking perfect.

There are two finishes available for the steel and aluminium; a satin and anodised finish, or a dark ceramic coating. I preferred the anodised look with a satin steel. The tools can be ordered with different colours and wood infills for those wanting a customised look.

There are bevel gauges and try and mitre squares available with either 4" or 6" long steel blades. Personally I would opt for the 6" versions and as I find the larger size more useful for most workshop jobs.

The mitre and try-squares can be recalibrated if needed by adjusting two allen screws in the base of the stock. Just turn the screw with the allen key to move the blade either way.

Yes, you can buy cheap squares and bevels that will mostly do the job. However if you want quality tools to help you create quality woodwork then consider tools from makers like Blue Spruce who put care and enthusiasm into every tool that exits their workshop.

*Photos: Raf Nathan
Raf Nathan is a Queensland furniture maker.*

*Review tools supplied by
Blue Spruce Toolworks
www.bluesprucetoolworks.com*



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Number of Knives	56pcs	Package Size	1480x570x1130mm

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Showing the Elipse P3 half face dust mask in medium/large size.

Elipse P3 Dust Mask

Reviewed by Raf Nathan

You can use disposable paper masks for pretty good dust protection in the workshop. If you want to 'dispose' less though, get a real dust mask that only needs the filters replaced.

This UK-made half face mask by Elipse is rated for protection against dust, metal fumes, certain smoke, wood dust, MDF and asbestos and is approved to European Standard. The label says it can trap 99.97% of airborne particles, which is outstanding (although a beard will reduce this).

The mask is soft-fitting with two adjustable elastic bands. It is rated as medium/large in size although I would have preferred it to be slightly larger.

There are two long-life replaceable filters that are quite slim and do not obstruct your view. You can't wash the filters and re-use them but replacement filters are around \$19 for a two-pack.

The mask is comfortable to wear for extended periods and I found it did not fog my spectacles at all. The exhalation valve is good and importantly there was no restriction in breathing. You should wipe out the inside of the mask after use to mop up corrosive sweat, and a regular wash and dry is recommended to look after the mask.

Over a two week period the mask has been worn for all kinds of wood machining and sanding and the filters still look as though they have hardly been used. Recommended for workshop use.

Review mask from Carroll's Woodcraft Supplies
www.cwsonline.com.au

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Veritas Shooting Board and Fence

Reviewed by Troy McDonald



The supplied package includes the Veritas fence, board and track. The Veritas shooting plane in right or left-hand versions sells separately for \$590.

The shooting board is one of the those age old relics of woodworking that seems so wonderfully simple it's escaped significant advance or improvement. So in hindsight it shouldn't be surprising that someone would finally bring a product to market that combines the simplicity of the original design with modern materials.

Given their track record of innovation it's perhaps also no surprise that it's Veritas who has found a way to improve a design that has been an important aid to woodworkers for centuries. A number of Veritas products targeted at improving the basic shooting board design such as the shooting plane and shooting board track have been available for some time, however, their new shooting board fence is a clever product that would appear to have its design roots sourced from the vintage Stanley 52, discontinued from the Stanley line in the 1940s.

In true Veritas style, they have taken the design several steps further in its evolution with their new fence presenting as a clever piece of functional engineering. The fence is to be made available as a standalone product for those that wish to match it to a home made shooting board, or alternatively, Veritas is also marketing a complete shooting board product in both left and righthand versions that is ready to use straight out of the box with both fence and tracks

pre-mounted to a solid 600mm long birch ply base.

The fence is fully adjustable with clever preset detents allowing you to quickly and accurately adjust your angle setting to 0° and seven other angle settings designed to suit the mitres required for common multifaceted boxes or mitred frames. Within each preset angle there is provision to further customise the setting via a number of additional fine adjustment markings, each of 0.25° to either side of the preset position.

I tested a number of the angles and found them all to be very accurate at the default preset position without need for finetuning. That said, experience suggests that these fine adjustments would come in very handy to ensure a perfect fit on multi faceted frames. To ensure there is no blow out on the far side of endgrain being planed, the design also includes provision for a fully adjustable sacrificial fence that quickly fastens to the fence casting.

For those that opt for the complete product these fences are included as part of the package. It was this complete unit that was supplied for my test along with the accompanying Veritas shooting board plane. The board itself is made from high quality 19mm Baltic birch ply with a cleat let into a housing across the base of the board to ensure it sits solidly on the bench.

In use I honestly found it difficult to fault either product. The fence adjusted effortlessly and the quality materials of the board with adjustable, low friction track ensured the plane presented perfectly square at all times to the material being planed. If I was to suggest any improvement it would be for the shooting board base to be slightly larger in size and the angle markings on the fence to be made slightly more visible, given they are finished in the same dark colour as the fence within which they are cast.

Recognising this is already a large item to freight I can however accept the sizing of the base as a very minor concession. Choosing to purchase the fence alone will of course allow full customisation of your board design.

In summary, I think Veritas and Carbatec are on a winner with these products. Both the full shooting board and the fence are wonderfully designed items of quality manufacture that I would welcome in my workshop.

Photos: Troy McDonald

Troy McDonald is an engineer and woodworker based in Brisbane. Email him at: helenoftroy1@optusnet.com.au

*Review tool from Carbatec
www.carbatec.com.au*

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*'Dream Steamer' by Eliot Brand
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New Compass Concept ►

Iris is a drawing compass that functions like a camera aperture. Laid flat, two fingers are used to rotate the top ring to expand or contract its 20 stainless steel leaves to vary the circle within. The Høvel pencil sharpener also shown can also be used as a small finishing plane. Both tools are designed by UK start-up Makers Cabinet.

www.makerscabinet.com



Product news

A round-up of tools and products to take notice of.



For Square Holes ▲

For those who need to drill square holes there should be a spot in the shed for this compact and, at 46kg, light enough to move around mortiser. The Hafco Woodmaster M-16 has a 120mm vertical head stroke, a 165mm lateral table stroke and can accept timber up to 125mm wide. Positioning material is via handwheel and the 370 watt, 240V motor generates 1400rpm of power. Priced at \$396 it's worth considering.

www.machineryhouse.com.au/W347

All-In-One Kit ►

Your sharpening needs in one handy lasercut tray, are shown here complete with 10,000 and 1,000 grit waterstones, a DMT lapping plate and even a thin ruler for employing the 'ruler trick'. A built-in angle setting jig for your honing guide adds to the convenience factor. High quality Ohishi stones don't need soaking – a spritz of water is all you need. The three inch wide stones can handle wide plane blades and have a fast cutting action. The kit sells for \$1099 including the Lie-Nielsen honing guide, or without the guide for \$699.

www.lie-nielsen.com.au



Another Acacia ▲

Its common name may be 'silver' wattle but the tones vary from light straw to pinky hues to mid-browns. *Acacia dealbata*, like its cousin *Acacia melanoxylon* (blackwood) grows in Tasmania's wet eucalypt forests to 600mm diameter and to 35 metres in height. Silver wattle is a lesser known native species that has potential for solid timber work.

www.islandspecialtytimbers.com.au



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www.interwoodshop.com.au



Fully Loaded ▲

With a host of new features, the Rikon 14" Professional Bandsaw is a contender for number one in its class. Spring-loaded, tool-less blade guides offer one-handed convenience, while a 'quick-adjust' rip fence streamlines workflow. The cut capacity is 353mm and the throat deep at 346mm. Power is promised, as is quality and a five year guarantee. Rip fence (150mm high) and mitre gauge are included.

www.woodworkmachinery.com.au

▼ Bits at Your Fingertips

If you've used woodworking tools within the last few decades there's not much chance you don't know the Carbitool brand. Australian born and made, this is the company which produces all manner of router and drill bits, not to mention a range of other tooling for machinery and power tools. With the recent launch of their new website with shopping cart your bits are only a few keystrokes away.

www.carbitool.com.au



◀ Accessorise Your Work

For those who create pens, desk accessories, clocks, walking sticks, lazy susans and much more, a range of brass, steel, pewter and plastic accessories await you at Tasmanian Turning Supplies. The gum nut pewter pot pourri lid shown here is available in different sizes for just under \$5 and is a new addition to the range of component and project parts on offer.

www.tasturningsupplies.com.au

Hiviz Pencil ►

Marking out on darker woods can be easier with Pica Dry marker pencils. The 2.8mm diameter leads are inserted and ejected via a pump-action button up the top, while the carrier also doubles as a sharpener. A range of water soluble colours means you can code your layouts as well. The pens are \$20 and refills cost \$14.

www.carbatec.com.au



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Hardwood Mills Australia make portable bandsaw mills designed to handle native hardwoods as well as exotic species. Most recently the team have produced the new GT34 which holds a 34 inch diameter log, 26 inch wide boards and has a deep 18 inch gullet. With this you can go straight to the centre of the log allowing you to cut the tension out of the timber, quartersaw or just leave your slabs on and keep going without having to lift them off.

www.hardwoodmills.com.au



▲ Big Protractor

FirstLightWorks say their Big Protractor is intended for 'anyone who needs to set out angular measurements and requires something bigger than the plastic protractor from your schools maths set'. Perfect for woodworkers, chairmakers, joiners, carpenters and people who like angles other than 90°. The Big Protractor is 300mm wide and made from 3.2mm 3-ply acrylic laminate, which is laser engraved to give high contrast markings. It is marked in single degrees for reading both clockwise and anti-clockwise and ships to Australia for UK£30.

www.firstlightworks.co.uk

▼ The Complete Kit

When all the spoon tools are blunt the next thing to know is how to sharpen them. Here's a kit that will give you the wherewithall. With MStein tools, strops for both inner and outer curves and a tin of Alfie Shine all wrapped up in a canvas tool roll you've got the goods (or a great present) for an outlay of \$275.

www.vespertools.com.au



◀ Midi is Maxi

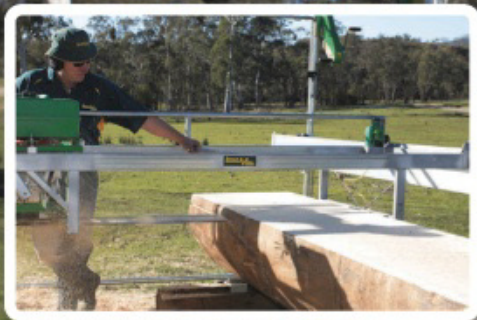
Laguna claim their REVO 12|16 is the midi lathe to end all midi lathes. With capacities larger than its relatively small size, this unit features 'pulse width modulation' to maintain torque and minimise rpm loss, a one-step, cam-action belt change with magnetic door housing and a 'luxury' banjo with 45° chamfered edge. The unit comes with a range of extras as well.

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Kelly Parker's Triptych redwood burl boxes with pyrography and copper leaf detailing. Photo: Kelly Parker



Triptych Boxes

Designing, making and detailing some complex boxes became an exercise in working safely with small parts. Story by Kelly Parker.

I was recently commissioned by a long-time client to make a box. He gave me beautiful slabs of some redwood burl (**photo 1**) with the instruction to 'go be creative'. He rarely uses the boxes I make, instead preferring them to be adornments in his home. Knowing the piece didn't really need to function gave me great creative freedom with the form. In this article I will discuss the design, construction and embellishment of the piece I call *Triptych*.

Design

As I started my design process* the ideas I was sketching felt more like vessels than boxes. Eventually I started exploring my ideas in 3D using rigid foam insulation (**photo 2**). I will often model smaller objects full-sized

using rigid foam as it's a quick way to start to refine shape and proportion. Additionally, I can cut it on my bandsaw or tablesaw and shape it with rasps and other tools. Ultimately I settled on a triptych, three small boxes that would relate to each other based on their shape and surface embellishments. The three mockups on the right in **photo 2** on p.28 show the final design.

Cutting the sides

The boxes are quite small at 75mm, 100mm and 125mm tall. Because of the size of the parts, the construction became an exercise in building jigs to safely hold and machine the individual components. To begin, I dimensioned the wood and cut the box sides sequentially so the grain would flow around the box.

The wood was machined extra thick so there would be generous offcuts to use later as clamping cauls. I rarely work square and my offcuts are often turned into clamping cauls or sanding cauls.

The next step was to create the side profiles. My full-sized drawings gave me the radius for each box – **fig.1** shows the middle sized box. I created jigs that would work in conjunction with my bandsaw circle cutting jig (**fig.2**).

My circle cutting jig has a platform with a sliding arm that runs perpendicular to the blade. The sliding arm has a piece of dowel that acts as a pivot. I centre the pivot at the centreline of the blade and use a stop so the sliding arm is set for the radius to be cut. The jigs I made to create the side profile were mounted on the dowel in the sliding arm. **Photo 3** shows the jig in use.

Although I had to create the side profile early in the process, it's typically easier to work with squared parts. For ease of use in subsequent operations I temporarily re-attached the offcuts to the box sides using hot glue tack welds.

Cutting the mitres

Once the side profile was cut I moved onto creating the mitres. Processing these small parts on the tablesaw would be dangerous without the control offered by a jig. I created a jig for each of the three sizes that allowed me to run the part against the fence, register it against a stop and hold it securely with a hold-down (**photo 4**). I should also mention that I bond sandpaper to my jigs in the location of the hold-downs to prevent vibration while machining.

Box joinery

Since these were small decorative objects I chose to use biscuits to join the parts. People will often scoff at biscuits and claim they are not true joinery. I would argue that biscuits are actually small floating tenons and are a valid joinery option in certain applications.

I have my biscuit joiner mounted to a platform that I can clamp to my bench (**fig.3**). This setup gives me much more control during use. Additionally I have a variety of jigs that I use with it, including one for biscuiting mitres. I registered the part against a 45° support faced with sandpaper and an end stop.

After the parts were slotted I added a spacer under the biscuit joiner and was able to cut a second slot so that each intersection ended up with two biscuits.

Routing grooves for the base

I made a jig for the router table to hold the parts while running grooves for the box bases using a straight bit. Another jig was used to rout the roundover at the tops of the box sides (**photo 5**). Each jig could accommodate the different box sizes and each had sandpaper and a hold-down. **Photo 6** shows one of the sides with the base groove and top round-over completed.

Before routing the grooves I veneered an oversized panel with a contrasting burl veneer to complement the box sides (**photo 7**). I cut the bases from the most interesting parts of the panel, maximising the amount of burl visible on each. I made the panel first so I could test the fit when routing the groove for the bases.

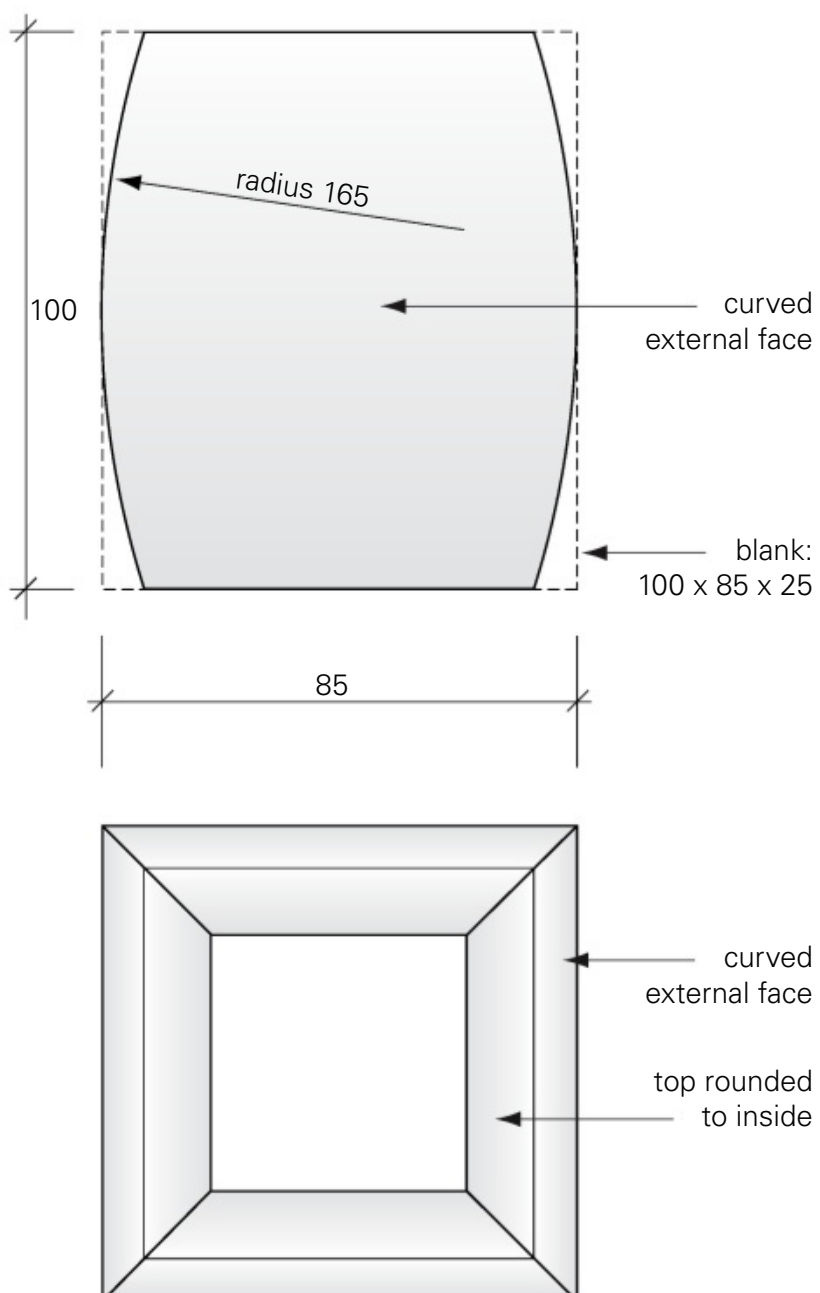


1. Raw to refined: 'This is how I start – usually with a tree that I had milled.' Kelly sits in one of her drying sheds, adjacent to the same redwood burl material used for the finished boxes she now holds.



2

Fig.1 Side and top view, mm not to scale



Box interiors

My plan was to gild the insides with copper leaf and use copper posts to support the lid. Holes were drilled for the copper rod on the drill press, cradling the parts in an offcut and registering them against a fence with stops on either side (**photo 8**). The inside faces and round-overs were next sanded as these would be difficult to sand once glued together.

Gilding a surface with metal leaf is a technique that dates back to ancient Egypt. For my project I chose contemporary techniques and art store materials. Prior to leafing I masked off the mitres and top and bottom edges and then sealed the inside surfaces with two light coats of shellac.

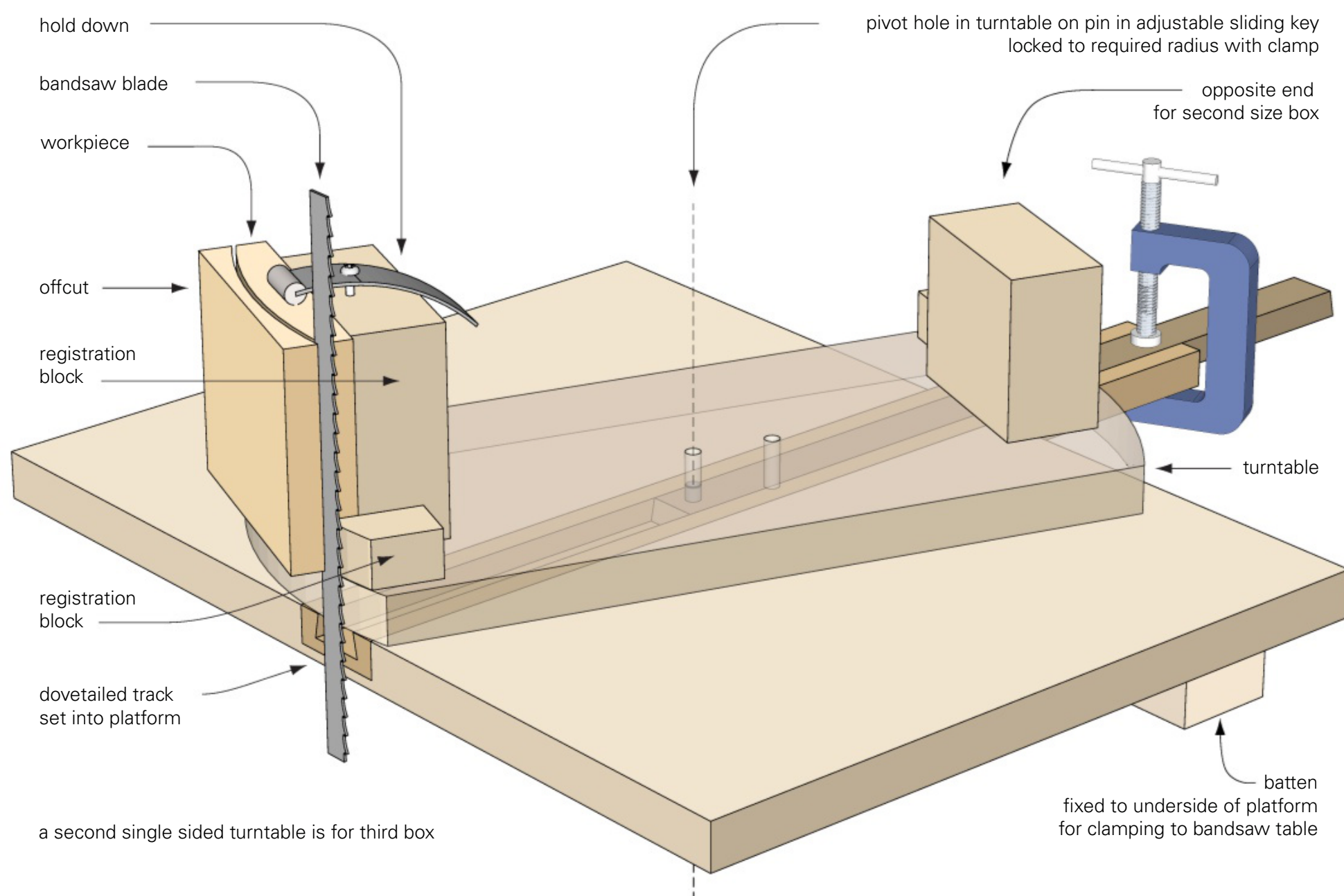
Oxide red is the traditional colour used for painting under a gilded surface however I chose a more contemporary charcoal grey. I used a water-based gilding size, the special adhesive that is used to attach metal leaf to a substrate. Once the size was ready I applied the copper leaf and burnished it into the surface. Lastly, I sealed the gilded surfaces with lacquer to prevent them from tarnishing (**photo 9**).

Once the gilding was done I cut the copper rod to length, chamfered the ends and glued them into the sides of the boxes using E6000, an adhesive that is good for bonding dissimilar materials.



2. After sketching, ideas were explored in 3D using rigid foam insulation – the final mock-ups are shown on the right along with some of the rejected ideas.
3. Using the bandsaw circle jig to cut the profile on the box sides.

Fig.2 Circle jig, not to scale





Assembly

The generous side offcuts were now used as clamping cauls but first modified a bit so they would deliver pressure where needed. A piece was ripped from each edge so they were slightly narrower than the box sides. I then glued on a strip of wood that had been ripped at 45° to each edge of the caul. These strips gave me parallel clamp surfaces where the two corners met. And finally the cauls were faced with sandpaper so they would stay put during the glue-up (**photo 10**). Since I was working alone I used tape to hold opposite cauls in their position while I applied clamps (**photo 11**).

