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103

THE RIGHT EDGE

Steel Types
& Selection

BYRON RALEIGH

The Human Touch

WORKSHOP UPGRADE

Better Dust Control

TESTED

- RIKON & WOODFAST
PLANER/THICKNESSERS
- ARBORTECH POWER
CARVING UNIT
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PROJECTS

- WHISKEY CABINET
- TONGUE DRUMS
- FOUR SQUARING TOOLS
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Editor's Letter

The human touch

Give ten people a piece of wood, ask them to make something and, unsurprisingly, you will get different results. Technique, skill, precision, the laws of geometry and also wood movement are critical, but nowadays can to some extent be mitigated and mimicked by machine and digital technology.

However I like to think the human element can't be simulated. A 'smart' answer might be to add an algorithm for random imperfection but I'm not giving ground on that either. Machine learning, artificial intelligence and robotics are developing at a fast rate but will they ever be able to design and make objects that convey the historical and cultural influences that add up to the human touch?

Personal journeys

Byron Raleigh, on the cover this issue, is a Melbourne based maker who grew up in central Victoria but studied furniture design at the University of Tasmania. As a lover of fine 'mid-century' machinery and processes his work stands at the intersection of (albeit older) technology and human values, and he expresses those ideas through his work.

All roads seemed indirectly to lead to Tasmania this issue, and the connection points were influences that went back in time. Hape Kiddle, maker and sculptor is also featured this issue and I discovered that he like Byron Raleigh also studied furniture making at UTAS. Both look back to formative years under the tutelage of John Smith and Kevin Perkins, and yet both have taken very individualistic paths as makers.

Hape's fluid carved forms reflect his connection to place and the natural environment, and he highlights both the strength and fragility of that relationship, nowhere felt more powerfully than in the modern context.

Also from Tasmania, Laura McCusker is a designer maker who this issue lists her 'tools for design' in an abridged version of the talk she gave at AWR LIVE last year. Here is yet another humanistic approach that is about finding inspiration, working within limits and working with other people – these are design tools that can't be coded.

Another personal approach is taken by Troy McDonald in his practical and common sense account of ways to reduce wood dust in your workshop. In the light of known health risks his is also a story about the importance of prioritising things that can literally seem easier to just keep sweeping away.

Student Awards 2019

Wood Review's Student Awards 2019 are now open for entry and remain Australia's only online showcase for woodwork by year 11 and 12 secondary students. Our website gallery will display entries as they arrive and some will also be featured on our Instagram and Facebook pages. Information and entry is at www.woodreview.com.au/student-awards Backing all this up we have great industry sponsors who are passionate about supporting younger woodworkers, see p.42 for more information.

And by the way, this issue we have a very nice give-away from 3M Australia for subscribers, one designed with personal safety in mind – details are on p.26.

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Byron Raleigh in his workshop,
Northcote, Vic

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Similar in most ways, Rikon 25-210h and Woodfast PT310A combination planer/thicknessers.

1. On/off switches. The Rikon switch sits proud of the body, meaning you can activate the stop button with a knee bump.
2. The cam-lock fence angle adjustment was a little awkward to operate.



Rikon 25-210H and Woodfast PT310A Planer/Thicknessers

Reviewed by Damion Fauser

These 300mm planer/thicknessers are both made in the same factory. With a price difference of only \$300 it quickly became evident that this was an exercise in identifying the differences between what are near-identical machines.

The heritage of these machines is obvious, with immediate comparisons to most other 300mm combinations already out there. Both have helical cutterheads with four rows each of 14 carbide insert cutters, which produced extremely clean finished surfaces on some tightly curled Queensland maple used for testing the machine. The resulting surface was also sufficiently flat to indicate that the tables were correctly aligned at the factory for both machines.

Both cutterheads are 70mm in diameter and have the same mass, so the only difference in the geometry or physics of the cutting action of these tools is the rpms: the Woodfast turns at 5500rpm, the Rikon at 5000rpm. For this diameter cutterhead this difference is cosmetic only in my opinion.

A 3.3hp/15amp motor powers the Rikon while the Woodfast has a 3hp/15amp motor, so either would need a 15 amp circuit installed for home users. Both motors are sufficiently powerful for almost any task that this machine would be asked to perform. I find the surface grind on the tables of most comparable machines on the market to be somewhat disappointing, so I was pleasantly surprised to find a good quality grind on both machines, with the Rikon having a slight advantage.

The jointer tables on both were a respectable 1409mm in length, the safety guards were both the Euro-style and both machines had an identically-sized aluminium extrusion fence that was nice and straight along its length. I found the camlocking system on the fence angle adjustment a little clumsy and it was difficult to lock the fence at



the angle that I wanted, but thankfully both had adjustable positive stops to assist in this regard. With persistence one could get it right but I'd be reluctant to be changing it too often.

Infeed table depth adjustment was similar, as was the ability to flip the safety guard out of the way if required. I thought the stop/off switch of the Rikon was a little better – being proud of its housing you can activate it with a knee bump. Both machines have standard 100mm dust ports which, when connected to the decent extractor provided for testing, meant there was very little waste not captured at the source.





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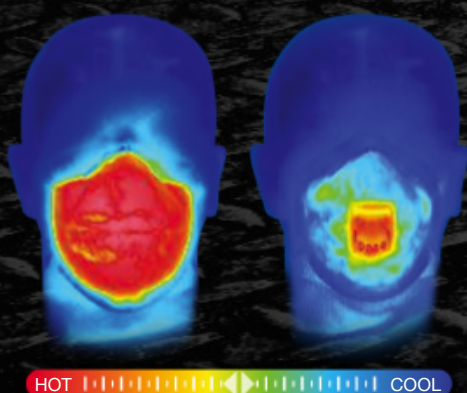
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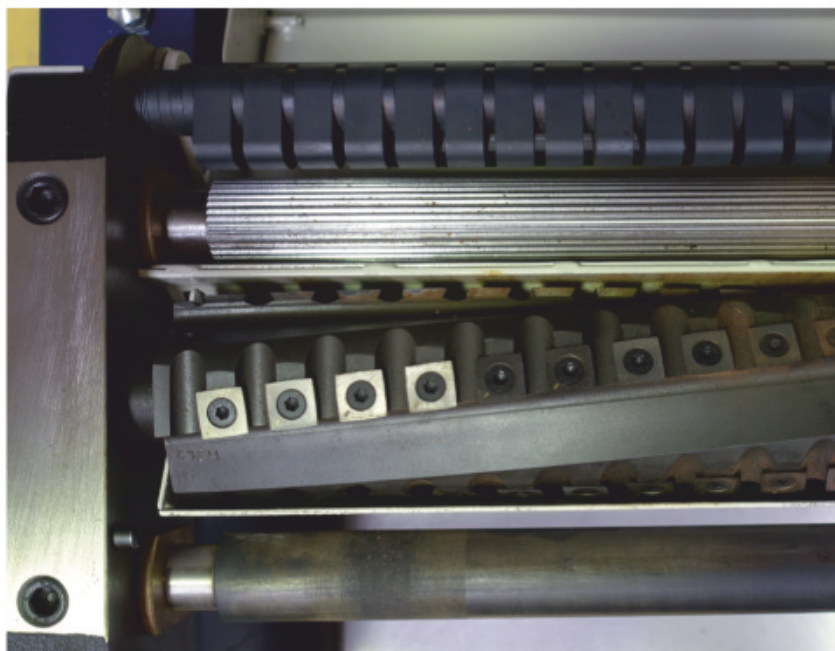