After the glue dried the outer surfaces were sanded – using profiled sanding blocks made quick work of this. The sanding blocks were made using the same bandsaw jigs used to cut the original outside profiles. These were made extra thick so they would be comfortable to hold while sanding. Based on past experience with this wood I knew it to be dry and thirsty. For that reason I sanded

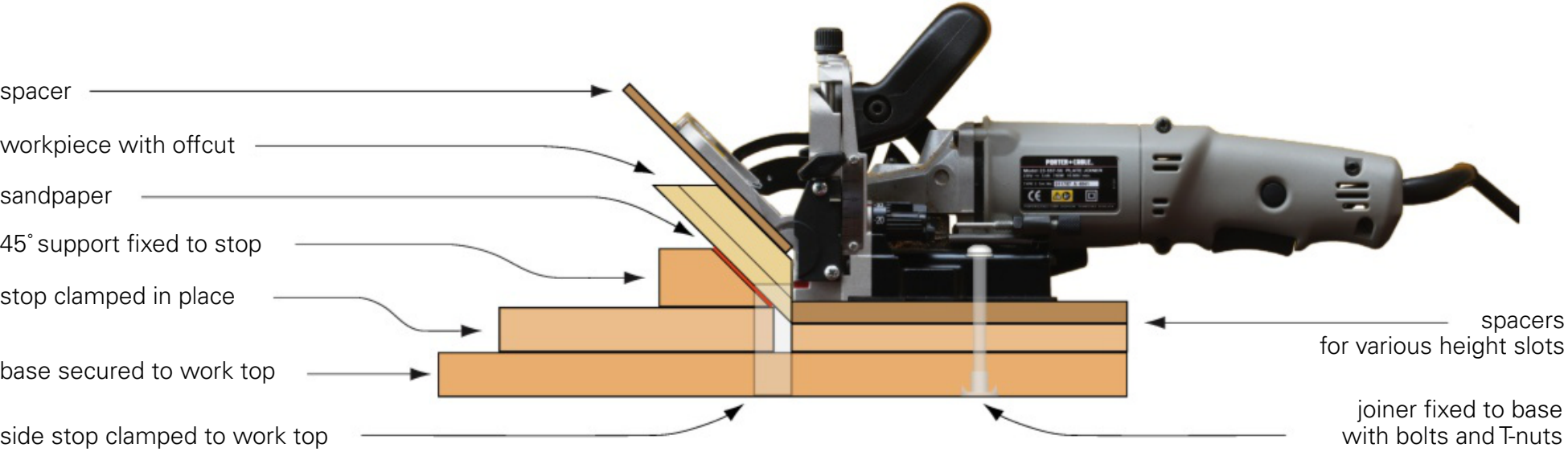
up to 600 grit trying to burnish the surface of the wood in order to slow down the absorption of the oil finish I planned on using.

Making the lids

The lids were dimensioned to fit just inside the box walls and their thicknesses were varied in proportion to their diameter. I cut square blanks just oversized of the final diameter in thicknesses of 10mm, 15mm and 20mm. I then drilled a hole in the centre of the tops of the lid blanks that would later receive the dowel used to connect the pulls and the lids.

The lids have a 30° chamfer on the top surface with a flat spot in the centre for the pull. Again I turned to a jig to help me process the small lids safely on the router table. This time I simply cut cavities in a bit of MDF to hold the individual lid blanks as I routed. The parts fit snugly in the jig and I was able to chamfer all four sides quickly and safely, one lid at a time (**photo 12**).

Fig.3 Biscuit joiner jig for mitres, not to scale





6

4. Showing the small parts tablesaw jig used for cutting mitres on the box sides (guard not shown for photo clarity).
5. Another jig was used on the router table. One of the box sides is positioned ready for the round.
6. Showing one of the sides with the base round-over groove and top round-over completed.
7. An oversized veneered panel was cut down for box bases.
8. Drilling for the copper rod. Offcuts were used to cradle the parts while registering them against a fence with stops on either side.
9. The copper gilded surfaces were sealed with lacquer.



7

My next challenge was to turn the square lids into circles. Once again I used the pivot capabilities of my circle cutting jig but this time on the disc sander. Circular MDF templates were made for each lid with a hole drilled in the centre of each for mounting on the jig with the sliding arm pivot adjusted to so they could be sanded to the exact diameter required. Each template was then attached with double-sided tape to its corresponding chamfered blank before being cut close to the line and then sanded to final dimension (**photo 13**).

Shaping the pulls

I wanted dramatic, angular pulls to be a counterpoint to the rounded boxes. I milled some rosewood blanks square, cut them to length and then drilled them for dowel that would connect them to the lids.

Once again I had small parts that needed to safely processed. Double-sided tape was used to attach the blank to a sacrificial piece of wood that was long enough to keep my fingers well back of the bandsaw blade when I made the cuts and also the disc sander when I cleaned them up. The pulls were repositioned on the sacrificial board before each stage cutting and sanding.



8



9



10



12



13



14



11

Embellishment

Although I loved the overall form of my little boxes I was most excited about embellishing their surfaces. I wanted to use pyrography detailing on the sides and also incorporate bit of copper gilding.

As I sanded I realised the grain of the boxes could (and should) guide my pyrography work rather than imposing the designs I had originally conceived. The end result was a lovely organic band of texture that flowed around the boxes.

To create this look I first chose the grain lines of the upper and lower boundaries of the bands that would encircle the boxes and used pencil to mark them. I also marked the 'dots' where I planned to add copper leaf (**photo 14**). I used a Burnmaster wood burner with a large ball tip pyrography pen to burn out the cavities for the copper leaf. Next I used a small ball tip to define the upper and lower pencilled in boundaries and filled in the space between with a stippled dot pattern (**photo 15**).

Photos 16–18 show details of the finished boxes. Each box has hundreds of individual dots burned into the surface. I gilded the deep cavities using the same technique I used to gild the insides of the boxes. I lightly sanded one more time



15



16



17



18

with 600 grit to clean up any errant leaf and char so tiny 'islands' of wood would show between the individual dots.

For the final finish I chose Tried and True Original Wood Finish. It is a non-toxic blend of polymerised linseed oil and beeswax. It leaves a lovely satin sheen that I find particularly pleasing and touchable. I want my work to be a delight to the fingertips as well as the eyes!

This piece had all of the elements of an ideal project for me as a designer and craftswoman: a unique design, a technically challenging build and engaging surface embellishments. Plus I had a client who was delighted with his new boxes!

Finished and process photos: Kelly Parker

Portraits of Kelly: Penelope Cline

Illustrations: Graham Sands

** See Kelly Parker's story 'Making Ideas', AWR#89.*

Learn more about Kelly at www.woodsongstudio.com and Instagram @kellyparker2017

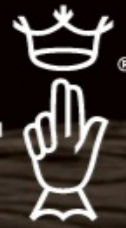
You can attend workshops with Kelly Parker at the Centre for Fine Woodworking in New Zealand in February 2020.

See <http://www.cfw.co.nz/>

10. Offcuts were made narrower and used as clamping cauls. Glued-on strips of wood ripped at 45° to each edge gave parallel clamp surfaces where corners met.
11. Assembly using the cauls and cross-wise clamp pressure. Tape was used to hold parts in place while the clamps were positioned.
12. Router table jig for chamfering box lids. Cavities were cut in a bit of MDF to hold the blanks.
13. The circle cutting jig used again, this time on the disc sander. Lids were mounted to circular MDF templates before sanding to final diameter.
14. Pencil lines defined boundaries for the pyrography and 'dots' would be gilded.
15. In-progress shot of pyrography.
16. Angular pulls and chamfered surfaces were created for the lids.
17. Each box has gilded details as well as hundreds of dots burned into the surface.
18. Showing the gilded box interiors. Copper rod inserts act as rests for the lids.

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REVIEW



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Saving Our Skins

Philip Ashley looks at developments in sawblade flesh sensing technology.

Is there a perfectly safe saw? The correct guards properly used will help to keep your tablesaw safe. A few simple safe operating procedures will help as well. Cleanliness and a good maintenance program will add more to your table or panel saw's safety but even after all this, your machine still has a sawblade that will remove a finger before you even realise it's gone. And it's so easy to do; a momentary lapse in concentration can find even the most skilled woodworkers in trouble. Enter the SawStop technology that instantly stops the spinning sawblade if you are unlucky enough to touch it.

The Sawstop story

So how does it work? Firstly, there are now a number of parallel

technologies, so we'll look at the original SawStop machine first. On this machine the blade carries a small electrical signal. When the skin contacts the blade, the signal changes because the human body is conductive. The change to the signal activates the machine safety system.

A block of aluminium springs into the spinning blade, stopping it in less than five milliseconds and the blade's angular momentum drives it beneath the table. Power to the motor is shut off in the same action. You can re-set the machine, but this requires a new brake mechanism that Carbatec currently sells for \$130 and you will certainly need a new blade as the brake and blade are usually fused together in the impact.

The technology was invented by Dr Steve Gass in 1999, and in 2004 the first SawStop tablesaw was sold. SawStop is a privately-owned company based in Portland, USA. The technology won Time Magazine's 'best new inventions' for 2006 award and rightly so.

The machine was first brought into Australia by Gabbett Machinery, now SCM Australia, and exhibited at the AWISA trade show in Sydney in 2010 where live demonstrations were held using a sausage in place of a finger. The best customers of this new technology were schools, especially secondary colleges. SawStop is now sold by Timbecon in Melbourne and Perth, and by Carbatec and Total Tools Australia-wide.

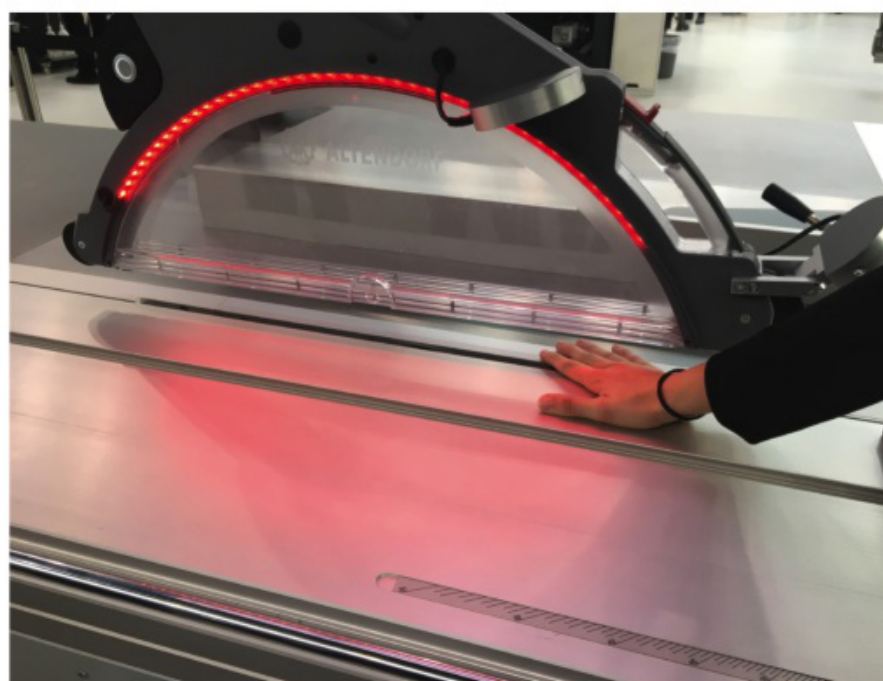
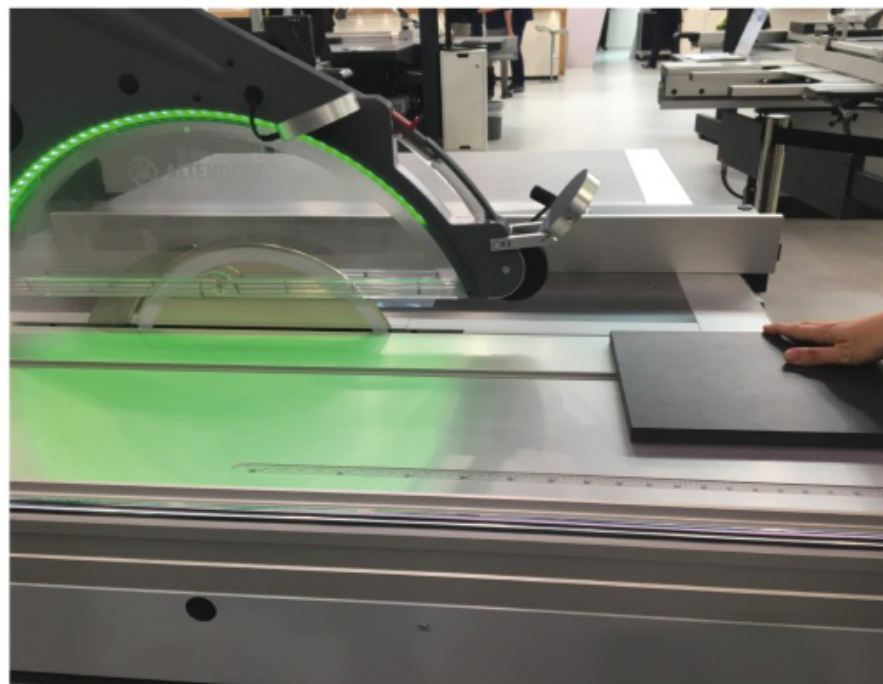
At the 2016 AWISA trade show in Melbourne, WoodTech Group exhibited a Griggio Unica Safe sliding table panel saw with this technology but Griggio went into receivership mid last year.

Another machine with similar technology is the Bosch Reaxx machine. There's no aluminium block and the saw stops naturally after being dropped below the table. A test done by an American tool review site revealed a 25mm cut in the palm of a human hand when slapped onto a Reaxx machine blade protruding only a few millimetres above the surface of a piece of wood. The same test on the SawStop machine produced only a minor scratch. It's worth noting that both these technologies draw blood.

SawStop is now owned by Tooltechnic Systems, a family of companies that also includes Festool. Bosch ran into copyright trouble from SawStop in 2015, even though there were some differences in the two technologies. One can understand SawStop's position but denying others developing similar safety technology limits the user's choice of machine if they want the new safety systems. Bosch has discontinued the sales of their Reaxx machine leaving SawStop as the only machine currently available with skin sensing technology.

Back to the future

Heavy industry usually drives change, just look at all the technologies we enjoy today as a result of the development of technologies like the Space Shuttle, for example. What will drive the future of 'sawstop' technology will be machines built for industrial applications. Two such companies are currently developing related technologies and while Australia may



Main: Showing the undercarriage of the SawStop tablesaw braking mechanism. 10" standard brake cartridges sell for \$130 however cartridges are replaced free of charge for confirmed 'finger saves'.
Photo: Todd Eckelman

Top: Showing the fused SawStop blade and brake mechanism after triggering.
Photo: Philip Ashley

Above and left: On the Altendorf machine the light shines green for normal operation. Red light shows that hand recognition has been triggered by a 3D camera, causing the blade to drop below the table. The blade is not damaged and the machine can be turned on and run again.
Photos: Philip Ashley

not see these machines on sale in the next one or two years, it's very exciting news for the industrial woodworking sector. The two companies are Altendorf and Felder, both very well known also to the small and hobby woodworker. Both technologies are different in their approach to the issue of hand safety, but both are (reportedly) bloodless in their approach.

Altendorf Safety Assistant

The Altendorf solution relies on detecting the hazard at an early stage. Various defined situations are recognised and classified using a number of cameras to gather information about the operator's activity. A computer interprets this and if it detects a hazard, it responds by warning the user in two stages.

Stage one is an optical signal: lights on the overhead guard. Stage two is the blade slowing slightly so the operator is aware of the danger. In stage three, the main sawblade stops very quickly and the whole saw unit rapidly drops beneath the table. There is no aluminium brake and the saw can be instantly reset and used normally.

The Altendorf Safety Assistant or ASA is the working title for this new development. The new system was shown for the first time at the German Ligna fair in late May and there were a lot of exposed cables and cameras on the prototype. These will obviously be hidden and miniaturised by the time the system goes on sale as an optional accessory.

The patent applications have been filed and the process is under way, which means realistically the system will not be available to buy before 2020. It will be interesting to see if Tooltechnic Systems objects to either the Altendorf or Felder developments.

Felder Preventive Contact System

We are taught that the best safety is the safety that you cannot see; the safety that's actually part of the machine and Felder Group proved at Ligna that this is in fact possible. Five years ago, Felder Group started a project with the University of Vienna with Sascha Wein, master joiner and managing director of the Joiner's Trade Guild in Munich. This all came to fruition at Ligna with a 'sawstop' system completely integrated into the machine. Apart from the name PCS Stop (Preventive Contact System) emblazoned on the front cover, you would never know this saw was one of the safest machines ever made.

When the risk of an accident is detected, PCS triggers the rapid lowering of the sawblade under the machine table. The function, based on the electro-magnetic law of repulsion, allows for an extremely short response time of a few milliseconds. The PCS safety lowering mechanism works without damage to the blade, so like the Altendorf, there's no extra cost. The sliding table panel saw is ready to

use again at the push of a button. The technology was actually demonstrated at Ligna with someone's real finger!

There is no doubt that all these clever safety systems reduce severe injuries. A contact system like SawStop will draw blood but only leave a small scratch, a small price to pay on a low cost machine. No doubt Altendorf and Felder will eventually offer their technologies on their low end machine models but this will take many more years and may add a reasonable amount to the price of a new machine.

What is not clear yet is how this technology will function in real working conditions. The SawStop machine has been known to misfire; will the cameras and associated computer systems work on the Altendorf? Will the built-in Felder system function as designed? Time will tell, but if they do what they are designed to do, your work will be a lot safer as a result.

Suppliers:

SawStop: www.carbatec.com.au

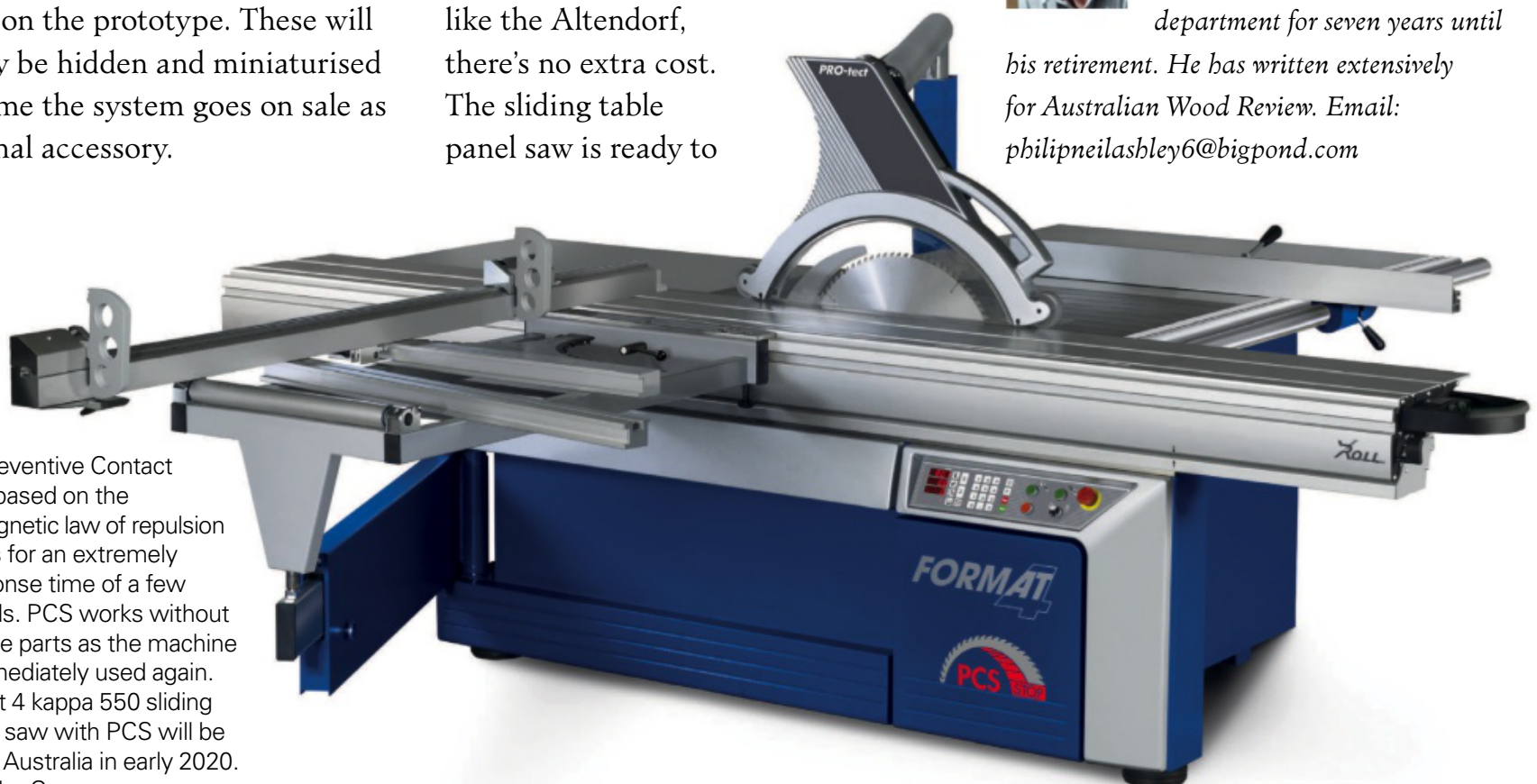
Felder Machinery: www.felder-group.com/au-en

Altendorf: www.altendorf.com.au



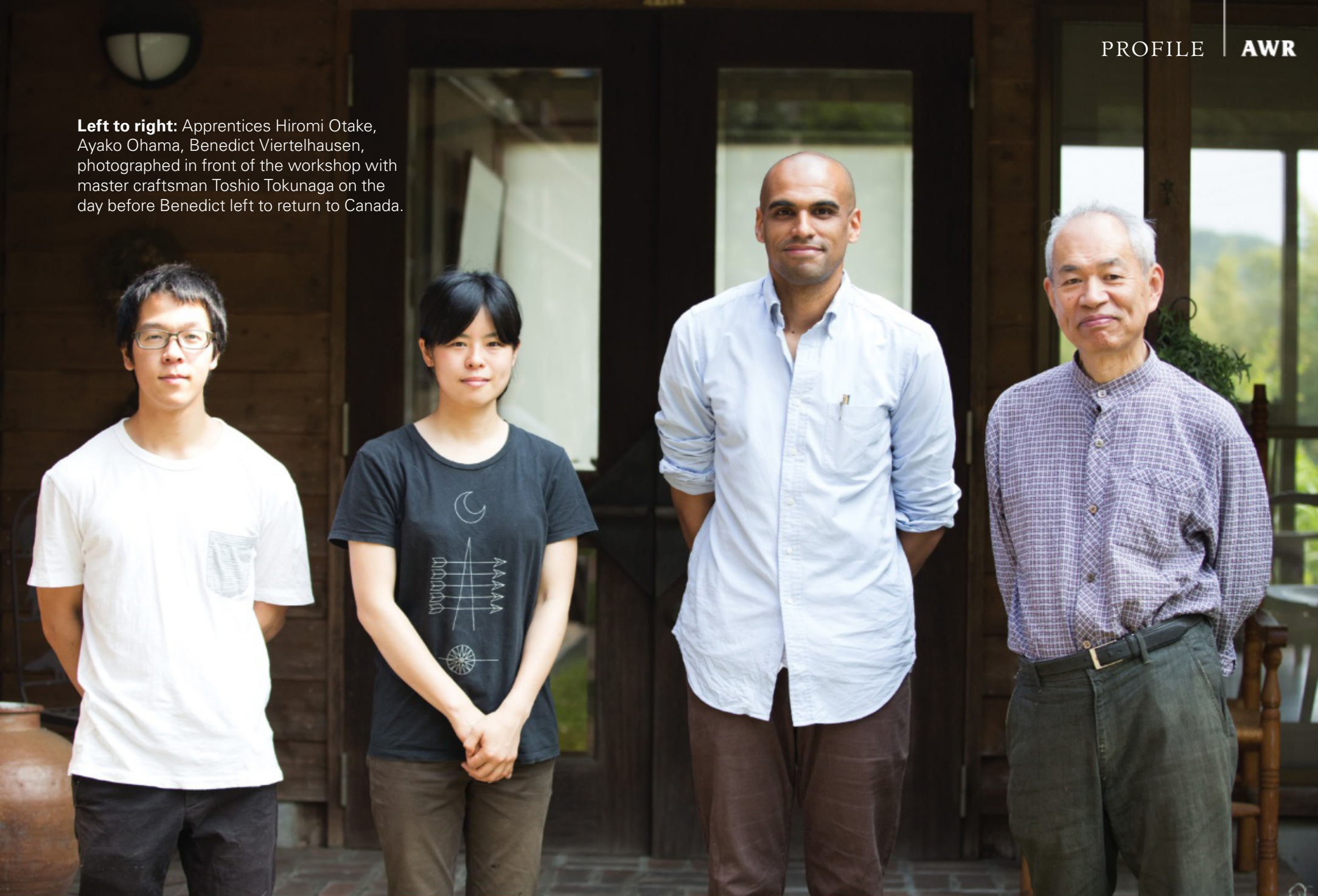
Philip Ashley lectured in furniture making and wood machining skills at Holmesglen TAFE (Vic) and headed the department for seven years until

his retirement. He has written extensively for Australian Wood Review. Email: philipneilashley6@bigpond.com



Felder's Preventive Contact System is based on the electro-magnetic law of repulsion and allows for an extremely short response time of a few milliseconds. PCS works without consumable parts as the machine can be immediately used again. The Format 4 kappa 550 sliding table panel saw with PCS will be available in Australia in early 2020. Photo: Felder Group

Left to right: Apprentices Hiromi Otake, Ayako Ohama, Benedict Viertelhausen, photographed in front of the workshop with master craftsman Toshio Tokunaga on the day before Benedict left to return to Canada.