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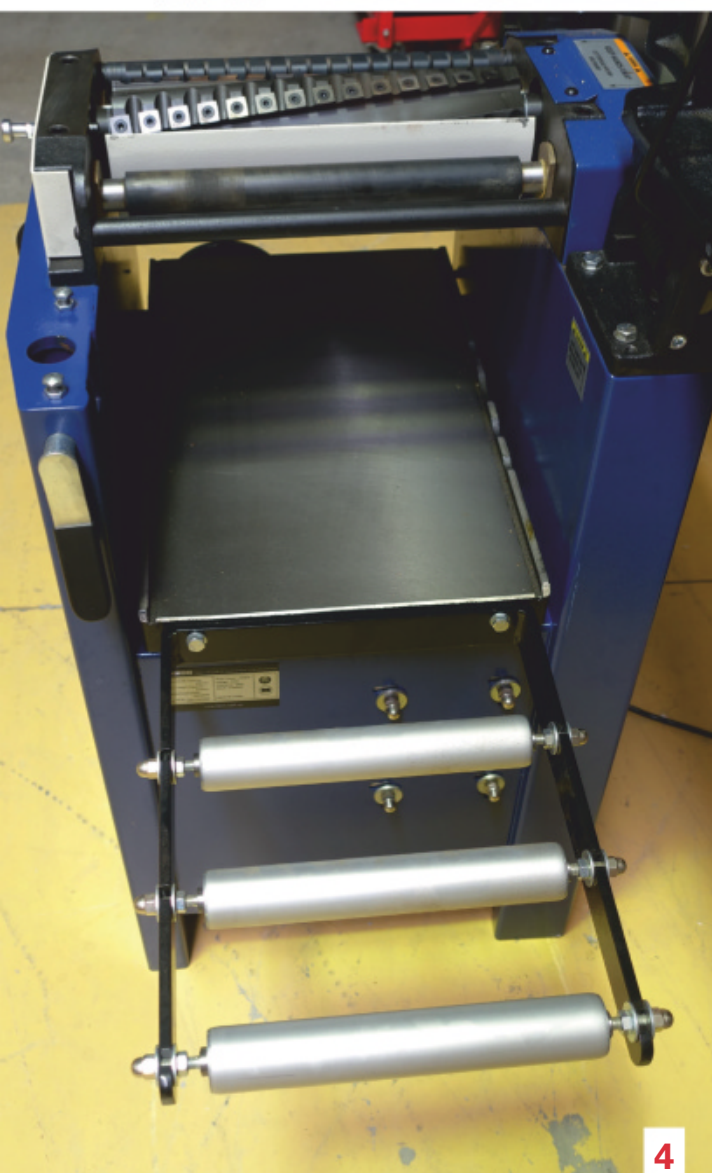
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4

Converting over to thicknessing mode was an identical process, although I found the Woodfast machine required significantly more effort to physically lift the tables. Once converted the machines have good safety features in that there is a locking toggle to prevent the tables from tilting back over without direct intervention, and once flipped over, the dust shroud also had a nice little spring-loaded pin to prevent it from being inadvertently flipped when not desired.

Feed speed is identical at a respectable 7m/min and the Woodfast has a slight advantage in maximum thicknessing width at 307mm compared to 305mm for the Rikon. Both have a thicknessing height range of 4–225mm.

The Rikon does have two distinct advantages in thicknessing mode. First, it has a counter-style readout to indicate the table height and it also has an accessory outfeed table fitted to the thicknessing table. The thicknessing table on both machines is locked with a rotating kip-lock

handle, however the Rikon offered a more solid lock in this regard.

Lengths of sapele, some Tasmanian blackwood with a distinct change in grain direction along the length, as well as the figured Qld maple were used to test cut quality. The results from both machines were great, with the only tear-out happening right at the change of grain direction in the blackwood, which would have happened on this piece of wood with just about any other machine as well in my opinion.