The Apprentice

How does a Canadian with a newly kindled interest in woodworking come to be apprenticed less than two years later to a renowned craftsman in Miki, Japan? We asked Benedict Viertelhausen this and many other questions about his year-long experience in the workshop of Toshio Tokunaga.

Three years ago you took a beginner boxmaking course and now you are totally committed to a new path in life. Where did the interest in Japanese woodworking come from?

I attended an intro course at my local community wood shop in the beginning of 2016. During a brief slideshow, the instructor described various schools of woodworking; one of which was Japanese woodworking. It was described as a style of woodworking that valued wood as a living material with an important history. It employed tools

of outwardly simple design, and used very few fasteners, as a rule. Additionally, it seemed to stress the critical importance of building one's skill with hand tools. 'We won't be doing any of that today', he told the class. Whether that was a little bit of reverse psychology or not...I think that peaked my curiosity.

Do you speak Japanese?

I didn't speak a word when I started out. By the time my apprenticeship began, it was expected that I would be able to. There were a few late

nights of studying in the time leading up to my training.

How is it possible for a Canadian to be apprenticed to a craftsperson in Japan?

I would say more than a little bit of luck. As a foreign apprentice, learning the language proved a great way to demonstrate commitment. That being said, finding a teacher that suits your working and learning style can take years, even for Japanese students. So I think I got very lucky to find my place with Master Tokunaga.



Can you tell us a little about Toshio Tokunaga, his style of work and the principles that guide it?

Master Tokunaga embodies many of the characteristics of what you or I might picture as a master craftsman. He is dedicated, tireless, disciplined, and of a singular talent.

Beyond that however, he is kind, quick to laugh, and possessing of a contagious *joie de vivre*.

If I had to try to explain his style, I would describe it as 'inviting'. His work invites you to touch and to look closely at subtle detail. Carefully selected materials invite you to reflect on the line between nature and human imagination.

What did you hope to learn as an apprentice? How many other people / apprentices work in his studio? Were you a paid? What were your duties? How did you survive financially?

I had a little experience before I arrived, and was working independently on honing my skills with a saw, *kanna* (a Japanese hand plane) and a chisel. I could sharpen to a passable edge on my tools. In Japan, I expected to learn how to do those things professionally, and to try to master the *kanna*. I did so alongside two other apprentices in my teacher's studio. One was very distantly my senior, another was very closely my junior. As an apprentice in the traditional sense, I was treated as a

1. One of the last made during Benedict's apprenticeship, a chair made from Japanese mulberry receives a final correction from Master Tokunaga.
2. 'The tiny "banana" *kanna* is all we need to shape and finish the chair seat. A little hammer to adjust the plane and you're good to go! The last thing you need, and perhaps the most important, is a clear mind.' The shape in the seat is the result of hours of hand planing, and the final texture is formed from individual long strokes of a round-bottom plane. Each stroke is uniform in depth and thickness, even though it follows contours. In some

cases it even runs perpendicular to the grain without changing shape or causing tear-out.

3. Tokunaga *Vibrato* chairs in Yoshino cedar. 'Just after sunset today, we had 11 more chairs standing. Since I've been here, we've made a little over one each day.'
- 'The *sugi* (cedar) used in the workshop is grown locally in the Yoshino mountains. Seeds from the oldest and highest quality trees are used for propagation. This yields a slow-growing tight-grained and ultimately very clear wood. It is a difficult wood to surface, but its beauty in a finished piece is worth the challenge.'

member of the family – and we would often eat dinner together.

My duties increased steadily, and I was soon making entire pieces of furniture under master Tokunaga's name. There is a sobering amount of responsibility that can be felt when your work bears a master's name. For these pieces, I was paid and often met my teacher's clients and business partners. Such a high amount of accountability certainly kept me focused on the quality of my work.

How did you learn while you were there? You mentioned three stages – were there lessons as such? What sort of a teacher is Toshio Tokunaga and how did you respond to his manner of teaching?

Traditionally, an early apprentice is referred to as a *minerai* – one who observes. After some time spent observing others, one is given a steadily increasing number of tasks (for example: shape a chair leg, sharpen a round blade, cut a tightly fitting joint and so on). Each task, the apprentice is likely to have observed only once. One chance to succeed at its completion is permitted. If you fail to develop a skill, it is unlikely that you will be given another chance.

Once the majority of a craftsman's skillset is mastered, an apprentice enters into the repayment stage. He or she is fully qualified to work independently, but continues to work with their *sensei* as a means of showing gratitude.

As a foreign apprentice whose time was limited by working permits and visas, my observation and early work stages overlapped. I was given observation duties, skill building exercises and paid work simultaneously – and for each, I felt I had my teacher's complete confidence. Wanting to maintain that confidence, I worked as hard as I could, as quickly as I could, and as finely as I could, all at once.

I suspect he intentionally kept me well outside of my comfort zone. As a result, I found myself developing skills quickly. Tea times, lunch times and late nights were spent taking notes of everything I had learned each day.

Did you ever doubt yourself and your decision to take what may seem to others like an extreme and even risky path?

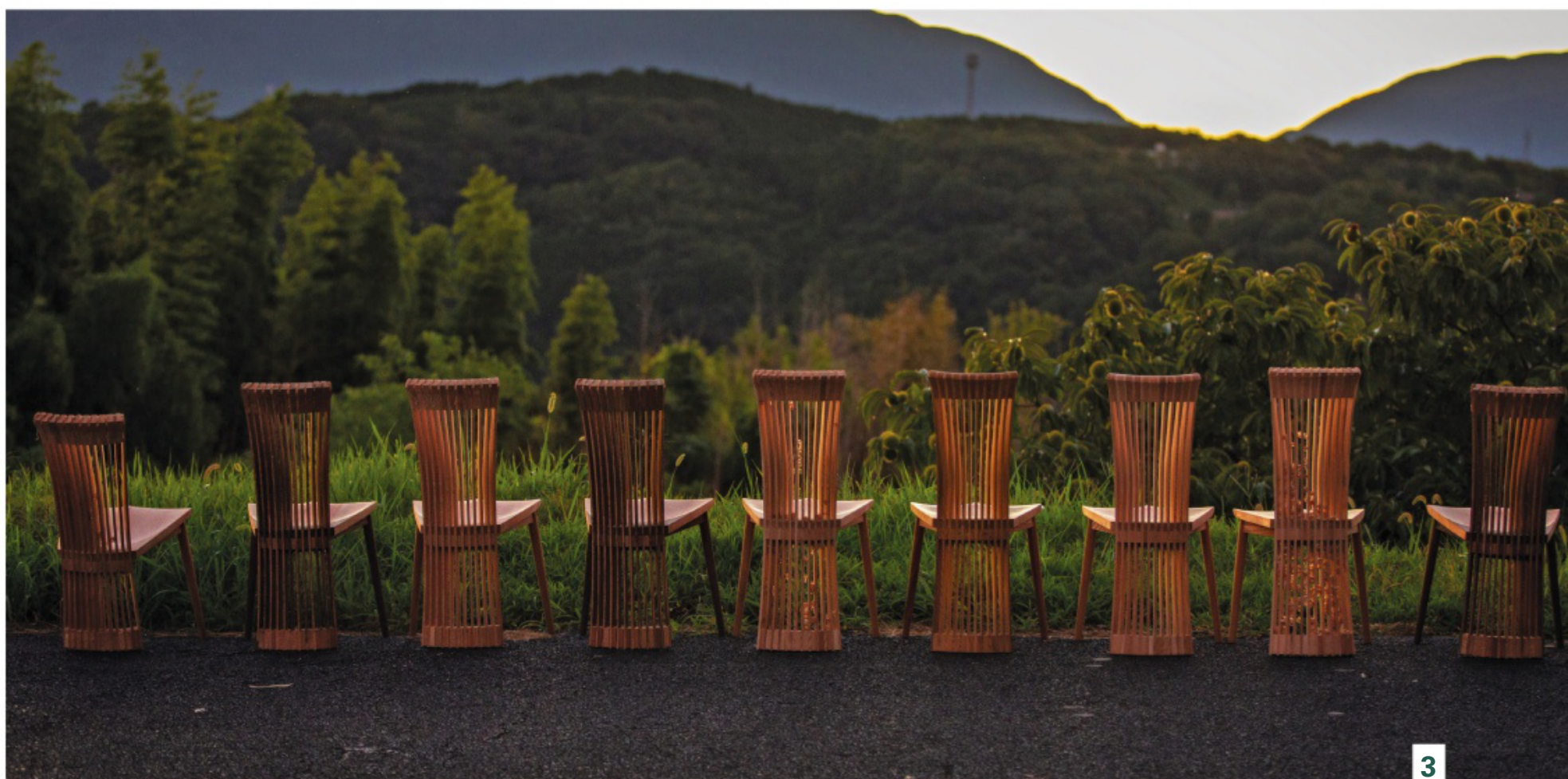
I constantly doubted myself. Having an apprentice junior to me meant I was not only responsible for my education, but to a certain extent, for his as well.

'See one, do one, teach one' became an unintentional mantra for me – and I second guessed myself often. There's an old business analogy that says, 'Be like a duck: above the surface, remain calm; below the surface, paddle like hell!' Ducks and good apprentices might have that in common.

There was a casual deliberateness to the way my teacher did things – and when I was in my greatest moments of crisis or self doubt, I simply mirrored his way of being. Perhaps I still do.

Now that you are back home in Canada what are your plans? Will you make in the same style? What is the significance and importance of kanna finishing in the context of a contemporary maker?

I remember Master Tokunaga saying that, in his mind, the kanna is the point where human ingenuity and nature converge. The tool itself is composed of two components, a blade made in the ancient tradition of forge laminated high carbon steel, and a carefully selected block of wood. My instruction focused on using the kanna to both shape and finish wood. Our goals in the shop were to achieve a level of design that emphasised the richness of wood as a living material,





4



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Has this changed your life? You said that before your apprenticeship in Japan you had planned to be a doctor or work in health care. Woodworking seems very far removed from that, or do you see parallels? How do you feel about being back home in Newfoundland?

I would say yes and no. 'Yes' because when I first started woodworking, I never envisioned myself becoming a professional furniture maker. On the other hand, I was very surprised to find out just how many similarities exist between a traditional Japanese apprenticeship, and the residency program we use to educate physicians. Some of the friends I met in school joke that I've simply traded out my patient populations.

Living in Newfoundland is a real privilege. Both Japan and Canada have beautiful and diverse forests. They are great places to work with wood. I look forward to sharing what I have learned so far, and to building lasting connections between professionals in both countries.

Being in Japan gave me perspective on how lucky I am to be a Canadian,

and surfaces that were smoother than could be achieved with sandpaper. In Japanese, this unique finishing texture is called *kanna-shiage*.

My personal style in Canada is similar to my teacher's. I am most passionate about chairmaking. I share Master Tokunaga's perspectives that when it comes to changing human minds about the value of wood, the chair is the 'how', but *kanna-shiage* is the 'why'.

and have the ability to cross the world in pursuit of my dreams. Being back home gives me perspective on just how different my life has become – and how much my apprenticeship has shaped who I am today.

Learning the craft skills of another culture in its country of origin must give you the ability to compare. What are the differences you see between timbers, tools, skills and attitudes?

In Canada we appreciate and value beautiful timbers but most craftsmen buy their wood from a lumber dealer or a sawyer. In Japan, knowledge of an intact tree and the environment from which it came is critical to the finished product. Pieces are never built from different trees of the same variety. As a craftsman in Japan, you are intimately aware of your supply chain, and work with other professionals to cultivate, harvest, mill and dry wood in such a way that future generations are able to carry on your efforts.

The first chair I built was made from a cedar from Yoshino mountain in Japan. It was planted by a woodworker like me over 400 years ago. It was cared for by generations of arborists in the Yoshino mountain afforestation project before it was purchased at auction by the local sawyer. He consulted with our shop, and milled the cedar according to the requirements for that chair. In an effort to minimise waste, our shop received the heartwood from that cedar, while the sapwood (which is not used for furniture), was delivered to the local chopstick maker.

All of this is to say that someone had to be the first to plant and care for trees in Japan for the benefit of future professionals. Perhaps the Japanese model is not suitable for every community, but it certainly highlights some of what we can achieve by working cooperatively.

Photos: Benedict Viertelhausen

*Contact Benedict via
Instagram @viertelhausen*



4. *Triple Vibrato* bench seat made by Toshio Tokunaga
5. One of Benedict's final projects made at the Tokunaga furniture workshop. This 'tatara type f' chair with *washi* cord seat weaving was one of the most technically demanding chairs Benedict worked on.
6. Designed by Mori Kohtaro and made by Benedict Viertelhausen with hand tools only, 'Mori-san's armchair is elegant, minimalist and ultra comfortable. For me it ticks all the boxes. I was lucky and very honoured to have the chance to build a few with him.'
7. 'Looking back on the first half of my apprenticeship, it's hard to believe I've worked on every product in this shot.'

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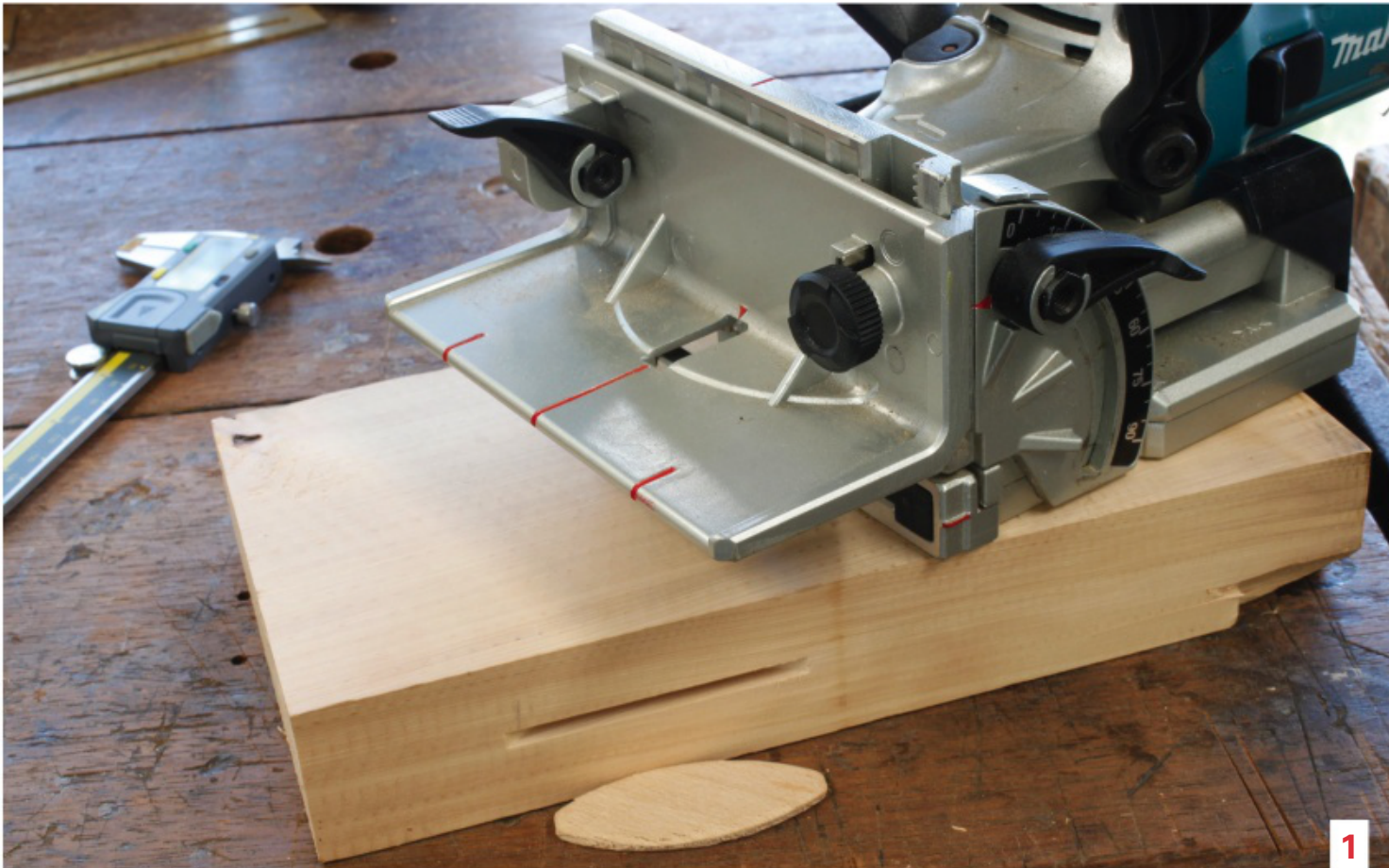
Mega Bundle



The Biscuit is Back

There are many reasons why you can rely on the functionality of the biscuit joiner, explains Raf Nathan.





1. With the extra fence fitted slots can be cut in various thicknesses of wood.
2. Marking out for a shelf.
3. With the shelf clamped down along the pencil lines, the lower edge is the reference face.

In 1956 a Swiss carpenter, Hermann Steiner converted an angle grinder to make simple joints for panels made from a then-new material known as chipboard. Later on, Lamello was the name he chose for the 1968 release of the first portable version of a quick jointing tool.

When Festool released their domino tool in 2007 it was a game changer. The actual technology had been around for years in heavy joinery machines but packaging it in a handheld power tool was an innovation. I sold my biscuit joiner and converted to dominos and have never left them. But recently, I've come back to the biscuit.

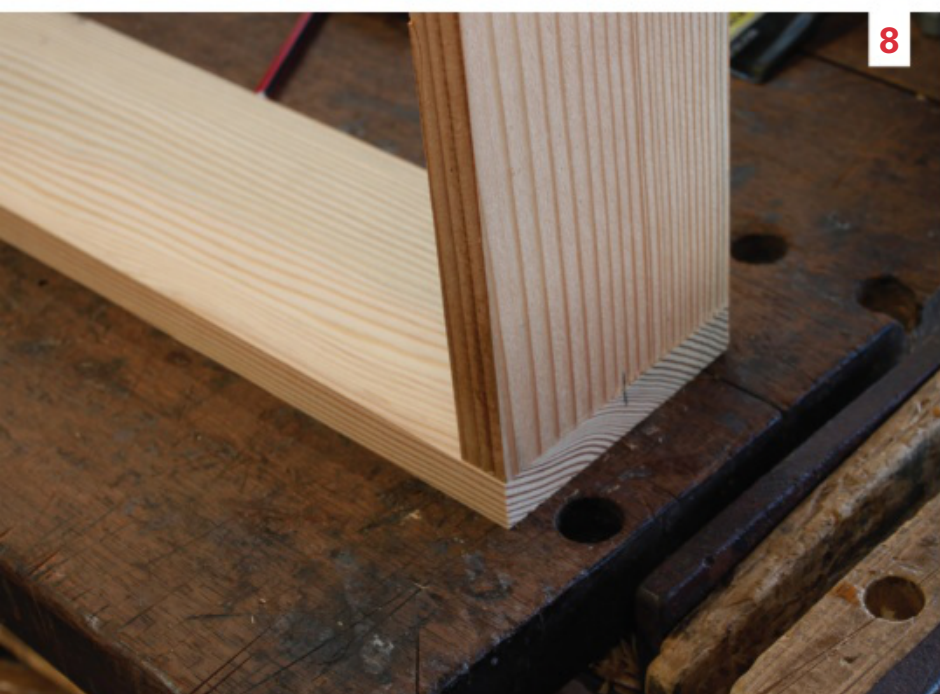
The joiner

The motor in this tool is housed in a barrel driving a 100mm diameter TCT tipped, 4mm thick sawblade – actually on my calipers it was 4.16mm thick. Plunging the tool leaves an arced slot that accepts manufactured wood joiners called biscuits – hence the name biscuit joiner, although plate joiner is also used. The fence and depth adjustment system set the height of the cut and depth.

The biscuits

The biscuits are compressed slightly and usually made from beech. Biscuits are 4mm thick and available in three main sizes – #0 at 47 x 15mm, #10 which are 53 x 19mm, and #20 at 56 x 23mm. This offers a range of widths for different workpieces.





The grain direction of the biscuit is angled slightly to avoid short grain weakness at the sides. When the glue and its moisture make contact with the compressed wood biscuit it expands making for a tight joint. Normal times for letting the wood glue cure still apply. This system is perfect for manufactured boards like MDF and ply, but also suits real wood joining very well.

Brand selection

A good biscuit joiner will have around 700 watts of power, several depth settings for the different sized biscuits, a facility for being used on mitres, a good right angle fence with height adjustment and a dust outlet. Cordless tools are available now which is great, but if you are plugging in a dust extractor hose (a good idea) then you may as well have a cabled tool.

I have a Makita joiner at the moment and it is very good. Previously I have trialled other tools and found the DeWalt also very good but the best is the Lamello, being the real deal. They have several versions all very well made at different price points. Don't get a really cheap tool as I have found they are problematic, for example the blade and base and fence may not be parallel, making good flush fitting joints impossible.

In use

You can use a joiner for edge joining, shelves, mitres and small cabinet doors. Basically you butt the two mating pieces of wood together and strike a pencil mark where



5



6



7

4. Cut the slot in the end of the shelf.
5. Showing the finished joint.
6. Cut slots for mitres with the point angled down.
7. Biscuit joinery is ideal for mitre joints.
8. Biscuited corner joint.
9. Showing the slots cut for a corner joint.

the biscuit slot will be. Use the mark to centre on the pointer of the tool and make the cut. It all comes down to referencing from matching faces to achieve flush joins.

For better results the biscuit joiner works with the base of the tool on a flat surface. The weight is down and the joiner is plunged into the wood. This will position the slot centred for a 20mm thick board or panel. Placing shims under the base will raise the slot for thicker pieces. But this is only for shorter lengths of material. Swing the fence flap down and rest this on top of the wood, and use that face for referencing the position of the slot.

The extra adjustable right angle fence slides onto the main fence and allows height adjustment for materials thicker than 20mm. On the Makita and Lamello the extra fence slides on to the main fence and allows good height adjustment for wood that's thicker than 20mm. On the DeWalt the fence is more sophisticated and offers all the functions as a one-piece unit (**photo 1**). All machines also come with an extra plastic clip-on base that allows you to cut wood 12mm (or 12.5mm on some machines).

Pros and cons

Within a minute or so you have a good clean joint strong enough for shelves and panel cabinets. Standard cabinetmaking rules apply still in relation to the length of a shelf in relation to the expected load and strain on the joint.

The thing is biscuit joinery has strength limits – perfect for manmade boards in say kitchen cabinetmaking, it will not be sufficient for a table leg to rail joint. And the same goes for chairs or any heavy work. Using biscuits for drawer making is a borderline option – most of the drawers I made this way stayed together.

However, there are various metal and plastic fittings available for knock-down and fixed joints giving enormous strength. Usually these comprise of two parts that mate and act as clamps as well. Composite biscuits are also used for manufactured stone joining. However we are only looking here at standard wood biscuit joining.

Shelf or T-joint

Mark the position of the shelf and mark a line on the lower face of the side (**photo 2**). Put the shelf on the pencil mark and clamp, the lower edge is always the reference face (**photo 3**). Cut the slot in the side. With the lower face of the shelf face down, cut the slot in the end (**photo 4**).

Photo 5 shows the finished joint.

Mitres

This works best on panels with the mitre point down (**photo 6**). The quality of the mitre will depend how accurately you can cut the slots. Small deviations that obstruct the mitre on a dry test fit can be helped by taking a shaving off the biscuit to give it a bit of play. The biscuits suit frames made from stock at least



10



11



12



13

45mm wide (**photo 7**). For small cabinet doors I have found biscuits will yield lasting results, however in my doors I glued a plywood panel in the door frame so the whole assembly is rigid.

Corner butt joint

For basic cabinet work with solid or manmade panels biscuits are good for corner joints (**photos 8, 9**). Examples are melamine panels or veneered MDF cabinetwork.

Edge joining boards

Biscuit joinery is a great use for tabletop making as the biscuits align the top edges almost perfectly (**photo 10**). I am not a big fan of gluing the biscuits fully in this application. An air-dried oak tabletop I made using glued biscuits had, after quite a few years, opened up a tiny bit on the joint line only where the biscuits were located. The rest of the glue line was perfect. In this case I guess the air-dried wood shrank in width, which is fine, but the biscuits with their angled grain direction couldn't move along with the rest of the wood. So now I would only glue half of the length of the biscuit, to cover myself.

Table clips

Fixing tabletops is made easy by biscuit cutting the slots for the clips (**photo 11**). Adjusting the depth between two cuts you can make say an 8mm slot that suits a shop made table clip. Metal clips from trade suppliers fit perfectly in the joiner's 4mm slot.

Mitre keys

With the tool sitting on top of a mitre it can be plunged into the wood and cuts a fairly neat slot for a key (**photo 12, 13**). It is not a super accurate way to cut these and the blade is exposed at one point so I only use this method occasionally.

As you can see, there are many good reasons to include the biscuit joiner in your tool kit. They are simple and fast to use and the biscuits themselves are quite inexpensive.



Photos: Raf Nathan

Raf Nathan is a furniture designer and maker who lives in Brisbane. Email: raf@interwoodshop.com.au



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Building a Cigar-Box Guitar

There is no end to the ways you can customise this musical instrument, writes Vic Tesolin.

As a woodworker, making your own tools is a real treat because you can make them to your exacting specifications. The same holds true for a musician – I've been playing stringed instruments for over 30 years and there is nothing more gratifying than making your own instruments. This cigar-box guitar (CBG for short) is one of my favourites to build. I can usually make one in a day and there is no end to the options you have for customisation.

This particular model is acoustic and fretless which is well suited for slide playing. I have also made versions that have a pick-up installed in them to amplify the sound, as well as versions with frets for chording. CBG's are also characteristically made with odd objects and commonly found parts that you likely have laying around your shed. Using items like bolts and threaded rod for parts like the nut and bridge may seem odd but a quick internet search will

turn up all kinds of weird and wacky CBG's so have some fun with it.

Start by gathering your parts. As the name suggests, a cigar box guitar requires a cigar box that you can usually find easily enough at a local tobacconist. The size and type are up to you, and you can even make your own box if you like. Boxes are made from anything ranging from hardboard and plywood to solid wood. I've made CBG's out of all types of boxes and they've all worked well. You will also need the other bits and pieces shown in the materials and supplies list. I get all of my hardware from www.cbgitty.com

Mark up the neck

You can use almost any timber to make a CBG, so this is really up to you. In this case I used a straight-grained piece of construction material, but fancy is good too. Mill the neck to the dimensions listed and indicate where the top surface and top end are. Mark the nut location

on the top and side surfaces, 150mm from the top end of the neck. Then measure from the nut down towards the bottom end of the neck and make a mark at 622.3mm. This is the bridge location and will give you a scale length of 24-1/2".

Now lay the neck down on the cigar box and line up the bridge location such that the bridge is approximately three-quarters to the bottom of the box (**photo 1**). Roughly mark the location of the box on the neck so you have an idea of what part of the neck will be in the box. Finally, find the centre of the neck width and mark it at the bottom end (**photo 2**).

Box work

Often times there are various labels and export stickers on the cigar box. In Canada and Australia there are some pretty graphic photos of what smoking can do to various parts of the anatomy. I typically take off the graphic stickers and leave the export labels in place. I've found the easiest way to do this is with a heat gun or even a hair drier set to its hottest setting.

In order to let the neck into the box, you have to create notches on either end of the cigar box. Place blue painters tape across the ends of the box. Find the centre of the inside of the box width and mark it clearly with a fine marker on both ends. Now line up the neck using the centre mark you made on the bottom end with the centre mark on the box ends (**photo 3**).

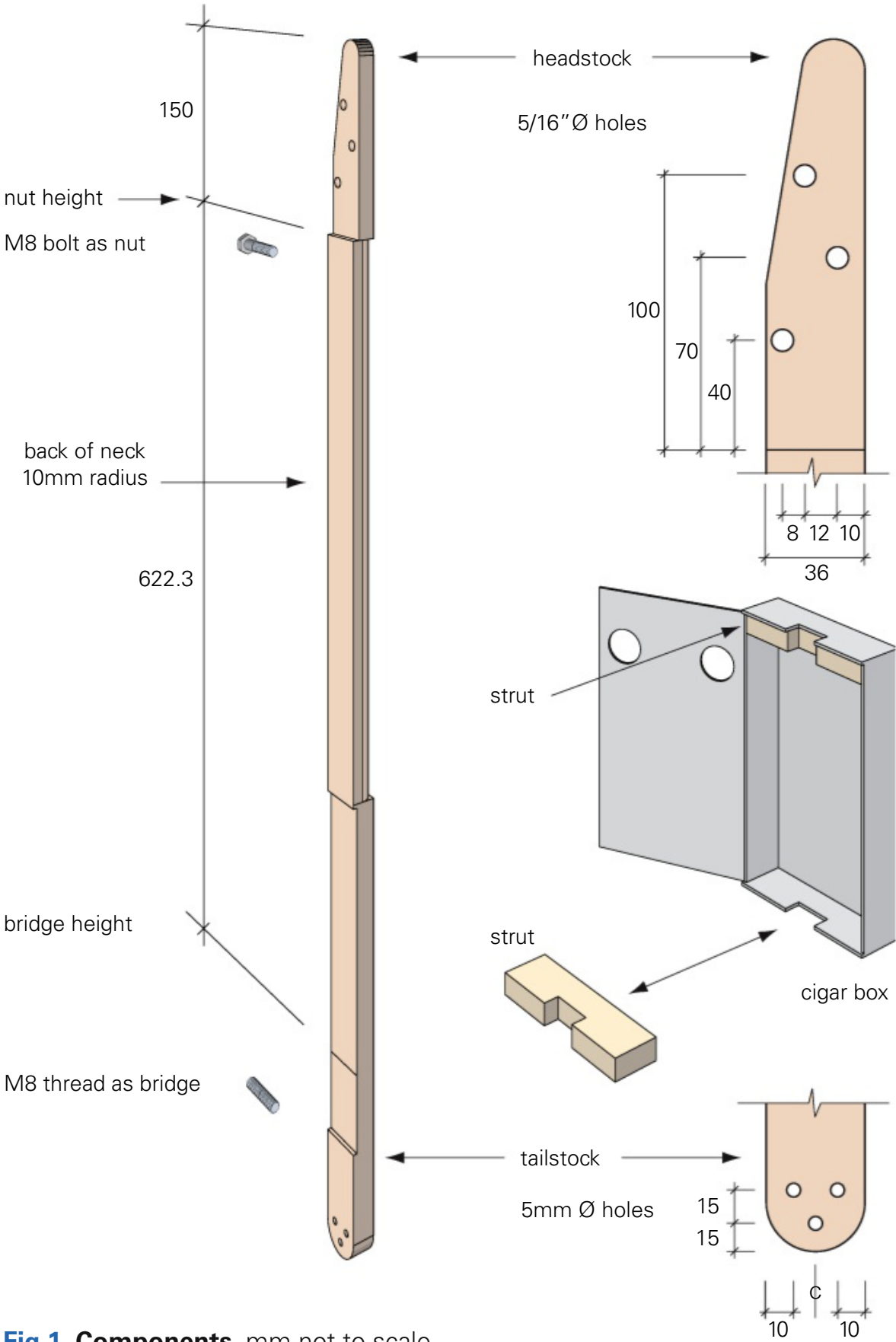
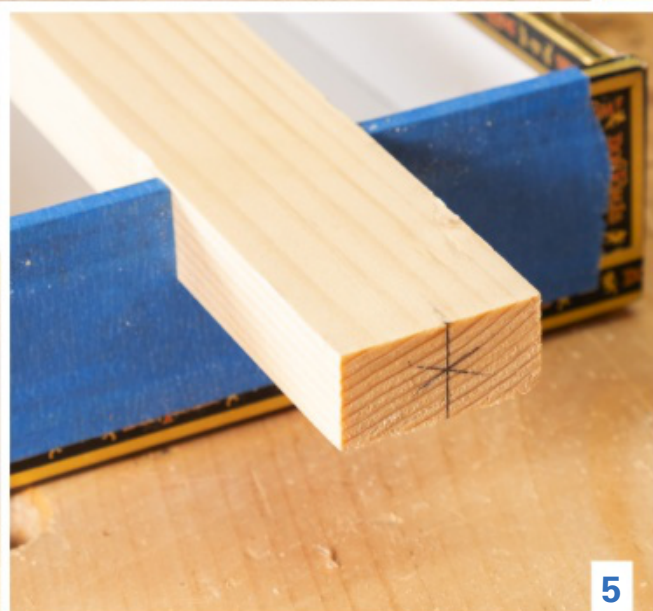
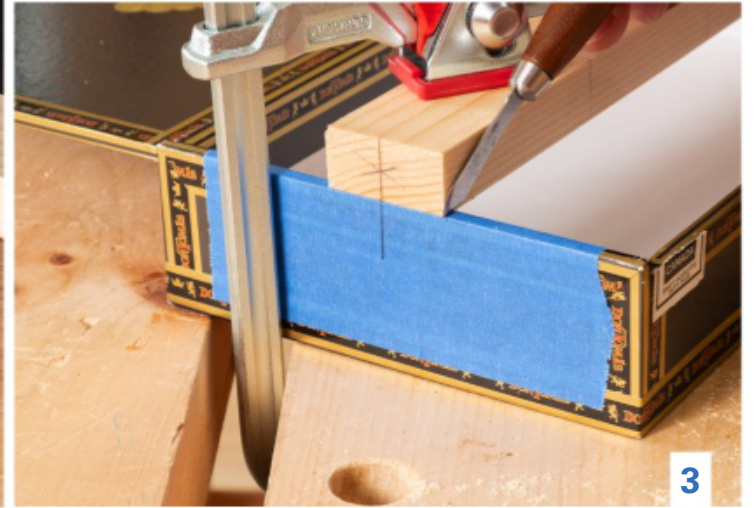


Fig.1 Components, mm not to scale

MATERIALS AND SUPPLIES		
PART	QTY	NOTES
Cigar box	1	
Neck	1	920 x 36 x 18mm
Box struts	2	reference inside of box for measurement
Tuners	set of 3	Shane Speal signature 3-string CBG tuners
Strings	1 set	3-string open G string set
Rivets	3	medium aluminium 6 x 5mm



1. Mark the location of the neck in the box.
2. Find the centre of the neck.
3. Score the blue tape to create a template.
4. Remove the waste.
5. Test-fit the notch.
6. Transfer the notch onto the strut.
7. Always take the time to make a pilot hole for screws.
8. Decorate your sound holes however you like.
9. Transfer the box lid location onto the neck.
10. The lid should close easily when you're done.
11. Remove the material for the head.
12. The holes will look cleaner once the bushings are installed.

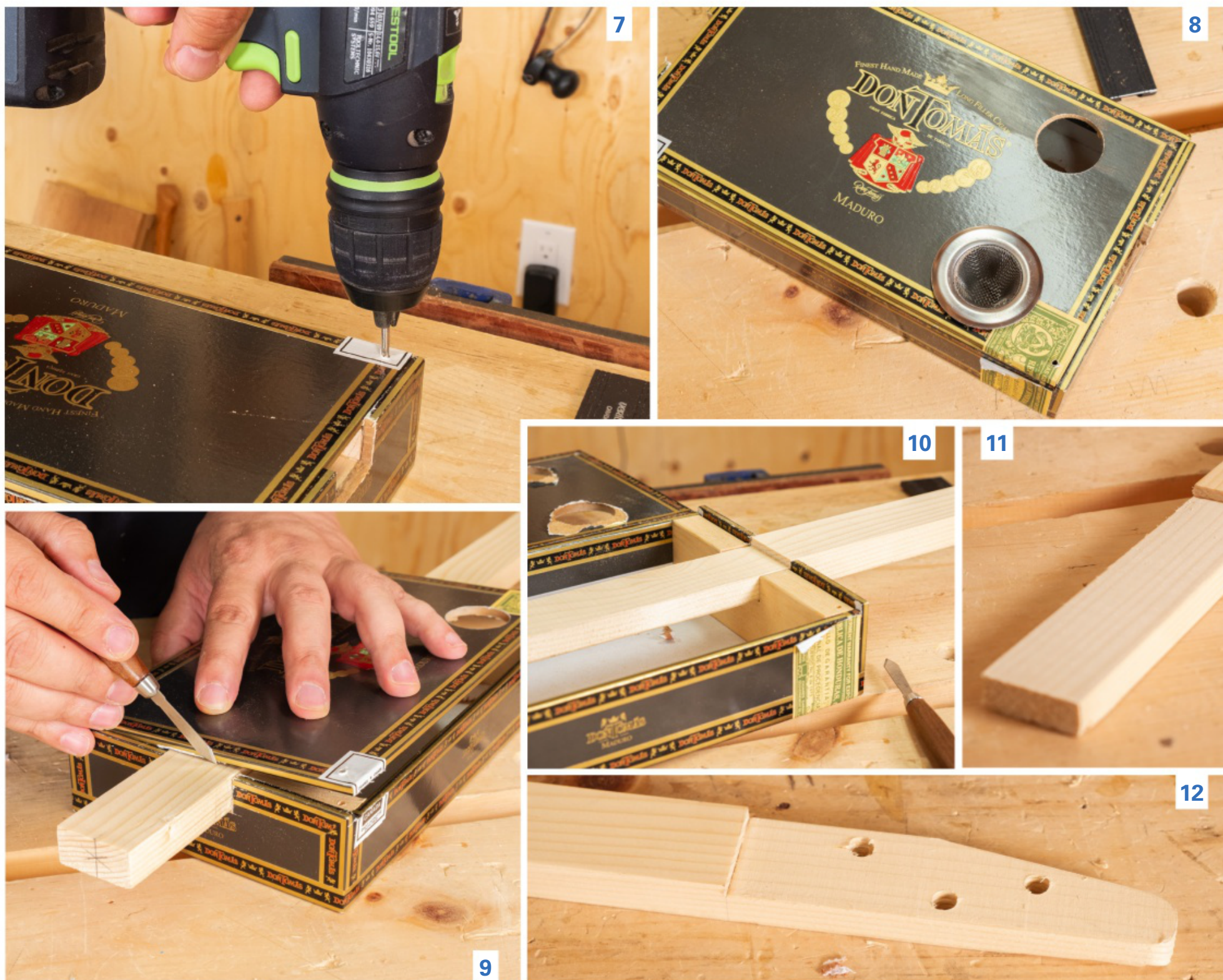
Clamp the neck in place lightly and use a marking knife to cut through the tape. Set a marking gauge to the thickness of the neck material and score the blue tape between the two marks you made for the neck width. Now use a square and a knife to carry the width lines down to the depth line and remove the rectangular bit of blue tape. The remaining blue tape will delineate your neck position.

Use a fine-tooth saw to make your cuts down from the top making sure you don't cut into the tape (**photo 4**). Use a utility knife to carefully cut across the bottom of the notch with multiple passes until the waste breaks away. Use the knife to refine the corners of the notch then place the neck into the notches to verify the fit (**photo 5**).

Strut your stuff

Next you will fit the box struts which serve to strengthen the box. When the strings are tensioned, they will exert force on the box and these struts will help to handle that force. The material for the struts can be solid wood or ply and anywhere from 12 to 20mm thick. The struts should be sized to the shortest depth of the box. The long sides of most cigar boxes are usually narrower by the thickness of the lid.

Cut the struts to fit the width of the box and install them. Use a pencil to trace the location of the notch then remove the waste (**photo 6**). Reinstall the struts and test fit the neck to be sure all fits well. Remove the neck again and attempt to close the lid. Make any minor adjustments at this



time to ensure the lid closes easily. The lid of the box will be screwed shut in a later step, but you can locate and drill the pilot holes for this now (**photo 7**).

Let there be sound

This model of CBG is acoustic so there needs to be some ports to let the sound out. This is an opportunity to get creative. In this case, I drilled two 35mm holes with a Forstner bit and hot-glued a couple of sink strainers into those holes (**photo 8**). In the past I've also used things like large grommets, or small clock bezels and I've also just left them as plain holes. The choice is yours – just be mindful that the neck goes through the centre of the box so putting a sound hole in the middle of the box will not work well. I also try to keep the box graphics intact so the artwork will look good.

Final neck fitting

Place the neck into the box so that it's positioned using the marks you made early on in the build. Lightly close the box lid and trace the location of the lid onto the neck with a marking knife (**photo 9**). Use a marking gauge set to the thickness of the lid and strike a line referencing the top surface of the neck. Remove the waste, essentially creating a really wide, shallow dado that will allow the box lid to close completely with the neck installed. I typically do this freehand at the bandsaw being sure to cut to the line, but I don't stress if the cut isn't perfect. This area will be in the box and never seen again once the box is screwed shut (**photo 10**).

Make heads and tails of it

We have to thin the headstock area

to properly fit the tuning machines and to create an area for the nut. Set a marking gauge to 5mm and strike a line on the edge of the neck running from the top of the head to the nut line you marked earlier on. Cross-cut on the nut line to the depth you just struck then resaw the waste away (**photo 11**). You can now remove the resaw marks with some sandpaper, although I typically leave the marks there.

Using the diagram shown in **fig.1**, locate the tuning machine holes and mark the shape of the headstock (**photo 12**). Drill the tuning machine holes with a 5/16" bit and then cut and shape the headstock. If you are using a set of tuners other than the ones listed, be sure to review the installation instructions for them to ensure the hole sizes and location are correct.



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Now locate the three holes in the tailstock for the string anchors and bore the holes with a 5mm bit. Finish off by tracing a pleasing arc on the end then cut and shape the curve. As you can see, any curve will do here, as long as you are happy with it (**photo 13**).

Soften the neck

The back of the neck should be rounded over to be easy on the hand while playing. Place a piece of blue tape 12mm down from the nut location and 12mm up from the point where the neck enters the box. Install a 3/8" radius round-over router bit into a router table and rout the round-over on the back side of the neck (**photo 14**).

Use the blue tape as a gauge for where

to start and stop the cuts visually. If it's important for you to be more accurate than this, feel welcome to set up a fence and stops on the router table. Remove any sharp corners on the neck then do any final sanding and apply finish (**photo 15**). I typically only use a coat of wax on the neck, but any finish will do including adding colour in the form of stain or paint.

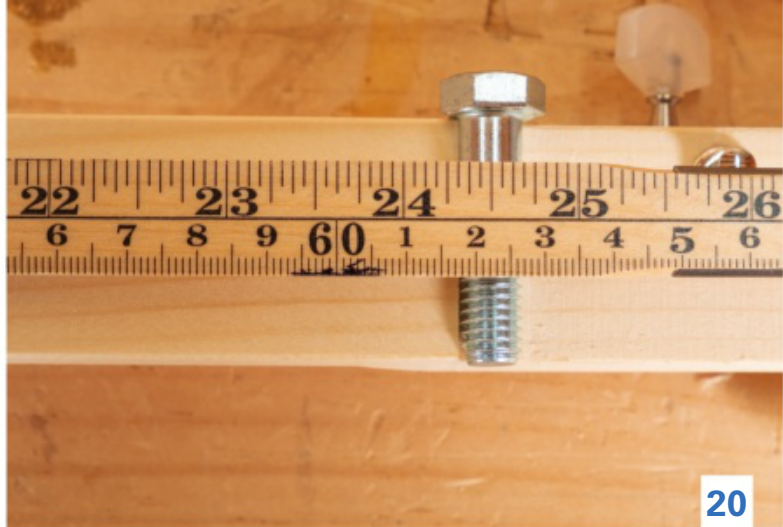
Install the hardware

With all the woodworking done, it's time to install the metal bits. Start by gluing the bridge (a 5/16" threaded bolt in this case) against the shoulder you created on the headstock (**photo 16**). Some five minute epoxy or strong hot-melt glue will be perfect for this. Now move to

the tailstock and glue the rivets into the anchor hole with some medium thickness cyanoacrylate glue making sure not to plug the holes with the glue (**photo 17**). Finally, install the tuning machines according to the instructions that came with them. Be mindful that the screws used for this hardware are typically tiny, so don't lose them (**photo 18**)!