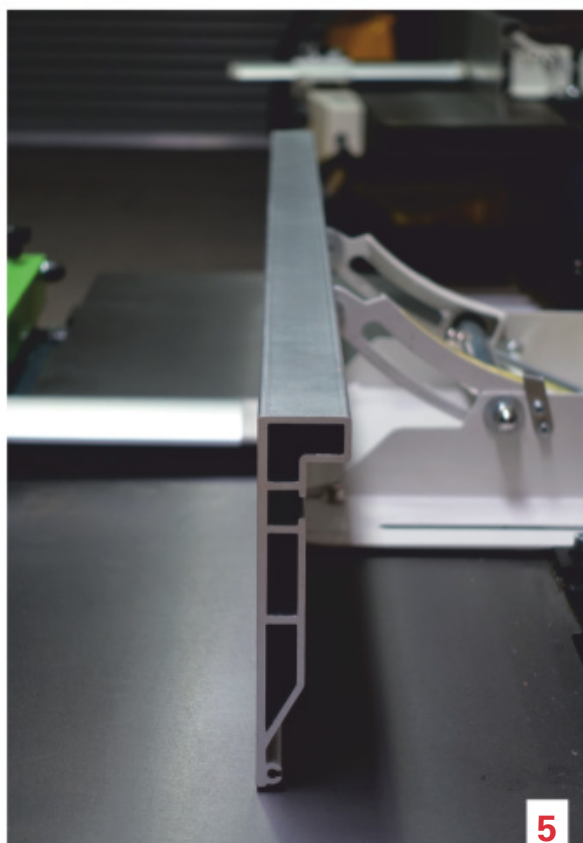
There are now a good number of options in this class of machine for woodworkers to choose from, and these two are certainly well positioned to take on their competitors. Most home-based woodworkers would be well served by either of these machines. Whilst extremely similar in so many regards, I found the Rikon to be just that little bit better a machine, with the additional 0.3hp power, the height readout and the outfeed table on the thicknesser helping it to stand out for me.

Damion Fauser is a furniture designer/maker who lives in Brisbane who also teaches woodwork. Email: damion@damionfauser.com

Review machines provided on location at Woodwork Machinery...Plus, see www.woodworkmachinery.com.au

See also www.woodfast-group.com and www.rikon.com.au

3. Cutterheads on the Rikon and Woodfast are the same configuration. The only difference is that the Rikon offers 5500rpm compared to 5000rpm on the Woodfast.
4. Point of difference: the Rikon has an accessory outfeed table fitted to the thicknessing table.
5. The machines had same-size aluminium extrusion fences that were nice and straight along their length.



5

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Arbortech Power Carving Unit

Reviewed by Andrew Potocnik

Arbortech have now developed their own angle grinder which they say is 'specifically designed as the recommended power unit to optimise all our attachments'. The unit has a soft start and variable speed switch and comes with two separate housings, a chip catcher and a levelling guide both of which may be used with the included sanding pad or turbo plane attachment. The latter is not included in the kit and costs \$159 but was loaned for review purposes.

Both housings attach to the grinder via two screw fittings also used for positioning the low vibration handle on either side of the body – simplicity in design! Although made of plastic they are sturdy and well finished, creating a look of quality.

As a sanding machine the unit performs very well, however the combination of the turbo plane and the newly developed soft-backed sander pad opens new horizons, especially coupled with dust trapping capabilities of the vacuum attachment which takes this tool to another level in terms of dust retention. In a way this is a four way comparison – the freehand carver using the turbo plane and sander, followed by the levelling guide using the turbo plane and sander.

Put to use straight out of the box I tested the levelling guide on flat planed wood with the 240grit sandpaper that was already fitted to the soft backed pad. The guide followed the surface with ease and coupled with the no.2 speed setting left a cleanly sanded



surface without overheating the wood or burning the disc when run at top speed. The guide adjusts with the twist of a knob so you can rough sand with the 60 grit velcro backed discs progressing to 120, 180 and 240 discs that are provided. Change over is simple.

To smooth a roughsawn board I changed from the sanding pad to the turbo plane which allows for a controlled depth of cut. The chip tube and a small finned insert fitted behind the turbo plane suck shavings away from your work and can be directed into a bucket, or hooked to an extraction system. I placed a plastic bag over the end of the tube and was surprised at how well shavings were diverted and collected. It was far better than I expected.