Last steps

The only things left to do are the assembly and stringing. Place the neck into the cigar box, close the lid and screw the lid shut (**photo 19**). Lay a ruler down on the centre of the nut at the 24-1/2" (622.3mm) mark (**photo 20**), then place a light pencil mark on the box at the end of the ruler.



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Place two pieces of tape on the box to show where the neck is as a means of centring the bridge location (**photo 21**). Glue the bridge (in this case, a piece of 5/16" threaded rod) to the box using five minute epoxy or hot-melt glue, then remove the tape.

Install the strings and tune them to the appropriate note (**photo 22**). I typically string my CBG's with an open G string set which are tuned to G-D-g to make it easy to play with a slide. If this is your first stringed instrument, jump online and learn how to string an instrument. It's not hard to do but like anything else you need to know the steps.

There are many instructional videos online that explain how to play a CBG. As you surf around, you'll start to see that there is an entire sub-sect of musicians that play instruments that they have made themselves. You will find events, concerts and festivals with the CBG as the central instrument, so have some fun with your new-found, handmade instrument.

Photos: Vic Tesolin

Diagram: Graham Sands

Vic Tesolin is a furniture maker and also a Lee Valley Woodworking Partner. He lives in Canada and teaches workshops all over the world. Learn more at <http://victesolin.com>



22



23

13. Tape rolls and finish cans make great templates for curves.
14. The router makes quick work of the round over.
15. Take off the hard corners.
16. Glue the bolt (nut) into place.
17. The rivets will protect the wood from the strings.
18. Install the tuning machines.
19. Button up the box.
20. Line up the scale length.
21. Locate the bridge on the box.
22. String it up and have some fun.
23. The finished instrument.



Woodturning Deconstructed

Andrew Potocnik shows how to elevate your work by thinking outside the circle.

Turning by its nature creates circular forms, be they long and cylindrical, or flat and round – but hidden within are various other shapes. All you need to do is cut and re-arrange to see a completely new aspect of the form you originally created, something explored by Vic Wood here in Australia and Stephen Hogbin in Canada some twenty-plus years ago.

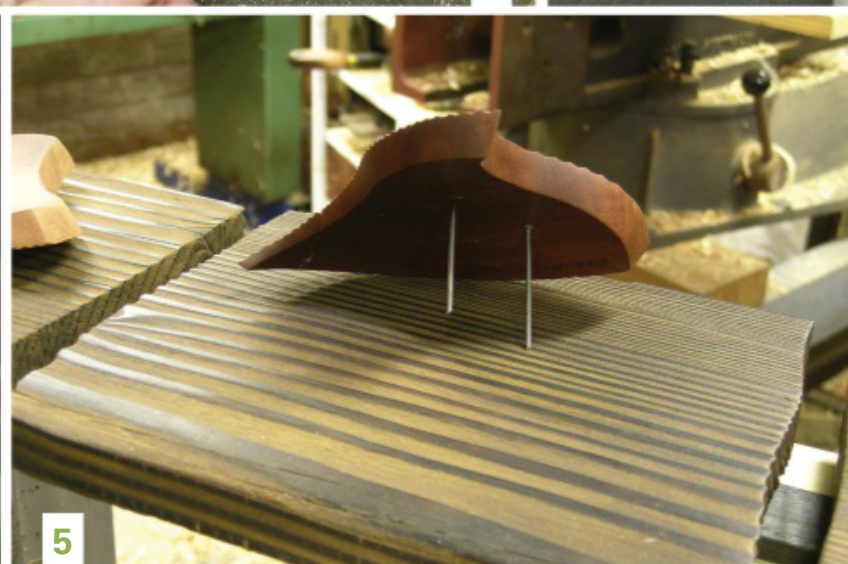
Out of round

Strangely, my mind leads me to think ‘outside the circle’, so when ideas head toward sculptural concepts, the circle is often dissected, rearranged and texture comes to the fore. In my time of working with wood either as a maker or a teacher, I think I’ve tackled more qualities of wood than I’d like to list, so here’s a bit of an insight into some pieces that, for some, challenge preconceptions of turned work.

And maybe you too will begin to think laterally about forms that are made on the lathe, and then there may come a spark where odd shaped pieces of wood lead to ideas you’d never thought you’d create.

Into the woods

My inspiration comes from the material – wood. Grain, texture, scent, feel and colour lead to pieces that focus on prominent qualities of the material. In my earlier days there was no way I’d do anything more than sand wood to show its inherent beauty, but now there are times when burning is the most obvious way to expose its inner core. And then there are times when paint can contrast the colour of wood, maybe complement it too... Now I’m open to a range of techniques; however, it is wood that still governs where my work comes from and where it goes.



All about the journey

Visual analysis is a key to working out what appeals to my aesthetics. It enables me to work out whether a combination of colours works or whether a particular texture works with that colour. The journey of creative evolution is never-ending; hence I tend to work in cycles. I get an idea, work through several pieces, move onto something else and then another distraction pops up. Eventually something sparks my mind again and I return to further exploration of a previous idea.

The unfortunate aspect of this is that some pieces take months even years to reach a conclusion; however the journey undergone creates even more possibilities. You can now see why my mind goes off on tangents. I now think that I suffer from a creative form of attention deficit disorder!

Planned or unexpected

It could be said that there are two main ways that my work develops, planned or unexpected, and at times the two overlap. My *Shard* series was the result of a mistake. A bowl with a base way too thin to be acceptable was too good to throw away – I hate to waste anything, especially wood and time. Put aside for some time, a moment of inspiration arrived when I realised that a three sided shape explored in other pieces could be adapted to the bowl and open up a new direction.

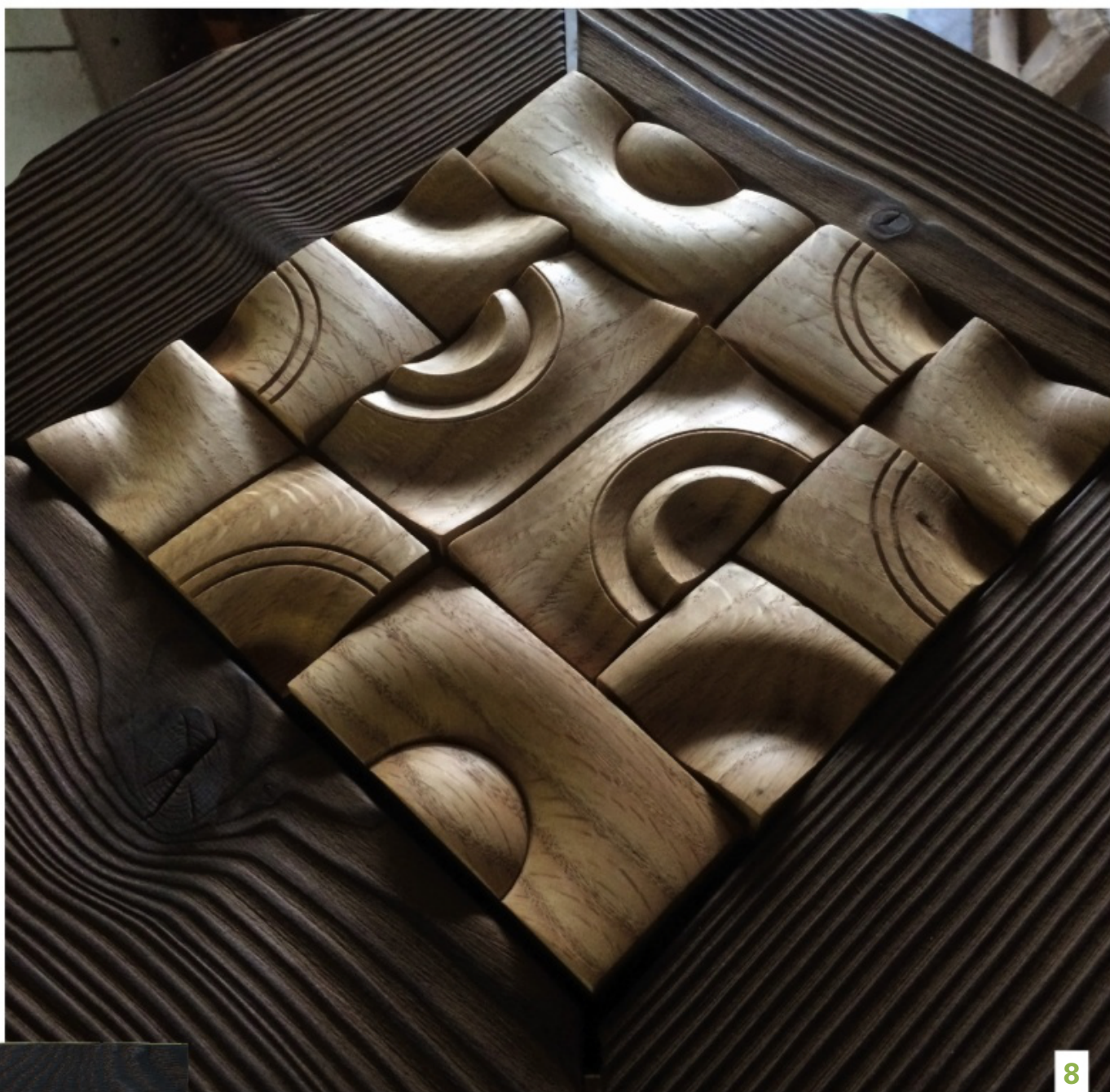


Main: Detail of
Chiaroscuro, 2019,
360mm dia x 20mm, pin
oak, oregon.

1–5. Showing the process of creating the segments for *Shard 2*.

6. *Shard 2*, 2017, 900 h x 170 w x 45mm deep, red ironbark, ash, oregon.

7. *Cascading Down*, 2017, 380 x 420 x 30mm, oak, cherry, maple (from recycled pallets).
8. *Chiaroscuro*, 2019, 360mm dia x 20mm, pin oak, oregon
9. *Grid*, 2014, 550 x 400 x 20mm deep, Pin Oak (from recycled pallets), MDF.
- 10–12 Showing the process of making *Grid*.



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In contrast, the concept of both *Grid* and *Chiaroscuro* were planned – working out how to shape the square components safely took a bit of thinking and the preparation of a jig, but then arranging the pieces was a matter of trial and error. Arrange, step back, assess and rearrange until all looks ‘right’ then consider how to hold everything in place. Taking photos along the way to look back on can help. I find it’s important to view the piece from a distance, so there are times when I place the item on the ground just outside my workshop and climb up onto the roof and look down...

Let things evolve

Often one idea leads to another, as was the case with *Cascading Down*, which evolved from *Grid* where I hoped to evoke something akin to tissues floating down. After turning small squares on both faces, then cutting each into uneven quarters which were shaped I could then begin to explore layout.

For a contrasting background some rough sawn oak was cut, burnt and wire-brushed. To seal the surface and deepen the colour I sprayed a couple of coats of matt polyurethane which soaked right into the wood and leaving a rough and raw appearance.



9

Square to round

Grid and *Chiaroscuro* began the same way. A jig that could hold four small squares firmly in place was mounted to a faceplate so I could shape the front of the assembled larger square. Rotating the shaped pieces creates different effects, especially when they're mixed with other shaped pieces. To arrive at a successful combination took several trials but here's a twist. Switching lights in the workshop off in the evening I noticed some new aspects of the shapes because of the fall of light! And the next morning with soft side light from a window I saw yet another series of undulating surfaces. I'm yet to see where this moment of unexpected insight will take me somewhere down the track.

Always look ahead

It must be said, it's one thing to start off with a clear vision for a piece, however working out how to create individual components and then piece them together is another matter. Not to forget suitable assembly that doesn't override the appearance of the completed item. Then there are the little tweaks that happen along the way, and sometimes the realisation that the idea just simply will not work...

Fingers crossed, things will visually and structurally meld, but if not then it's time to work out why and how to overcome the problem. And then there's next time!

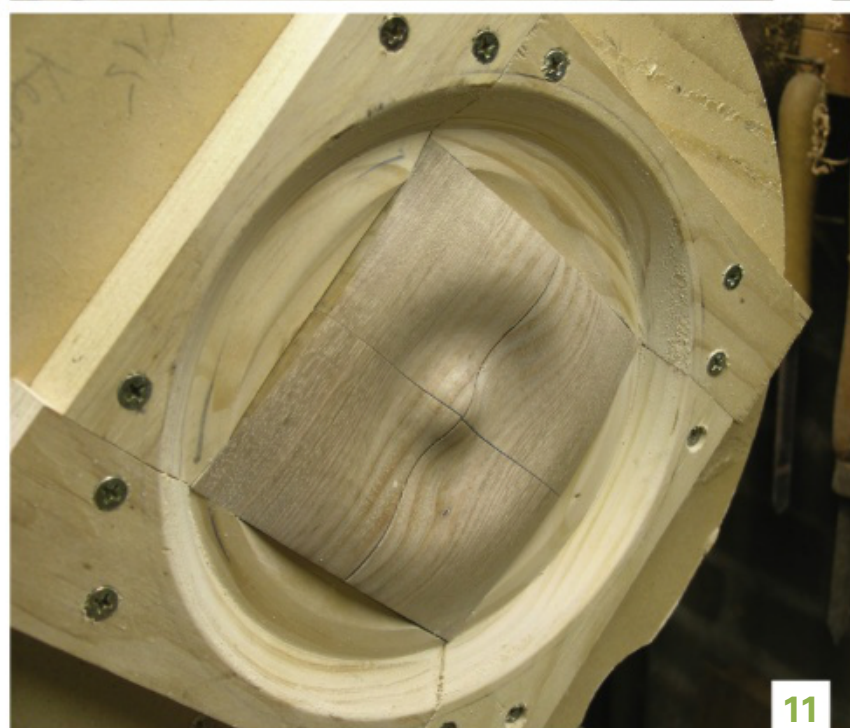
Photos: Andrew Potocnik



Andrew Potocnik is a wood artist and woodwork teacher who lives in Melbourne. Email andrewpotocnik@telstra.com



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Elegant Tools

Duncan Nisbet shows how beauty of form can derive from time proven effectiveness in function.

Elegance: the state or quality of being elegant: refined grace or propriety; tasteful correctness; ingenious simplicity; neatness; said of form, movement, style (OED).

Many tools appeal to me as elegant. A number of tools used by woodworkers achieved a pinnacle of form and function in the 18th and 19th centuries and have remained little changed since. The best ones look fine, are comfortable to hold and are ideal for their intended use. Tasteful, ingenious simplicity. Some tools I don't evaluate as elegant because they are too ornate, others have their elegance compromised by their manufacture or materials.

Well-made tools remain elegant after decades of use, their tasteful correctness enhanced by signs of wear and attractive patina. Most working sheds and wood shops have good examples that spark delight, if not joy, in their

users and owners. They have style; in the words of English novelist, Howard Spring, who appreciated Georgian architecture, 'There's sense in style. People think it's an extra, but it isn't. It's the thing.'

There is an elegance in using hand tools to gauge plumb, to mark and measure, to shave and smooth timber, to cut and fix it. They don't need to be expensive and are better to exhibit a certain frugality. The tools I have chosen appeal to me greatly for these reasons and are all within reach from my workbench.

Photos: Duncan Nisbet

Main image: The author's Stanley plane collection includes tools from the 1870s. It is 150 years since Leonard Bailey granted exclusive manufacturing rights to Henry Stanley, founder of Stanley Rule & Level (1857).



Folding rule

Based on that other elegant tool, the stick, the rule has marks regularly on it. The oldest measuring rod found may date from 2650 BC (in copper alloy) and many ancient examples are accurate to 0.1mm. From around 1800, folding rules gradually became ubiquitous in aprons, nailbags and toolboxes. By the 1930s, the two-handed operation of the folding rule was largely superseded by the tape measure convenient for single handed measuring.

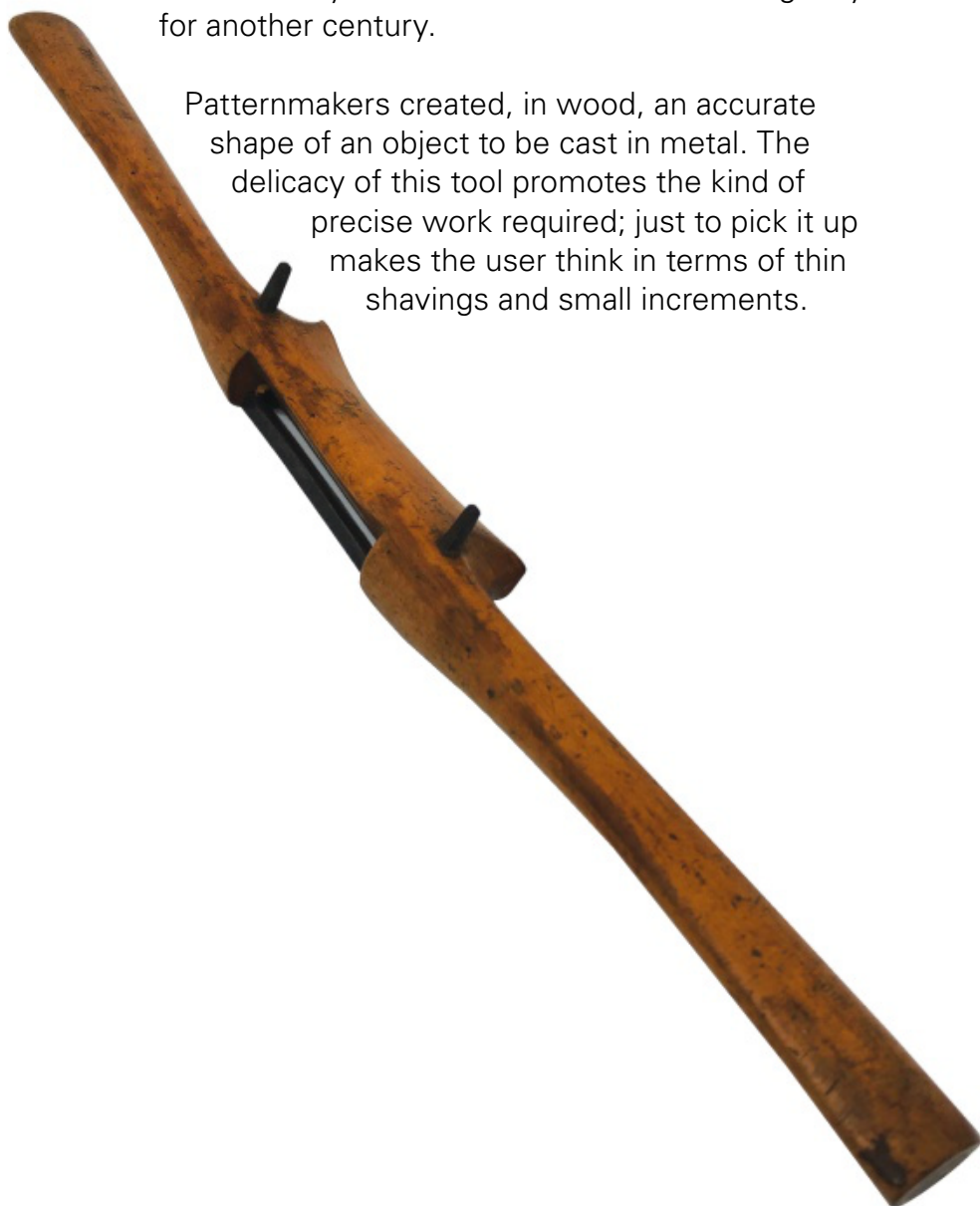
This example is a Stanley No.66-3/4 late SW fully brass-bound model in boxwood with brass fittings. It was offered between 1902 and 1942. It is a three-feet, arched joint, four-fold rule one inch wide and graduated in 8ths and 16ths of inches.

I shudder to think how much boxwood has been harvested unsustainably around the world for their manufacture since the 1850s. Many rules were made from ivory, yet are hard to consider elegant because of their brutal history

Spokeshave

This 10-1/4" long boxwood round bottom patternmakers spokeshave with a friction fit steel blade has a refined grace in appearance and a comfortable correctness of form in its use. Perhaps 100 years ago, this tool was made in a workshop, probably in Britain, in a batch of up to a dozen. Each wooden handle was individually fitted with its own cutter and both marked with the same roman numeral, in this case VIII. The boxwood is very resilient, and the cutter usually needs little more than a hone; this shave is unlikely to be made redundant by a better tool and will serve elegantly for another century.

Patternmakers created, in wood, an accurate shape of an object to be cast in metal. The delicacy of this tool promotes the kind of precise work required; just to pick it up makes the user think in terms of thin shavings and small increments.



Hammers

Can a hammer be considered elegant? They can be brutes, can be ugly and may be used inelegantly. However; I say yes and offer these two tack, patternmakers, saddlers, trimmers or card hammers (as they may be) as proof.

The larger is 9-1/2", strapped and sweet. The smaller is 4-1/2" long and as cute as an insect's ear. It could be a jeweller's hammer. The hammer is another tool that developed from the stick; dating from the day someone tied a rock to one. Almost every trade has its own hammer and they take on their own elegance in use when swung by someone experienced in that trade. The sight of one well cocked, arcing perfectly and striking its target with explosive force is a delight to behold.

Here's to hammers, one of the few tools to have its own emoji on your phone.

Marking gauge

A simple tool for scribing a line parallel with the edge of a workpiece, the marking gauge can be used with a pushing or pulling motion. This oval stem example, made of rosewood with a boxwood captive wedge, is likely user made a good number of decades ago.

Add another pin on a slide and you have a double marking or mortise gauge, then triples, gauges for ovals and circles and so on. They get quite ornate; ebony and brass anyone? Stanley made quite a number, from the simple No.0 Marking Gauge in beech with a boxwood screw, to the No.90 Williams Patent Combination Gauge, a rosewood, steel and brass combined mortise, marking and cutting gauge with four steel tips. For elegance, I favour such a simple model such as shown, often one of the first tools a joiner's apprentice makes for themselves, along with a bench hook and mallet.



Saw handle

The Disston handsaw is found in different types in many sheds and woodshops, its elegance apparent with a look and confirmed with a grip and action.

This 8" 14tpi No.5 brass backed backsaw has the 13/16" 'Disston Phila.' medallion which dates it to the early C20th. The deep V in the hand hole rather than the later subtle dip (just below mid-point, in front of the fingers) dates it prior to the c.1918 shape change. The apple was changed to beech in the 1930s and the brass backs (popular in the UK and Australia) disappeared in the domestic material shortages of WW2.

The feel of the apple and the graceful shape of the handle embody hand saw elegance. Just pick it up and your fingers fall into comfortable place. Fingers curl through the handhole, the top tip points back between the thumb and forefinger and the latter settles comfortably on the top step. A delight to be have and behold.

Turnscrews

Made to turn screws fixing wood to wood or steel hardware, the turnscrew (latterly screwdriver) has a functional elegance in its nomenclature alone. These four are wooden handled flat and round cabinetmakers turnscrews, perhaps dating to the late C19th, early C20th, before alternatives to slot screws appeared.

The tools themselves, with one or two turned lines for decoration, have a simple elegance; so too does the slot screw. For many purposes, a Phillips head screw (invented early 1930s) just looks wrong whereas a snug, well-fitting slot screw is perfect. When the driver's tip fills the screw slot and engages the screw and drives it home a feeling of tasteful correctness is achieved. Woodworkers fall into two camps for the final turn of the screw: those who 'clock' their screws (align the slot with the grain) and those who do not, just allowing the slot to align wherever it sits at its most firm final point.



The Bailey plane

May 19, 2019 was the 150th anniversary of the day Leonard Bailey granted the Stanley Rule & Level Company the rights to manufacture iron and wood bench planes under four patents granted to him between 1858 and 1867. Each patent is an elegant solution to iron plane problems that American toolmakers and inventors had been wrestling with since Hazard Knowles' (arguably) first cast iron plane stock patent of 1827.

Leonard Bailey's patents were for: device for adjusting plane irons (1958), cammed levercaps (1858), vertical post cutter adjustment – which turned horizontal immediately on production (1867), plane lever caps (1867).

Each feature added up to one of the most elegant tools used by woodworkers over the 150 years since: the Bailey plane. The pivoted forked lever cutter adjusts the cutter by turning a grooved brass nut. The thin cap iron, curved at the lower end and held by a screw, provides even pressure to the thin cutter which prevents chatter. Bailey was the first to use a separable frog and rosewood handles and knobs.



Wood chisels

The chisel for working wood is a very old tool and, compared to the plane and the saw, quite primitive; a tool again derived from the stick.

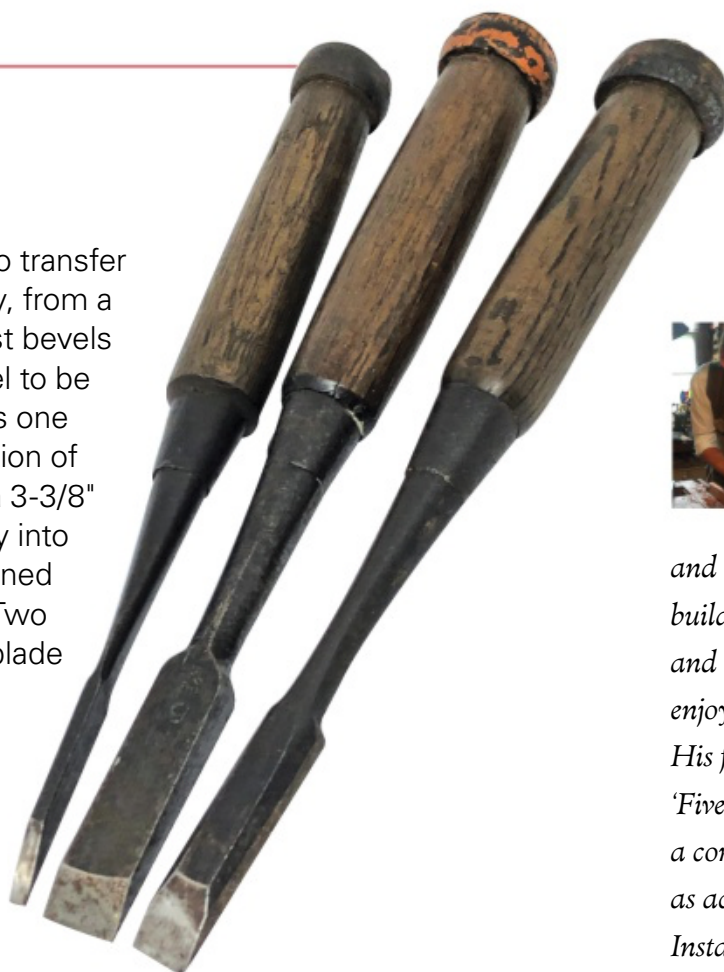
Many chisels are elegant, but for me, Japanese chisels (*nomi*) have a particular grace in form and function. Modern Japanese chisels are a cross between socket and tang chisels and the top end of the handle is often surrounded by a steel hoop, called a *saagirawa* (slide-down ring). This hoop is tapered on the inside, so it tightens as it slides down; it prevents the wood handle from splitting when struck and is surprisingly comfortable when pushed by hand. Traditionally, differently handled chisels were used for striking and hand pushing (paring chisels without the ring).

The blade is perhaps the most elegant part of a Japanese chisel; even such inexpensive Tokyo flea market examples such as these can remind one of the *katan-kaji*, the samurai swordsmiths. Characteristically, the back of the blade is hollowed for faster sharpening and to maintain flatness.

Bevel

A bevel is a wooden and/or metal tool used to transfer an angle from workpiece to workpiece or, say, from a drawing or model. Many are user-made. Most bevels use a wingnut or equivalent to allow the bevel to be adjusted quickly and locked into position. This one does not; I like to think it pre-dates the invention of the wingnut. It has a 5" rosewood body and a 3-3/8" beaten (?) brass blade which folds completely into the body. The blade is held by a steel pin peened over and the adjustment is a firm friction fit. Two brass plates of the same appearance as the blade hold the joint fast.

I still have the two Silex bevels I started my apprenticeship with in Sydney in 1977 and use them often. I have others, including Stanley, but consider this one to be the most elegant. I hope you like it too.



Duncan Nisbet is a lapsed carpenter and joiner in his late 50s who lives on the NSW South Coast. He is self-employed in education

and training and enjoys woodwork and building in his spare time. He is a tool user and collector with an acquisitive nature and enjoys researching tools and their history. His friends have been known to call him 'Five Sheds'. This story came about through a combination of gazing at tools as well as actually using them. Contact him via Instagram @bespokeshave

A Sense of Place

Bryan Cush draws on the influence of place and native species to design and make furniture that reflects his own interests and that of his clients. Story by Linda Nathan.

1



1. Bryan Cush designs and makes furniture under the name Sawdust Bureau. *Photo: Northside Studio*
2. The workshop is situated in a heritage site that overlooks a canal and the grassy Maribyrnong floodplain. *Photo: Michael Firus*



Bryan Cush, 37 is a designer and maker of furniture whose earlier career as an architect is reflected in the structural and built nature of his designs. He doesn't rely on the traditional hallmarks of fine woodworking – dovetails, veneer layups, frame and panel constructions – but the feel and ethic is all about quality and handcrafted.

When it comes to using Australian native species, this Irish-born maker is all about local. 'A lot of designers specify American timbers on every job...but I like to offer local species. The only piece of foreign timber I've ever cut in this workshop is a piece of oregon to make a workbench,' said Bryan. 'Blackbutt is my alternative for American oak. You can soap wash it if you want to get it a bit paler. If you oil it, it goes caramel and beautiful.' Mostly though Bryan uses spotted gum and Victorian ash eucalypts, but ironwood, redgum and jarrah come into the workshop as well.

A remote location for a woodworking shop within far sight of Melbourne's CBD and the urban creep of apartment blocks seems like a contradiction. And yet in the 1800s Jack's Magazine was just that, a place far enough out of town to store gunpowder and munitions that were manufactured nearby



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up until World War II. At that time goods were floated up the Maribyrnong River and then carted in and out by rail from what is now a heritage site that overlooks a canal and grassy floodplain surrounds.

Two and a half years ago Bryan leased this space, overlaid flooring to protect the original jarrah boards, but left access to rails that run its length. With an 1870s trolley these are now the best workshop aid a sole business proprietor ever had for moving work within, and to and from a delivery van.

Bryan was born in Belfast, studied architecture in Glasgow and Holland, then travelled to Melbourne to work for an architecture studio before meeting his Australian future wife, and settling permanently 15 years ago. Completing his masters at Melbourne University he fell under the spell of woodworking in the architecture school workshop, then headed by Hamish Hill. Influenced by that experience but more so by his grandfather, also an architect turned furniture maker, Bryan eventually changed career.

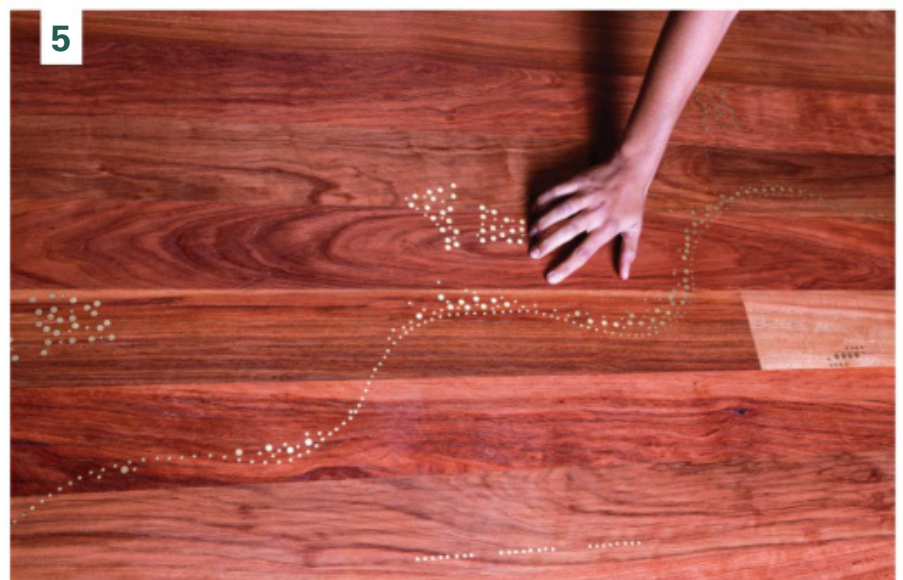
Making things was more satisfying and suits him better Bryan explained. 'The main thing I found frustrating about architecture was how slowly everything went. It could be years before we'd broken ground. What with council issues and building permits – you end up begin a project manager. The creative side ends up being 10 per cent of the job, the rest is negotiating and documenting.'

Now it's different, as a designer maker he can control every stage of the process. 'I wouldn't get the same buzz out of designing something if someone else made it, and I wouldn't get the buzz out of making it if someone else designed it,' he said.

However training in architecture has given Bryan a better understanding of manipulating space and form. 'Just dimensionally I think a lot of makers will stick to standards, whereas I would say if you want to design a slender piece, stretch it out to be extra long and svelte. If you want to design a tall piece, make it tower above standard heights and narrow it in at the base to exaggerate the perspective, as opposed to staying within the golden ratio. I find that an awkward way to design, really limiting.'

Despite being adept with CAD technology, Bryan feels he is fortunate for probably being the last generation of architecture students at Glasgow University that didn't use a computer for the first two years. After that Bryan studied in Holland where 'it was all very technical, very advanced computer based subjects but their model making workshop was out of this world. They had every piece of machinery you could wish for. That was inspiring, I learnt a lot there.'

His training has been an advantage in other ways as well.



5

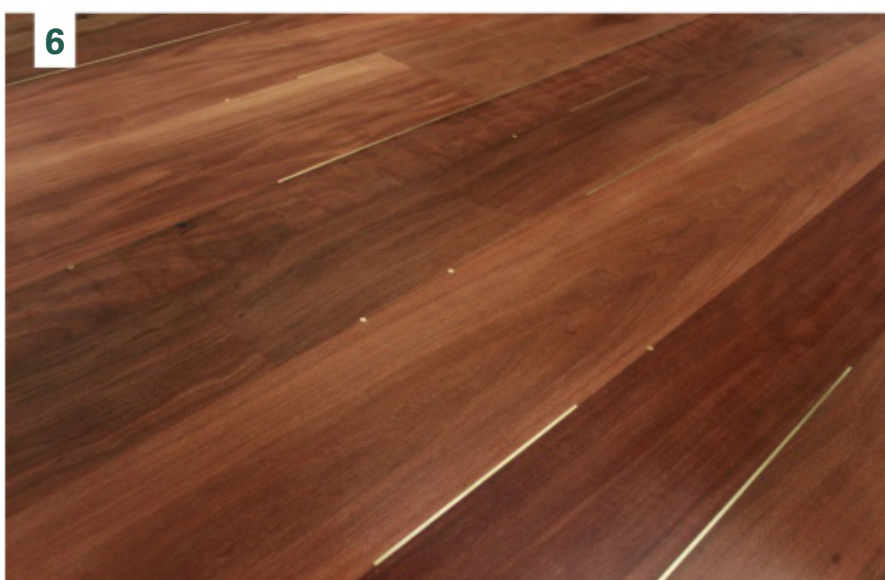


‘When you have a background in architecture clients will be trusting of you and give you very minimal briefs. Finding out their aesthetic tastes and practical requirements (even though it’s harder to budget for) is definitely the most rewarding part of it for me rather than churning out tables for a café.’

There’s a lack of pretension that comes through in Bryan’s humour. His *Plonk* and *Vino* bars are just that – places to openly stash your grog. *Parasite* side tables are made of laminated plywood that is incrementally ‘eaten away’ to show their linear endgrain while playing with notions of balance and solid construction.

Mr and Mrs Brightside are an outwardly conservative couple. These are bedside tables that express their personality with built-in LEDs, lockable drawers and screen printed interiors. ‘The humorous references are definitely inspired by the part of architecture that I didn’t like – the super serious side,’ Bryan said. As with

3. The original 1870s trolley can be used to move work around the workshop, and also to and from Bryan’s delivery van outside. *Photo: Michael Firus*
4. *Sudare* credenza in spotted gum, shown with a detail view of its contemporary ‘stitched’ feature. *Photos: Northside Studio*
5. *My Country’s Story* was a collaboration with Sarrita and Tarris King whose imagery was reproduced in Bryan’s signature brass rod inlay. *Photo: Keith Murphy*
6. *Dot Dot Dash* was crafted from salvaged ironbark for celebrity chef Shane Delia. The ‘Morse code bling’ has a secret message which even Shane doesn’t know the meaning of. *Photo: Bryan Cush*
7. *Ancestors Table*, ironbark, brass. Another collaboration with Gurindji artist Sarrita King. *Photo: Northside Studio*



8



9



10



8. Bryan's *Vino* bench is 'a matrix of cantilevered dowels' which serve to store wine.
Photo: Northside Studio

9. *Tetromino* cabinet in spotted gum and eucalypt functions as shelving, media or whiskey cabinet.
Photo: Northside Studio

10. The *Pinch Boom* bench features a World War II shell

casing, as a tribute to local history.
Photo: Northside Studio

11. Bryan Cush using the tablesaw, his favourite machine.
Photo: Northside Studio

12. The *Parasite* side table, made of plywood plays with notions of balance and solid construction.
Photo: Bryan Cush

architecture, he is a firm believer that the way you live should inform structures and not the other way around.

Just as furniture should provide function in a modern context it can also tell stories about the interests, attitudes and influences of the maker and also the person it is made for. Bryan's star map tables reflect his own interest in astronomy, however clients can commission CNC mapped inlaid brass 'constellations' that pinpoint memorable moments in their own lives.

Collaborations with Gurindji artist Sarrita King have produced two tables that combine Bryan's interest in astronomy with Sarrita's cultural heritage. Both their *Ancestors* coffee table and *My Country's Story* dining table reference of Indigenous dreamtime stories with inlaid brass 'dot-paintings'.

Even more local is a recent commission that incorporates a World War II shell casing that now holds up the customised end of one of Bryan's signature *Pinch* Benches, a tribute to local history made for a client. And there are other influences that manifest as stories told in his designs. A commission for a celebrity chef involved reusing ironbark cladding from a fitout to be replaced. Getting to know Shane Delia, Bryan developed his minimal brief to incorporate 'a little bit of bling' which took the form of a Morse code inlay in the resulting *Dot Dot Dash* dining table he made.

A bespoke maker needs to be a bit of a psychologist at times to give a client what they want Bryan intimated. 'Rather than telling clients how they ought to live, a really good maker understands how a client lives and how to make it better.'

Photos: Bryan Cush

Learn more about Bryan Cush at www.sawdustbureau.com



11

Q&A

What and who has been the biggest influence on your work?

Probably my grandfather, having seen him go from architecture into furniture. He built his own house and then a workshop. That's still very nostalgic to me – when I come into my workshop in the morning, it smells like his workshop. And there are others like Hamish Hill. He's the kind of person I learn best from; the person that answers a question with a question rather than just showing you how to do something.

Whose work do you admire?

I kind of struggle with favourites. I like chefs – the fact they have access to a fixed range of ingredients but it's the way you bring them together that requires creativity. Anyone can go to a timberyard and buy the same timber, anyone can own the same tools but it requires a different way of thinking.

Where do you get your ideas from?

I try not to look at (the work of) too many other makers. I sketch a lot. I probably have about 20 pieces in my sketch book that will never be made. There might be ideas that get incorporated into other pieces.

Favourite tool?

A tablesaw – the amount of stuff you can do on it, the accurate and diverse joinery you can cut perfectly straight off the tool.

Favourite wood?

Spotted gum because everyone hates it and complains about it being oily and how it delaminates. I think it's just about understanding the material, and it does take a long time to work with a timber like spotted gum.

What do you dislike most about this work?

It's something that I dislike but perversely enjoy at the same time – the toll it takes on your body and your hands. There's not too many jobs that can make you feel exhausted but with a such a sense of relief and reward at the end. You deliver a piece and you see the reaction of the client.

What do you think woodworkers should do better?

Interact with designers and creatives outside the world of furniture – ceramicists, painters, artists, chefs. If you lock yourself away in a very woody world your furniture is going to look very woody.

Your best advice to others who want to make a career in woodwork?

Learn from as many other makers as possible, which is not what I did. Go and work with someone else, do an internship. See different ways of doing tasks and then come up with your own. You'll also learn about the pace you should be working at and the safety aspects. Learn from other people and try to not copy other people's work.



12



Pinocchio, brought to life by the author, Jeff Donne.

1. Carlo Chiostri's drawing of Geppetto and Pinocchio.
2. A basic tool kit for puppet carving.

Like Geppetto Did

Wood straight from the tree can have a mind of its own, but carved into a puppet it will gain a soul. Story by Jeff Donne.

'Once upon a time there was a piece of wood. It was not an expensive piece of wood. Far from it. Just a common block of firewood, one of those thick, solid logs that are put on the fire in winter to make cold rooms cosy and warm.'

For close to 140 years, readers of a classic Carlo Collodi tale have witnessed this embryonic beginning of a wooden puppet we know as Pinocchio. We've delighted at his impishness, ill-behaviour and eventual heroism, but what of the puppet, why should a character made from wood capture the imaginations of so many?

It's difficult to explain, but there is something about a puppet; it's immediately believable regardless of how far from reality the puppet really is. The moment a string is pulled, it's as if the puppet gains a soul; it's alive!

And yet I can't imagine the tale of Pinocchio imprinting on so many minds had the story talked of a puppet made from anything else. Wood, when cloaked in bark, and complete with twists and crooked branches, has life, and as the impoverished carver, Geppetto finds out, it's not afraid to speak its mind.

Anyone who has carved a puppet, or anything else for that matter, straight from a tree will know how the wood can speak: wrong way...go with the grain...too deep...too fast...skirt around that knot...and so it goes. But the reward is a carved puppet that is ready to start its own adventure.





3. Using the cobbled together stock knife.
4. The top of head has been axed out.
5. The head and shoulders are now roughed out.
6. Showing the head and body carved.
7. Next, cut out the hip joints.
8. The axe comes out again to split out stock for the limbs.
9. Lay the pieces out to check proportions.
10. One arm is carved.
11. These two parts will form a complete leg.

The tools

I made my first puppet using an axe and a knife; this wasn't an attempt at historical correctness, instead it was because I often carve spoons and I used the tools at hand. They did a fine job and I unwittingly managed to replicate old Geppetto's techniques.

Since then I have made every puppet the same way, exploring new ways to use the tools I have and in some cases how to adapt them to puppet carving. This is my current set up:

- **A small carving axe.** I use a Gränsfors Bruk Wildlife Hatchet

- **A shortish carving knife.** A Morakniv 120 is perfect for the job

- **A cordless drill.** Yep, I know Master Geppetto didn't have a 14 volt Bosch drill in his kit, but hand drills and small pieces of wood aren't the best of friends!

- **A cobbled together 'stock knife'.**

Rare as handcarved hen's teeth, a real stock knife, traditionally used to carve clogs, is an expensive investment. Or you could make one in five minutes from a Morakniv push knife and a mug hook. Screw the hook into a bench top, insert one of the knife handles and you have yourself a powerful cutting tool. Sure it'll never carve clogs, but we wear thongs in this neck of the woods.

- **Detail carving knives.** Great for carving faces and adding details like clothing to your puppets. They're generally inexpensive so get the best you can.

- **Hook knives.** These come in handy for all sorts of things, from leg joint sockets to hollowing the inside of rabbit ears. I use Ben Orford knives and the fantastic new Australian hooks made by Pete Trott from Kyneton.



You can of course use carving chisels and gouges, as is commonly used by wooden puppet makers in Europe, but a knife is a one-handed tool that improves your connection to the puppet taking shape in your other hand.

The material

Straight from the tree is best as the wood is green and soft to carve. That said, if you are carving from round branch or stem wood you're best off allowing the wood to dry in longer sections if you want to avoid cracks. Try experimenting because some woods shrink and crack more than others; banksia, for example opens up wide chasms as it dries, but black sheoak is fairly stable.

The other thing to consider is lightness and the capacity of the wood to hold detail. On small-to-medium size puppets I'll commonly use black sheoak as it's nice to carve



Useful Grips for Handcarving

Some of the common grips used for handcarving and whittling are shown here.

- A. Thumb lever grip
- B. Chest lever grip
- C. Supported pull grip
- D. Thumb pull grip
- E. A closer view of the thumb pull grip
- F. Spring pull cut





12. Drawing on the features.

13. The hairline and facial features are next carved.

14. Knee joint is ready for assembly.

15. Drill tiny pilot holes so the wood won't split when you screw the eye hooks in or cause the hooks to snap.

16. Tying the legs to the hips.



13



14

and dense enough to hold detail, but for larger puppets, I don't want a dense wood that will make the puppet too heavy, so I opt for lighter woods like poplar or cedar. Pine is fine, appropriate too because Pinocchio is thought to stem from the Italian word for pine (*pino*).

Things to look for in the tree are the conjunctions of twigs coming from the main stem as these produce a fantastic looking Pinocchio nose that is stronger than any drilled and jointed nose. They also make convenient thumbs when carving hands, as well as fantastic dinosaur tails.

While you're pruning the tree look out for bent branches as these come in handy for other puppet projects: Viking horns, rabbit feet, dragon puppets, they're all lurking in a tree near you!

Making Pinocchio

So let's bring this log to life and hope it's better behaved than the original wooden boy. The small log I'm working on here is the stem from

a black sheoak tree, complete with a built-in branch conjunction that will become Pinocchio's nose.

Mark out the sections of the head and body, keeping in mind this is a caricature, so any feature can be exaggerated, shrunk or simplified. I love staying fairly close to the original Carlo Chionstri illustrations, which interestingly show Geppetto carving with a half-crescent knife similar to those used for centuries by the *wayang golek* puppet carvers of Indonesia.

With an axe, start carving either a conical shape above the nose (if you would like a hat wearing Pinocchio), or a rounded shape if he's without a hat like the little fella here. Still with the axe, roughly shape the rest of the body, moving first to the neck by carving a notch around the circumference at the base of the chin, and then onto the bottom of the body and hip.

With the head and body roughly shaped, it's time to refine the surface with a knife, aiming for a finish that shows off the tool marks.



15



16

17. A basic control bar made from a forked branch.
18. Work space during assembly.
19. Starting to layer watercolours.
20. That magic moment when the puppet comes alive.
21. Spending time carving details like the clothing for this rabbit really brings the puppet to life.
22. Another Pinocchio reading about himself in AWR#101.
23. Pinocchio, finished and all stringed up.