Changing from the levelling guide to the chip catcher via two screws is simple. The shroud fits snugly against the body of the grinder and you're ready to go. I opted for the turbo plane first, keen to see whether the chip tube and catcher would restrict movement or get in the way. Neither did as the hose fitting swivels with ease and the chip catcher offers ample exposure of the plane to do its job. Again I was impressed with how well shavings were cleared away and collected in my trusty plastic bag.

For sanding in the same mode I hooked up a standard household vacuum cleaner which also surprised me. With the hose connection on the right of the disc it is easy to see how dust can be directed into the chute, but even when using the left



side of the disc, I could see dust being sucked away trapping most of it.

The soft backed pad allows shaping of contours, and with speed settings which range from 2,000 to 11,000 rpm you can make optimum use of this power unit either when shaping or sanding.

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

Review tool supplied by Arbortech, see www.arbortechtools.com



1. Showing the power carving unit in use with the soft backed sanding pad, chip catcher and chip hose with the vibration reducing handle visible. In this mode, the grinder is turned down to 2 or 3 on the 1–6 variable speed scale.
2. The levelling attachment with turbo plane fitted created the flattened surface on a roughsawn myrtle board. Set up according to instructions the turboplane sucks away shavings via the chip hose, leaving minimal residue – no dust extraction here, the fan does it all.
3. The soft-backed sanding pad may be used in freehand mode with the chipcatcher, or with the levelling guide.

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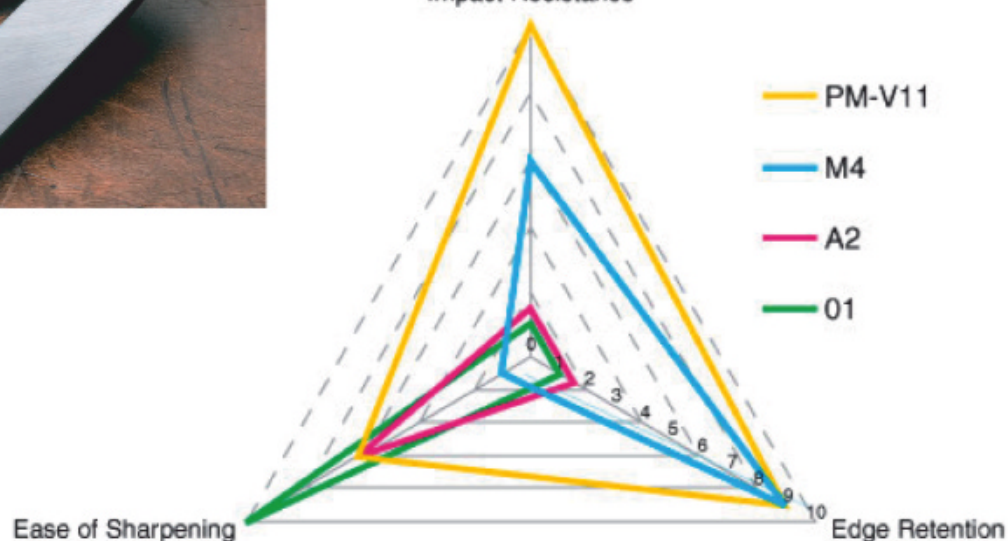
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Bosch Cordless Trim Router – GKF 12V-8

Reviewed by Raf Nathan



This is a new design for what were once called laminate trimmers. It features a brushless motor, standard 1/4" collet and is quite lightweight. Its off-set design offers a different way to use a tool like this. In use the front of the rectangular base can be placed on the wood first offering good support. Then the cutter can be brought into action. On a 32mm wide piece of wood it can be tricky to balance a standard barrel type trimmer and run a bevel along both edges. However the rectangular off-set base on the Bosch made the job quite easy.

Compared to a corded tool it has a slower cutter speed of 13,000 rpm without the same power, but of course that's



not the point. Don't underestimate it as I hogged off a very large bevel quickly without any slowing down or straining sounds from the motor.

Changing cutters is easy with the clever spindle lock, and depth adjustment is quick on the sliding thread that can be also be finely dialed in. There is not a lot of travel in height, I could not use some longer spiral cutters, but all shorter cutters were fine to use.

Visibility of the cutting area can be poor due to the low position of the body and small opening and this applies to large cutters like rounding over bits. Straight cutters can be viewed well so you can creep up on a cut.

Run time depends on use and battery size. The smaller 2 amp batteries are very light and cheap but be real and get a 4 or 6 amp amp battery which is heavier but offers a massive difference in run-time.

Pricing is a high compared to corded tools. There is an optional dust shroud for extractor connection but then it will lose its cordless freedom.

It is not as heavily built as some corded trimmers and won't like being banged around on-site. The collet was a bit tight and hence fiddly to remove cutters, and as mentioned the visibility with larger cutters is limited. However, I loved it.

Bosch Cordless Mini Plane – GHO 12V-20

Reviewed by Raf Nathan

This is a powered block plane and certainly packs a punch. It will plane up to 2mm in a pass with its 56mm wide blade and has a rebating function. It's well balanced to use and worked like I would expect any electric plane to work. Power is plentiful and at full depth you can push it hard through the wood. However, its not designed for that sort of work.

I liked it for cleaning up faces of strips and applying a clean chamfer on an edge. You can walk up to a board and check the grain, fit a door to an opening or clean up some small boards. It uses one reversible carbide cutter and has a tiny drawer in the base to store a spare included cutter. The switch has a thumb lever that has to be depressed before the trigger will work. This is for safety but it's a bit fiddly in use, however I get the rationale. This is a great littler plane for site work.



For this tool and the Mini Plane above you will need a charger at around \$100 and ideally two batteries at around \$120 for a 4 amp version.

Review tools from Bosch Australia

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- 120W, 240V

Order Code: W859

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SAVE \$49



bts 900x - Belt & Disc Linisher Sander

- 100 x 915mm belt
- Ø150mm disc
- Tilting table & mitre guide
- 370W 240V

Order Code: L105

\$198

SAVE \$44



os-58 - Oscillating Vertical Bobbin Sander

- 1/2", 3/4", 1", 1-1/2", 2" & 3"
- 370 x 290mm cast iron table
- Rotating & oscillating
- 450W / 240V

Order Code: W843

\$239

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DS300 Bench Disc Sander

- 305mm sanding disc
- 435 x 225mm table size
- 0.75kW / 1hp 240V
- Includes: mitre guide & brake

Order Code: L1335

\$297

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L-69A Belt & Disc Linisher Sander

- 150 x 1220mm sanding belt
- 230mm disc with guarding
- Tilting table and mitre guide
- 0.75kW 1hp, 240V

Order Code: L107

\$379

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cs-55 - Circular Plunge & Mitre Cut Saw

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BP-255 Wood Band Saw

- 245 x 152mm capacity
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- 109cfm HPLV system
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Order Code: W885

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3M Respirator 6211

Reviewed by Raf Nathan

A reusable mask with filter cartridges is pretty well essential nowadays given the level of protection they offer to woodworkers against hazardous dust and fumes

This 3M mask uses twin organic vapour filters as well as fibre pre-filters. The latter are there to keep the main filters clean. It is rated by 3M as suited to paint spraying, solvents and pesticides. Woodwork dust and fumes fall under these categories. For trade or part-time woodworking this mask is very suitable when working in spray booths, sanding or machining wood as well as applying various polishes.

The way the mask fits with adjustable straps and a soft contoured face profile means the air seal is very good. These masks are cumbersome to wear and on a hot day can be a sweat box, however the superior air filtration is worth any minor discomfort. They are not recommended for those with beards! The cartridges are positioned to the side and so allow quite good vision compared to simpler masks that have one filter in the middle.