A number of knife grips are used here, including the thumb lever grip, pull stroke and thumb pull, all common techniques used when spoon carving. A different grip used in some of the more finicky parts of puppet carving, such as detailing feet and hands, is the spring pull grip, where to a casual onlooker it appears you are attempting to remove your index finger with a knife. Actually you are pushing the blade away from your finger and countering it with a controlled thumb pull, resulting in a safe spring grip.

The last part of the body to shape is the hip, where simple saw cuts make recesses to accommodate the legs.

With the body and head now shaped, it's on to the limbs. These are made from the section of log we removed when breaking the head and body down to size. Saw to arm and leg length – marionette puppets often have longer arms and shorter legs than us mortals – and split the log into four. Using the knife, carve these to the shapes you desire.



We're keeping it simple with this puppet, but you can carve detailed hands and feet if you wish. I find that puppets, like illustrations, work well with simplified features, such as dots for eyes and a basic hand with no defined fingers, because they leave a lot of the storytelling with the audience.

And now we start breathing life into the puppet. First we make knee and elbow joints; there are many ways to do this, but I find a simple

way is to saw at the elbow and knees and rejoin with cord glued into carefully drilled holes. The same technique can be used for shoulder joints. To attach legs to the hip, I drill through the groin (eyes watering!) and the tops of legs, and then thread through leather cordage before knotting at each end.

You will now be holding a puppet in your hand, albeit pretty floppy. To string it you need to screw small hook eyes into the thigh tops, hands and head, thread waxed cotton through these and then tie to a control bar that you have made from a forked stick with an additional cross section attached. The head string is tied to the middle of the control bar, the thigh strings to the forked extremity of the branch and the hand strings to the cross section.

And now Pinocchio is ready to dance! It's a fine moment; one that sticks with you for a long time.

If you want to paint the little guy, I recommend layering watercolours – which allow the grain to shine through – and then finish with linseed oil. Remember that linseed oil left on a rag can spontaneously combust and burn down your shed*.

Which of course we don't want, because a certain ill-behaved puppet would only get the blame.

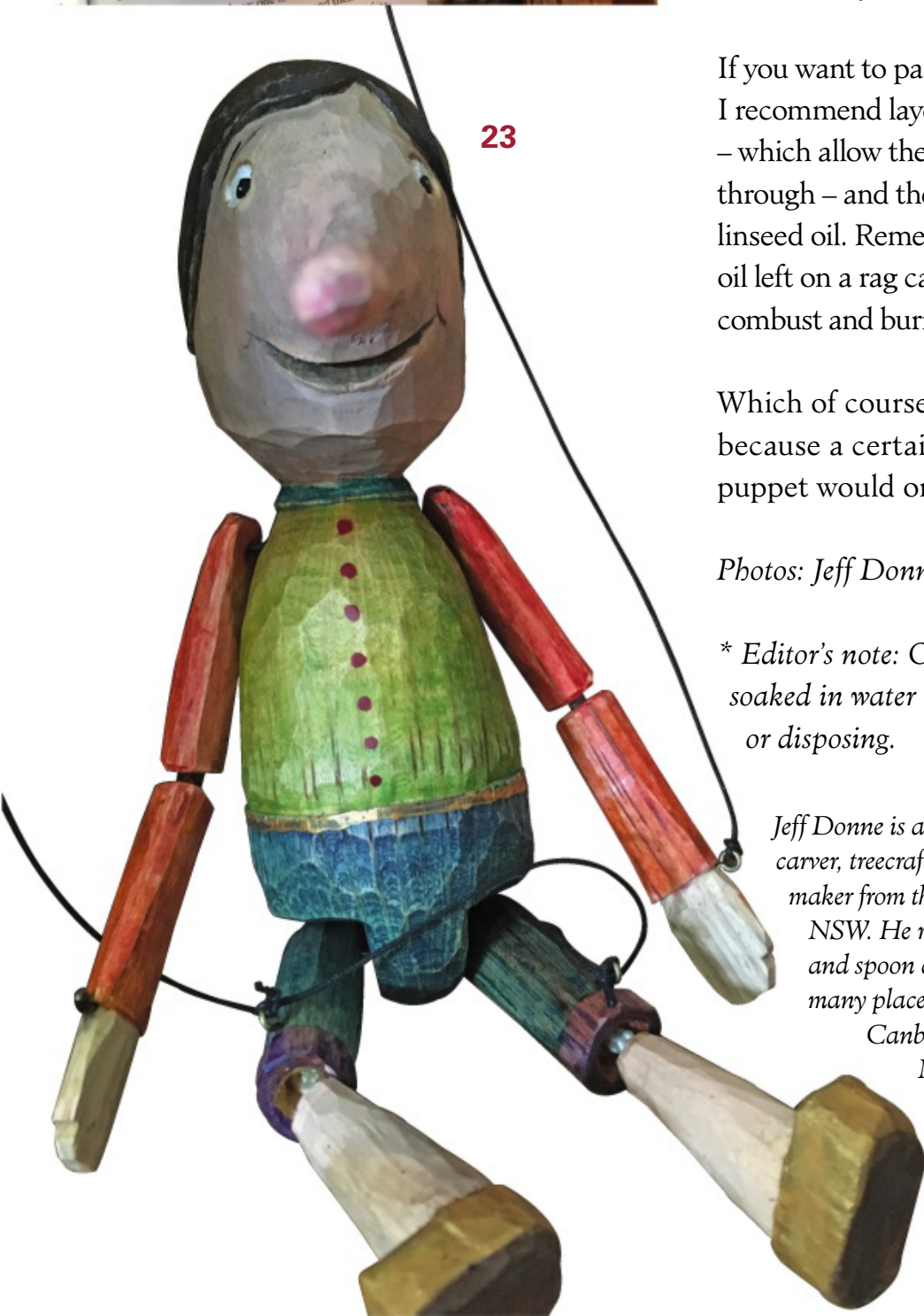
Photos: Jeff Donne

** Editor's note: Oily rags should be soaked in water before drying out or disposing.*

Jeff Donne is a professional spoon carver, treecraft teacher and puppet maker from the far south coast of NSW. He runs regular puppet and spoon carving workshops in many places, including Sydney, Canberra and Pambula NSW. See: www.spoonsmith.com.au



23



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A New Saw Story

Kerryn Carter explains why upgrading to a new tablesaw was all about priorities.

I've lost count of how many times I've been confronted with a photograph of yet another person whose hand has been rearranged by getting on the wrong side of a router or tablesaw blade. Like clockwork I then think of my kids who are 9 and 11, and I fight the compulsion to steer them clear of woodworking and woodworking machinery and experiment with base jumping, which I am sure is a lot safer.

It seems that my kids are a little too young to be let loose on my machines at this particular moment. But the day that they start asking about them is undeniably fast approaching.

At times like this I hark back to my father in his home workshop back in the 80s. While he had access to the big Wadkins at the school he taught at he would come back to his little workshop under our house in Newcastle and pull

out his one million horsepower Skilsaw and his trusty Black and Decker workmate. To my 10 year old mind you would have to be a certifiable lunatic to power that Skilsaw up. I would watch as he would roll it all into some space while announcing to our household that we were finally entering the age of some nice louvered joinery closets.

'Kerryn watch yourself, I'm starting it up!' which was the household code for '...get out now'. There was no blade guard but he had the 6 Million Dollar Man style safety glasses and a fence. Dust would spew forth and much noise and commotion and then many more hours behind the closed workshop door. The only indication that all was about to be revealed was the affronting aroma



Kerryn Carter with the new SawStop in the covered area next to her workshop.
Photo: Kerryn Carter

of solvents. Finally the door would swing open and slowly a beautiful closet would emerge from the dark cavernous depths. This was typical of my father, from not much came so much.

When I look at the rudimentary safety gear he used and am reminded that he was one of the boilermakers who, for the first 10 years of his working life maintained the boilers and the smoke stacks at the BHP steelworks in Newcastle, I am truly astounded that when he died he was not missing any digits or parts thereof. He maintained excellent workshop practice, always used fences, guards, push sticks and 'fingers' and that is what he practised and preached for many a year at Newcastle High School where he was a teacher.

I became a woodworker in the weeks and years that have passed since his death. I was a lawyer. Funnily, the first people to notice this surprising development was my credit card provider. As a lawyer I had a penchant for Herringbone, Mikimoto, Channel and Louboutin. When the hits to my credit card starting rolling in from Carbatec, Timbecon, Timberbits and Bunnings it triggered a call from the credit card company asking if everything was okay.

In the space of two years I had added, amongst other things, a Jet contractor tablesaw to Dad's hand and power tool collection. I was full steam ahead in building mode with simple pine cabinets and kids projects being churned out at a rate of knots. I vacuumed up beginners woodworking books like a kid eating fairy floss at the Easter Show.

Eventually I settled down and embarked on more challenging projects with more dense (and more expensive) wood varieties and realised that the 1-3/4 horsepower tablesaw was literally not going to cut it. I officially joined the ranks of the power hungry.

I concluded that I had entered a more sensible part of my woodworking career where I now look at the number next to the horsepower and try very hard to understand how that little number will relate to my daily activities when I, for instance, offer up a massive lump of jarrah to its raging fangs. Will it kill the machine? Will it kill me? I'd rather not be querying that. So it is with a sense of graduation that I have quietly divorced my Jet Contractor tablesaw. It has done its job and is relieved of its duties.

I purchased a SawStop Professional Cabinet Saw with a 36" T-Glide rail, overhead dust extraction and a sliding table extension. The SawStop motor has 3hp and eats jarrah for appetisers, Tasmanian blackwood for mains and gidgee for dessert.

The other unexpected side effect of owning this machine is that I have

confirmation that I have never suffered from obsessive compulsive disorder. The person who was the architect of the Sawstop owners manuals has OCD on a level which is unprecedented in history. It's a colour coded, large fonted, fully diagramed step-by-step extravaganza. My next door neighbour's parrot could not put a claw wrong putting this together.

Once the saw and all its 'add ons' are together the biggest challenge is getting used to pulling the big red button out (instead of in) to get the thing to go. Squaring a fence up is always the least enjoyable chore on my list (besides levelling a table wing that is) but this was done with ease using the tools provided. The sliding table could use some positive stops but is easily my favourite feature and that is saying something given the floating overhead dust extraction means never having to remove a guard to do rebates, dados or grooves – bliss! The blade cover is clear, meaning excellent visibility at all times and it lifts easily out of the way if a blade change is necessary.

The only pause in the march towards buying one is perhaps its eye-watering price but I'm comfortable it reflects the old adage you get what you pay for. The quality of the equipment is reflected in everything down to the OCD manual, which says that Sawstop marches to beat of its own drum...such that I suspect that tumbleweeds are rolling through the middle of their help desk. But what you can't put a price on is that I will sleep better at night knowing the SawStop will do as its name suggests...it will pseudo-self-destruct if my kids or I, for that matter, accidentally put a pinky finger in its fangs while it's raging.

** See Safety Plus Performance, Damion Fauser, AWR#88, also on our website, see 'Reviews'.*

SawStop information and supply from Carbatec: www.carbatec.com.au

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From Tree to Table

A furniture maker's guide to the basics of drying and milling your own wood. Story by Dante Stivanello.



There is a romance associated with the idea of using a tree growing in your own backyard for furniture. Perhaps the tree is old and at risk of falling, or in the way of a renovation or extension. Whatever the circumstances, it can be very rewarding to use timber that would otherwise be chipped into tiny pieces and lost forever.

In early 2018 I was contacted by a client who wanted me to build a dining table using slabs milled by an arborist from a quandong tree that had grown in their backyard. After inspecting the timber, providing a quote and detailing the process involved, the client and I agreed to the commission.

Fast forward to late December 2018 and I had completed the dining table and delivered it to its new home. The clients were thrilled with the outcome and proud to have their new dining table made from a tree grown in own backyard. This was a very rewarding experience for me and a true tree to table project.



However there is more involved than first apparent and important steps need to be taken to ensure a successful outcome. The following information is for anyone considering using their own tree to make furniture.

Tree suitability

Australia has an incredibly diverse range of native and introduced species, however not all are suitable for furniture. If unknown, a qualified arborist will determine the species of the selected tree and from there you can ascertain its suitability¹.

The overall health and condition of the tree will also bear on the quality of the timber. If the tree is heavily decayed and damaged by termites or borers it will most likely produce little usable timber, if any.

The tree will need to be of reasonable age and size. Generally a 400mm diameter is required to produce usable boards of heartwood. Tree shape is also important and straighter trunks will naturally yield more suitable boards.

Sawing and storage

A qualified arborist will fell the tree correctly and safely, and may then use a portable sawmill to cut the trunk into slabs. This is when you can get your first glimpse of the colour and quality of the wood inside.

Slabs should be a minimum of 50mm thick. As the wood dries it will lose a considerable volume of water and shrink in thickness. Thicker slabs will also better withstand the internal



stresses that can cause warping, twisting and cracking.

Prior to stacking it is very important to seal the ends of each slab. This is best done the same day the tree has been milled as the slabs will start shedding moisture almost immediately through the exposed endgrain. If the ends aren't sealed rapid moisture loss can cause splits and warping. You can buy proprietary waxed based end sealers or alternatively apply several coats of a latex paint.

Air drying

Stack the slabs on a hard flat surface around 400mm off the ground. Use stable supports that are not more than 600mm apart. For airflow the slabs also needed to be stickered –

Opposite: A native quandong tree and the finished table made from it is shown some 18 months after the tree was felled.

Above: The quandong tree is sawn on the Wood Mizer portable mill. Let your sawmiller know in advance the use you have in mind for the sawn timber.



Above: Once sawn, slabs need to be stickered in stacks. The ‘pack’ was then strapped and covered before being air and then kiln dried.

Above right: After air drying the quandong slabs were finished off in a solar kiln.

Opposite: The finished quandong table shown in the client’s home.

20 x 20mm garden stakes cut to support the full width work well – space them around 400mm apart. The stickers should be the same thickness as this helps to keep the slabs flat and reduce any warping.

Strapping the pack tight after stacking will help to prevent warping, cupping and twisting as the timber dries.

Ratchet straps are ideal for this and best placed 500mm to 750mm apart, making sure there is a strap close to each end. Edge protectors will help prevent the straps from digging into the slabs.

Covering the stack will protect it from the weather. A sound structure can be made using roofing iron and timber (or marine ply and timber) ensuring it is

stable and weighted down to prevent blowing away. Leave a space between the top slab and the roof for airflow. Monitor the stack on a monthly basis to make sure there are no leaks and also to retighten the straps as the timber shrinks.

The recommended moisture content for furniture grade hardwoods is between 8 and 13%². Timber for use in furniture needs to be dried to ensure its structural integrity and greatly reduce wood movement. Dry timber will glue and join effectively, and take a finish without reaction.

As a guide, a 25mm thickness of timber can take up to 12 months to dry. One important point to remember is that air drying will only reduce the moisture content (MC) of the slabs to the surrounding temperature and relative humidity (this is called the equilibrium moisture content or EMC). In humid and warmer areas such as Queensland, kiln drying will be required.

Kiln drying

Once your slabs have reached around 25% MC they can go in a solar kiln to finish the drying process. Commercial kilns will charge a cubic metre rate to dry your timber. I have used LDS Silviculture in Federal, NSW a company which owns and operates solar kilns for this purpose.

A kiln will ensure uniform drying in much less time than by air drying



alone. For example, if your pack of slabs takes four months to reach 25% MC it may take up to a further 12 months to reach 13% – or not, if you happen to live in a humid climate. However placed in a solar kiln, the pack may only take another four to six weeks to reach that moisture content.

The reason it is best to air dry the timber first is that if you place the timber wet into the kiln it will cause large stresses to the timber by drying too quickly, this can result in the timber being unusable. Lowering the initial moisture level slowly by air drying to at least 25% will ensure that the remaining drying in the kiln will be done with minimal stress to the timber.

Once the timber has reached its optimum moisture content of between 8% and 13% the timber is ready for collection. The pack should be stored internally in a dry, well ventilated area, stacked as previously discussed awaiting use.

This is a lot to consider when thinking about using a tree from your yard for furniture. It is not a quick process and requires attention to detail. However with time and care the steps and processes mentioned can make use of a valuable resource and help provide a quality material for your furniture making.

Photos: Dante Stivanello

1. Some references for wood identification include: Keith R Bootle, *Wood in Australia, Types, Properties and Uses*, 2nd Ed 2010, McGraw-Hill Education, Morris Lake, *Australian Rainforest Woods*, 2015, CSIRO Publishing, Morris Lake, *Australian Forest Woods*, 2019, CSIRO Publishing

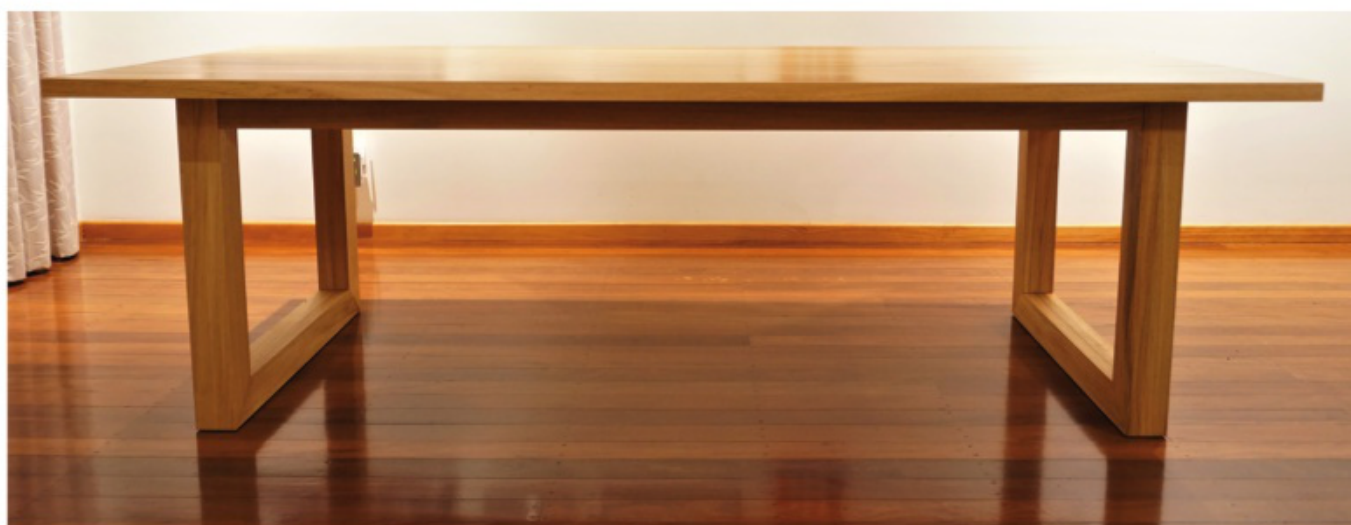
See also Euclid <http://keyserver.lucidcentral.org:8080/euclid/keys.jsp>

2. See Australian Standard 2796-1999: *Timber – Hardwood – Sawn and milled products*.

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Lucas Mill (Lucasmill): <https://www.lucasmill.com/>
Hardwood Mills (Norwood): <http://www.hardwoodmills.com.au>



Dante Stivanello is a builder, furniture designer and maker in Brisbane. Learn more at <https://stivanellobespoke.com.au>



Gesture of Balance

Grant Vaughan's recent exhibition marks new directions in his work.



1



2

With early training in engineering and architecture Grant Vaughan went on to become one of Australia's best known and admired wood sculptors. His bowls, freestanding and wall mounted forms are inspired by natural forms and yet do not mimic them. His work is further characterised by its free flowing lines and subtle curves that often envelop and fold within each other.

In recent years Grant has made a number of works with a 'split' theme. These are works that are often paired and express the concept of duality in the reflected halves.

Grant's preferred medium is native species and red cedar, rosewood and white beech often feature for their consistency of colour and texture, as well as being superb carving woods.

His work has featured in numerous solo and group exhibitions and is held in public and private collections throughout the world. The latter include the National Gallery of Australia, Parliament House Art Collection, Powerhouse Museum in Sydney and the Museum of Fine Art in Boston.

In July an exhibition of Grant Vaughan's work titled *Gesture of Balance* opened at Lismore Gallery, NSW.



- 1 *Split Form #10*, 480 x 320mm. A matt black finish contrasts with the warmth of red cedar.
- 2 Portrait of the artist, Grant Vaughan.
- 3 *Split Forms #11 and #12*, 560 x 100mm, white beech, in stained and natural tones.
- 4 *Bowl*, white beech, lacquer, 480 x 260 x 200mm.
- 5 *Wall Sculpture*, 2019, white beech, matt white finish, 670mm diameter. Hand carved lines radiate from a central point.



The exhibition runs until September 8, 2019. The collection of 15 pieces included several new works that feature new colourisation and texturing directions in the artist's work. While Grant has exhibited throughout Australia, the USA and UK, this is his first solo exhibition in the Northern Rivers region where he lives.

As a craftsman and sculptor Grant Vaughan is unsurpassed, especially in his ability to express the flowing and yet restrained forms he envisions.

Photos: David Young

Learn more about Grant Vaughan at www.grantvaughan.com.au

Wood Diary

For more events and news sign up to AWR fortnightly newsletters at:



www.woodreview.com.au

Diary listings are free. Email to: linda@woodreview.com.au

Note: Listings are correct at time of publication but may be subject to change. It is advisable to check details with the organiser before visiting.

Until 8 SEPTEMBER

Gesture of Balance

Sculpture by Grant Vaughan
Lismore Regional Gallery, NSW
www.lismoregallery.org

12–29 SEPTEMBER

Fringe Furniture 32

Open access experimental design

Abbotsford Convent, Melbourne
www.melbournefringe.com.au

14–22 SEPTEMBER

London Design Festival

Events, Exhibitions, Projects
London, UK
www.londondesignfestival.com

20–21 SEPTEMBER

Cooroora Woodcraft Show

Cooroora Woodworkers Club Inc
Cooroy Memorial Hall
Steve Chapman: 0419611565
www.cooroorawoodworkersclub.com

20–22 SEPTEMBER

Golden Gouge Woodcraft Competition

Toowoomba and District Woodcrafters Inc
Toowoomba Showgrounds, Glenvale Rd
Kerry Smith 0418 196 712
Email: tdwoodcrafters@gmail.com

5–6 OCTOBER

Hand Tool Event/Open Day Weekend

Melbourne Guild of Fine Woodworking
14 Cottage St, Blackburn, Vic
www.mgfw.com.au

5–6 OCTOBER

Spoonies in the Tweed

Spooncarving weekend with Robert Howard
Uki, Tweed Valley, NSW
www.tweedspooncarving.com.au

5–6 OCTOBER

Lost Trades Fair NSW

Hawkesbury Showgrounds, NSW
www.rundellandrundell.com.au

12–13 OCTOBER

Illawarra Festival of Wood

Bulli Showgrounds, NSW
www.illawarrafestivalofwood.com

17–19 OCTOBER

Oktoberfest Felder Group

Unit 1/125 Russel St, Emu Plains, NSW
www.felder-group.com/au-en

19–27 OCTOBER

Bribie Island Woodcrafters Exhibition

Bribie Island Community Arts Centre
Sunderland Dve, Banksia Beach, Bribie
Email: cst8812@bigpond.net.au

19 OCTOBER–1 DECEMBER

An exhibition of fine woodwork

by Geoff Hannah and 26 of his students
Lismore Regional Gallery, NSW
www.lismoregallery.org

22 OCTOBER–2 NOVEMBER

The Piano Transformation Challenge

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North Melbourne
piano.transformation.challenge@pianosrecycled.eco
www.pianosrecycled.eco/

26–27 OCTOBER

Spoon Jam Spooncarving Festival

Carving workshops and demonstrations
Tharwa Valley, ACT
www.spoonsmith.com.au

26–27 OCTOBER

London International Woodworking Festival Demonstrations and seminars

<https://londoniwwf.co.uk/>

26–27 OCTOBER

Annual Wood Show

Goulburn Valley Woodworkers

MacIntosh Pavillion, Shepparton Showgrounds
High Street Shepparton, Vic
www.gvwoodworkers.com.au

26 OCTOBER– 3 NOVEMBER

Craft Display and Sales

Clarence Valley Woodworkers Assoc

during Grafton Jacaranda Festival

South Grafton Servicemens Club
Linda Roberts: 0491 130 546
Email: cvwassoc@gmail.com

31 OCTOBER

IFDA Asahikawa 2020

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entry deadline
www.ifda.jp/en/index.html

1–3 NOVEMBER

Timber Tools & Artisan Show

Exhibition Park (EPIC) Mitchell, ACT
www.timbertoolsartisan.com.au

9 NOVEMBER

Tools and Trades Day 20129

Hand Tool Preservation Assoc Australia
St Anthony's Parish Hall,
Cnr Neerim and Grange Rds, Carnegie, Vic
Dick Lynch: 0419 392 042, dicklynch43@gmail.com

9–10 NOVEMBER

Annual Woodwork Exhibition & demonstrations, childrens program

Eltham & District Woodworkers
Eltham Community Centre Main Rd Eltham
Geoff Oliver on 94329047
Charlie Camera on 0413481699
www.htpaa.org.au

16–17 NOVEMBER

30th Wood and Craft Expo

Bundaberg Woodworkers Guild Inc.
Displays, demonstrations and sales
Main Pavilion, Bundaberg Precinct
(enter Kendalls Road)
Stephen Faulkner: sfa57198@bigpond.net.au

23 NOVEMBER–8 DECEMBER

Sturt School for Wood Graduating Exhibition 2019

Mittagong, NSW
www.sturt.nsw.edu.au

11 DECEMBER

Deadline for entry

AWR Student Awards

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www.woodreview.com.au/student-awards

12 DECEMBER–18 JANUARY

Graduate Exhibition

Centre for Fine Woodworking
Refinery Artspace, 3 Halifax Street
Nelson, New Zealand
www.cfw.co.nz

14–15 DECEMBER

Woodturning exhibition

Woodturners Society Queensland

Mt Coot-tha Botanic Gardens Auditorium
<http://woodturnerssocietyqld.org.au/>

2020

13 JANUARY–21 FEBRUARY

Michael Fortune Artist Residency & Open Studio

Centre for Fine Woodworking
Nelson, New Zealand
www.cfw.co.nz/course_m5.html

16 FEBRUARY–29 MARCH

EDGE – Exploring Boundaries

An exhibition of work by
Studio Woodworkers Australia
Sturt Gallery, Mittagong, NSW
www.studiowoodworkers.org.au

15–16 FEBRUARY

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www.sturt.nsw.edu.au

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A Tree Emblem for Australia

Australia has emblems for native animals, flowers, gemstones and more, but not for trees. Australian members of the International Wood Collectors have a project underway to establish one.

Australia's coat of arms features an emu and a kangaroo placed to either side of a shield that shows the symbols for each of our states. These native animals represent part of our national identity. Australia's floral emblem is the golden wattle and each state and territory has its own floral and other emblems. While there are other kinds of Australian emblems there are none for trees.

Inspired by the success which the International Wood Collectors Society (IWCS) in Canada had some 20 years ago in establishing a national tree emblem, Australian

IWCS member and dendrologist Eugene Dimitriadis set about following suit. 'This is our collective effort to recognise that the woods we love, collect and work with once came from trees,' said Eugene.

Expressions of interest and support for the establishment of a National Arboreal Emblem were sought and received from notables such as Dame Elizabeth Murdoch, Ian Kiernan, Dick Smith of Australian Geographic, representatives from Greening Australia and several botanic gardens.



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1. Salmon gum in native woodland around Kalgoorlie/Coolgardie WA. *Photo: Ian Kealley*
2. Ghost gum, Northern Territory. *Photo: Eugene Dimitriadis*
3. Wollemi pine, 10–12 years old, 7–8 metres tall growing in Warragul at an IWCS member's yard. *Photo: Eugene Dimitriadis*
4. Wollemi pine cone, 40–50mm across. *Photo: Eugene Dimitriadis*
5. Showing the variegated bark of a sugar gum tree in South Australia. *Photo: Neville Bonney*



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6. Queensland kauri, close-up of bark.
Photo: Geoff Holloway
7. Young mountain ash growing in the Dandenong Ranges, Victoria.
Photo: Eugene Dimitriadis
8. A pair of ancient yellow box trees growing in Southern NSW.
Photo: Eugene Dimitriadis
9. Sherwood Arboretum in Brisbane has an avenue of 70 kauri trees.
Photo: Geoff Holloway
10. Huon pine, Teepookana Plateau south of Strahan. This is a traditional harvest area for Huon pine logs where old logs and residues are salvaged from small coupes each summer.
Photo: Island Specialty Timbers
11. Sugar gum tree in South Australia.
Photo: Neville Bonney



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However the project 'languished' and was put in the too hard basket. 'Reaching and ultimately attracting the interest of federal government was then, and remains, a difficult challenge. Reaching and involving wood and the tree-interested public is now much easier with many groups active and using electronic and social media', said Eugene.

Following discussions and decisions at last September's national IWCS meeting in Kalgoorlie, it was decided to reinvigorate the project through a stepwise approach, one which involved IWCS members only electing their favourite trees.

IWCS members have a wide range of backgrounds, ranging from wood artisans to foresters, millers, scientists, wood anatomists and biologists; however all are united by their love for and interest in trees. Members were asked to nominate one or more trees that may best represent each state and territory in Australia with the selection of a national tree symbol to be left for a later stage.

The vote would not be for an individual tree but nevertheless for one over five metres that could represent the species and best symbolise the member's state. Members were encouraged to supplement their vote with photos, stories or information to support their selection. Voting forms were sent out and nominations collected by state representatives for discussion and evaluation in order to arrive at a consensus.

Suggested reasons for nomination included the species' significance to Indigenous communities, its usefulness for

building, furniture and/or craft along with its beauty of form or unique nature. Reasons of historic and economic significance as well as great size or age were also considered as being of importance.

At the end of February, after the closing date for voting, the following species were duly selected as Tree Emblems for Australian States and Territories:

West Australia: Salmon gum, *Eucalyptus salmonophloia*

South Australia: Sugar gum, *Eucalyptus cladocalyx*

Tasmania: Huon pine, *Lagarostrobus franklinii*

Victoria: Mountain ash, *Eucalyptus regnans*

New South Wales: Wollemi pine, *Wollemia nobilis*

Australian Capital Territory: Yellow box, *Eucalyptus melliodora*

Queensland: Qld kauri, *Agathis robusta*

Northern Territory: Ghost gum, *Corymbia aparrerinja*

From October 14–19, 2019 IWCS will meet in Canberra and showcase each of the selected species with posters, information and displays of wood items or other plant parts. At that point the next stage in the project for establishing a national tree emblem will be determined.

The International Wood Collectors Society is a non-profit society devoted to distributing information of collecting wood, identifying and naming wood specimens and using wood for creative crafts. There are members in over 30 countries around the world. See www.woodcollectors.org for more information.

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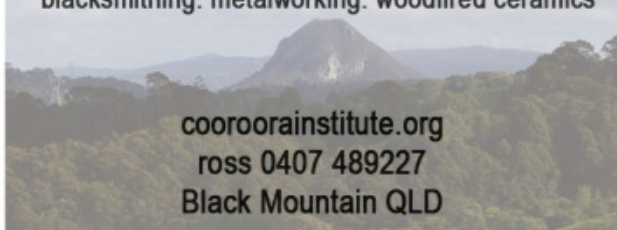


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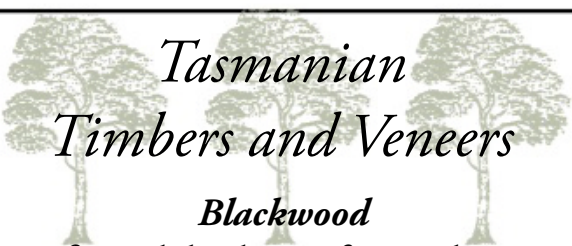


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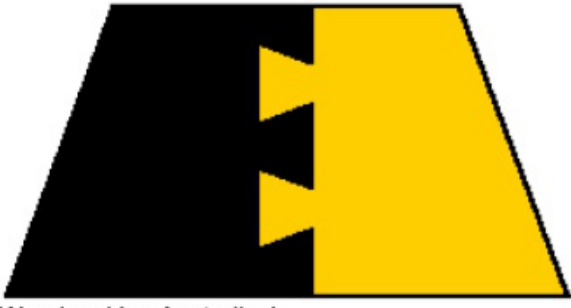
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The Technicalities of Bending Wood

Why, when and how wood can bend. Story by Dr Jugo Ilic.

Wood is a complex material consisting of naturally produced compounds that include water, carbohydrates (cellulose and non-cellulosic) and aromatic compounds (lignin). These are organised as mostly long, slender, and hollow cells with tightly wound fibrils and fillers. For the most part, lignins cement the cells walls together but are also found within cell walls.

Wood bending is an age old art used for making furniture, boats and ships, agricultural implements, tool handles, cooperage, coachwork, wheel rims, sporting goods and musical instruments. Knowledge of species properties and processes guide the techniques used.

For strength

Straight, solid wood cut in curves will eventually produce weak cross grain areas. Bending carefully selected straight grain sections of wood can virtually eliminate this weakness. In other words, material thickness can be reduced while maintaining strength.

Boat building and cooperage use gradual bends, however more severe bends require more care and a better understanding of the process in order to obviate bending losses through failures.

The selection of species and wood sections is important, as is an understanding of the process of plasticising wood.

Plastic and elastic

To get a straight piece of wood to remain bent you have to work in the 'plastic' range of its properties otherwise in its elastic range the bend will not remain permanent. Creep can occur after plasticity and before failure, and must be avoided as it may produce unacceptable fractures.

Steam power

The simplest way to make tight bends is by plasticising the wood with steam at relatively high moisture. In the presence of moisture, the heat from steaming will soften the lignin and make the wood pliable. Just heating the timber with dry air is unsatisfactory because that will lower the moisture content (MC) and not plasticise the timber. (This is a similar

Oposite: Ross Annels (centre) and students work together to bend steamed timber around a form which it will then be secured in order to constrain the outside-face stretch. *Photo: Linda Nathan*

requirement to timber reconditioning of collapse prone ash eucalypts.)

Considering the stress-strain behaviour of wood during softening, the response in compression within the plastic range is magnified and becomes large, up to 10x that in the dry range, while not affecting the tension properties.

Initially it may be thought that green wood might be easily softened with heat or steam, however as in drying, prolonged heating of green wood increases the drying rate, but reduces its strength markedly. Steaming time should be kept to a necessary minimum, even for dry wood.

Experience has shown in Australia¹ and elsewhere that while air-dry timber (notionally 12%) can be used, the ‘goldilocks’ MC for softening timber for bending is approximately 20–25%. Consequently, moisture plays a key role in the ability of wood to be bent. It was noted that while some pines (*Pinus*) also bend well when softened green, this is however unsatisfactory for hardwoods, probably because the timber becomes more collapse and check prone on subsequent drying.

Kiln dried timber, unless dried aggressively, should also be no different from air-dried. Still, if the intent is to dry for bending, then kiln drying is an unnecessary step as the timber would need to be steamed for longer to raise its moisture content for optimal softening. Furthermore, the timber’s MC in the core should also be below fibre saturation point (FSP) otherwise severe internal and surface checking is likely to develop upon final drying.

A further point to consider is that air-dried species are prone to surface checking (as with for example messmate, karri and others of high density). Here the steaming used for softening tends to reopen otherwise closed surface checks which do not close after the bent timber is set and dried.

Stretching and compression

Considering the actual amount that wood surfaces can stretch and shorten, normally flat pieces can absorb a difference between outside and inside radiuses of 2–3% (without using end pressure or steaming). Where a more severe radius is needed, up to 20 to 30 times the wood’s thickness, steaming and end pressure and retraining straps can be used.

Softened timber can compress considerably without fracture however the outer (convex) face tends to stretch only a little more than non-softened before it tears apart (fracture). Because of this, softened timber can only be bent to a large radius if a means of preventing the stretch on the outside face is applied.

A practical way of reducing tension during bending is to bend slowly and to prevent the ends from expanding by using bending straps with tightly fitting ends – the idea being to

AUSTRALIAN TIMBER SPECIES AND THEIR BENDING PROPERTIES

Excellent

Red tulip oak	<i>Tarrietia peralata</i>	N.Qld
Myrtle beech	<i>Nothofagus cunninghamii</i>	Tas
Southern sassafras	<i>Atherosperma moschatum</i>	Tas
Celery top pine	<i>Phyllocladus rhomboidalis</i>	Tas

Very good

Northern silky oak	<i>Cardwellia sublimis</i>	N.Qld
Silver quandong	<i>Elaeocarpus grandis</i>	NSW, N.Qld
Huon pine	<i>Lagarostrobos franklinii</i>	Tas
King William pine	<i>Athrotaxis selaginoides</i>	Tas
Southern blue gum	<i>Eucalyptus globulus</i>	Vic, Tas
Radiata pine	<i>Pinus radiata</i>	plantation

Good

Silver ash	<i>Flindersia pubescens</i> , <i>Flindersia bourjotiana</i>	N.Qld
Yellow siris	<i>Albizzia xanthoxylon</i>	N.Qld
Rose mahogany	<i>Dysoxylum fraseranum</i>	N.Qld
Red siris	<i>Albizzia toona</i>	Qld
Yellowwood	<i>Flindersia oxleyana</i>	NSW, Qld
Spotted gum	<i>Corymbia maculata</i>	NSW, Qld
Silver wattle	<i>Acacia dealbata</i>	Vic, NSW, Tas
Blackwood	<i>Acacia melanoxylon</i>	Tas, Vic
Mountain ash	<i>Eucalyptus regnans</i>	Vic, Tas
Silvertop ash	<i>Eucalyptus sieberiana</i>	Vic, Tas
Messmate stringybark	<i>Eucalyptus obliqua</i>	Vic, Tas
Red stringybark	<i>Eucalyptus macrorrhyncha</i>	Vic, Tas
Alpine ash	<i>Eucalyptus gigantea</i>	Vic, NSW, Tas
Mountain grey gum	<i>Eucalyptus goniocalyx</i>	Vic
Manna gum	<i>Eucalyptus viminalis</i>	Vic, Tas
Brown stringybark	<i>Eucalyptus capitellata</i>	Vic
Karri	<i>Eucalyptus diversicolor</i>	WA

Fair

Spotted gum	<i>Corymbia maculata*</i>	NSW, northern NSW, Qld
Red silkwood	<i>Lucuma galactoxylon</i>	
Blackbutt	<i>Eucalyptus pilularis</i>	

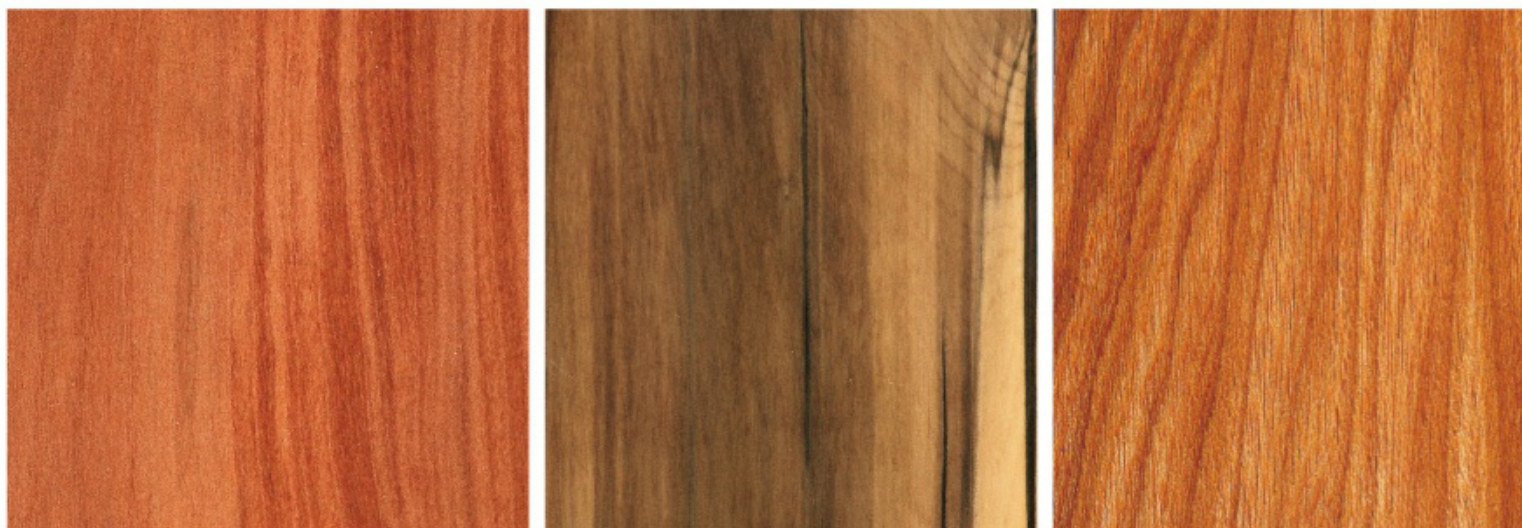
Poor

Qld maple	<i>Flindersia brayleyana</i>	N.Qld
Hoop pine	<i>Araucaria cunninghamii</i>	NSW, Qld

Bad

Rose gum	<i>Eucalyptus grandis</i>	NSW, Qld
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** Spotted gum from the south coast of NSW is said to be superior to the more highly interlocked material from northern NSW and Qld Although an extensive classification of Australian timbers produced in 1948 is given in the Trade Circular¹ unfortunately only a few species listed are available today.*



From left: Myrtle beech, southern sassafras and red tulip oak are noted as having excellent bending qualities. Visually it is not possible to predict how well a particular section of different woods might bend.

constrain the outside-face stretch. Consequently, the practical procedures required to achieve successful bending without failure are not trivial and few rules of thumb work¹.

Other ways to bend wood

There are additional ways of softening wood other than with steam by way of chemicals such as liquid ammonia and urea, or by heating rapidly near-green wood with microwave radiation². Most of these methods require more complex handling and additional difficulties for re-drying of the wood for use.

Choice of material

Species type is an important consideration in terms of appearance, degree of bend and end use. Even if the best performing species is chosen however, its suitability may be overshadowed by the selection of the individual pieces in terms of their quality.

As in design of building structures, defects and their location are critically important and need to be avoided, or if inevitable, they need to be small and located discretely or close to the central zone where bending stresses are less significant. Features to avoid include:

- 1. Knots.** Pin knots are less important in backsawn material but will give rise, along with species with wide rays, to wrinkles with quartersawn material
- 2. Cross grain.** (<1:15) wood near the pith (first 5–6 growth rings) in softwoods often contains spiral grain, this is less of a problem in hardwoods
- 3. Interlocked grain.** Many eucalypts and tropical woods exhibit this feature
- 4. Decay, gum/kino veins** discontinuities and shakes
- 5. Drying checks.** Surface and internal checks are common in pre-steamed green wood and check prone ash eucalypt species.
- 6. Brash wood.** Brash or brittle heart is usually found near the tree pith and is either of natural origin or resulting from the use of high temperatures in drying or felling damage.

7. Timbers with wide rays. These should be backsawn¹, for example silky oak, tulip oak and true oaks

Choice of species

Reportedly, density and rate of growth has little effect on species bending performance¹. Interestingly, many of the higher density species listed which bend poorly, have well developed interlocked grain. Secondly, it seems that species with distinct growth rings tend to bend better than those lacking them.

Also, in a study of Australian plantation and regrowth species including karri, jarrah, myrtle, beech, blackwood, radiata pine, shining gum and Sydney blue gum it was noted that when microwaves are used to heat near-green wood, plantation and regrowth species performed better than their mature growth counterparts, but reportedly there were some discrepancies with previous reports particularly for karri, and myrtle beech.

The Trade Circular¹ list shows that the best species for bending still in use today include myrtle beech and to a lesser extent celery top pine with radiata pine, and Northern silky oak not far behind. The ash eucalypts, blackbutt, spotted gum, karri and blackwood are in about the mid-range position and many of the high-density eucalypts and rose gum are under the poor banner. Interestingly, the popular Sydney blue gum (*Eucalyptus saligna*) is not listed, but its performance is expected to be little different from rose gum on wood structure grounds. Generally outside Australia, northern temperate oaks are among the best with hickory and beech (*Fagus*) at midrange and the maples and yellow poplar being poor.

1. CSIRO, Division of Forest Products 1948 Trade Circular No. 22 – Timber Bending. Rev. Ed. Commonwealth of Australia Council of Scientific and Industrial Research.

2. B. Ozarska and G. Daian (2010) Assessment of microwave bending capabilities for Australian wood species. Forest Prod. J. 60(1):64-68



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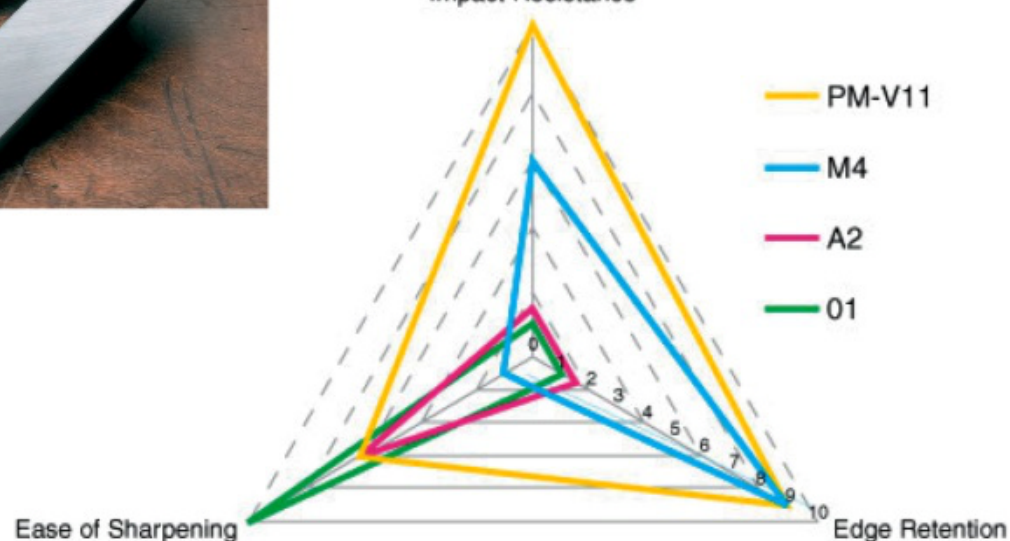
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