Whilst I no longer spray finishes this mask is still highly useful for applying all sorts of hand and brushed-on wood polishes as well as wearing when machining and sanding wood. This particularly applies when working with known irritant woods.



Left: Adjustable straps and a soft contoured face profile give a very good air seal.

Below: Pre-filters (left) fit over main filter cartridges.

Initially I wore the mask while using a carnauba based wax which has an offensive smell on application. Fitting the 3M mask gave instant relief from all odour and I now regularly wear the mask for a range of jobs.

Vapour filters have a limited life on exposure to air and therefore need to be stored in an airtight container such as a simple kitchen plastic type. The outer pre-filters can be changed when visibly dirty. The vapour filter cartridges can be changed on a set schedule or as soon as any odour or taste is detected through the respirator.

Build quality of the mask is good and should last a part-timer a few



years if cleaned and maintained between use, however be aware that sweat left inside the mask can corrode the plastic.

Raf Nathan is a tool reviewer and designer maker who lives in Queensland.

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No matter whether you're sizing solid timber or panel material, the MiniMax sliding table saws are designed for you. Oversized sliding tables and support tables make material handling easy – particularly for those larger work pieces. Large blade capacities and motor sizes will make these machines the workhorse of your shop.



T55 ELITE S SPINDLE MOULDER

Capable of a variety of shaping and moulding operations, the MiniMax spindle range will give you that extra level of capacity in your shop. Sliding tables, aluminium fences & interchangeable spindles will make you more versatile in your designs and projects.

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WoodRiver Countersink Set

Reviewed by James Brook

This six-pack of countersinks and plug cutters are very cleanly ground, perfectly finished and come in a wood storage case. The included brad-point pilot drill bits come razor sharp and can be adjusted for different lengths.

You can drill a clearance hole and countersink the screw head all with one pass using one of these bits. The smaller bits have 3/8" carbide tipped countersink bits that will also act as a plug cutter. The two larger bits have 1/2" plug cutters and these gave a perfect fit.

I found the bits drilled fast and clean but did note that the better the wood the better the results. Soft and porous acacia drilled reasonably well whilst hard jarrah gave far superior results.

In the photo you can see the neat fit of a 1/2" plug in the jarrah.

Available from www.woodworksupplies.com.au
James Brook is a furniture maker and AWR contributor.

\$97.50



\$137.50

WoodRiver Digital Thickness Gauge

Reviewed by Linda Nathan

Anything that comes in a sturdy plastic storage case instantly gets my vote however inspection and test usage was the aim.

This is a simple to operate thickness gauge. The frame is powder coated steel and the mechanism is lever operated. Turn it on, zero the reading, depress the lever to open the jaws, slide the gauge over the workpiece and then release the lever. Do that and you'll get a large display

reading in millimetres or inches (0.001mm/0.00005") as selected.

The WoodRiver gauge is a convenient handheld tool to operate for boards up to 25.65mm (one inch) in thickness. You can reach in up to 35mm from the edge of the board.

It's worth considering if those parameters suit the kinds of work you do. Supplied with an SR44 battery.

Review tool supplied by www.woodworksupplies.com.au



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Affordable Orbital

TGEOS stands for the new Triton Geared Eccentric Orbital Sander which comes with 500 watts of power, plenty of features and a RRP of \$479. The geared eccentric fixed orbit mode is used for rapid stock removal, and the free-run random orbit delivers fine sanding for a smooth result. An adjustable dial delivers constant speed under load for maximum control. Ergonomic rubber over-moulded grips are designed to reduce vibration and the adjustable auxiliary handle lets you position it where it suits you best. The TGEOS comes with a 125mm backing pad, 150mm backing pad, 12 sanding discs of various grit, spare brushes and a soft carry case. Triton Tools are distributed in Australia by White International. For your nearest stockist see: www.whiteint.com.au

Product news

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

Aussie-Made River Resin ▼

Recently released and made in Australia, LuciClear casting resin is formulated for crystal clear results. Bubble free castings 75mm or more deep can be done in a single pour making it well suited to river style tables, and for embedding objects. Low temperature rise means it won't harm objects or timber edges. Low viscosity and low surface tension ensure effective encapsulation while UV absorbers will minimise yellowing due to UV exposure. LuciClear is available in small to large quantities and has been developed by Boatcraft Pacific, Queensland manufacturers of adhesives, finishes and supplies for boat builders. For information and advice call 07 3806 1944 or head to www.lccr.boatcraft.com.au



The Wonderful Wizard ▲

Lumber Wizard 5 is the latest model of a metal detecting wand that can save many times more than its \$215 worth by preventing damage to planer and thicknesser blades. Version 5 now has 'automatic tuning' which is set when literally a green light goes on. Even better is the laser-line beam that flashes when metal is detected. Chalk that line in, then turn the wand 90° to mark another – the resulting crosshairs now pinpoint the metal you want to avoid. Available from Woodcraft Supplies, phone (07) 4129 4644, or see www.wizardproducts.com.au



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◀ Benchtop Bobbin Sander

The Hafco Woodmaster OS-140 Vertical Bobbin Sander could be your new best surface finishing friend. With a robust cast iron table that tilts 90–45°, this benchtop beauty has a built-in oscillating system that travels 26 times per minute and moves 24mm up and down to utilise more of the sanding sleeve. It plugs into a standard 240V 10-amp power outlet, has an 0.5hp motor, a safety switch with emergency stop, and on-board storage for included accessories, sleeves, inserts and tools. Available from Hare & Forbes Machinery House.

www.machineryhouse.com.au

The Mighty Thor ▶

Thor Filtration air filters work differently to the rectangular box type – with their Swiss-made motors they use a ‘Coanda effect’ to more efficiently circulate air. Three sizes are available: TF250 will suit someone who does pyrography or power carving, while the TF470 will filter the air of a single car garage around 40 cubic metres in size. If you have a double garage or an area of 120 cubic metres the model to choose is TF260. Made in the UK, Thor units were once branded as Microclene and are now available locally from Carrolls Woodcraft Supplies.

www.cwsonline.com.au



◀ Genius Combo

The big brother of MiniMax’s popular C26 combination machine, the C30 Genius 4-in-1 has all the features of the C26 but with two big advantages, making this European designed combination well worth considering. With its 300mm planer/thicknesser width capacity and 1200mm sliding table, the Genius 4-in-1 is designed to work both flat panels and solid wood. The MiniMax Xylent spiral cutterblock system uses rows of square cutter knives to deliver smooth surfaces. Supplied by I Wood Like, Genius is designed to be a complete and compact workshop machining solution.

www.iwoodlike.com

Fastest Vice on the Planet ▶

USA based Lake Erie Toolworks claim their just released 2X Wood Vice is the largest and fastest threaded workbench vice on the planet. A large 3-inch diameter hard maple screw has one turn per inch movement compared to the standard 5–6 tpi, meaning fast action clamping and unclamping is possible. Supplied as a kit from

www.LakeErieToolworks.com



PT310A 12"X8" PLANER & THICKNESSER \$3,999.00 incl GST

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SPECIFICATIONS & CONFIGURATION

Feed Speed	7m/min	Knife Size	15x15x2.5mm/R150mm
Cutterblock Speed	5500rpm	Over all Lengh of Planer Tables	1409mm
Cutterblock Diameter	70mm	Thicknesser Table Size	545x307mm
Max Thicknesser Height	4-225mm	Extractor Port Dia	100mm
Max Thicknesser Width	310mm	Motor Power	3HP
Min Length of Workpiece	160mm	Volt	220-240V/50Hz
Max Depth of Cut	3mm	Net/Gross Weight	175/217kgs
Number of Knives	56pcs	Package Size	1480x570x1130mm

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Duplicating Fingers ▲

For reproducing required diameters when turning these 'fingers' are an ingenious aid. An allen key operated cap screw allows each finger to be installed on a 19mm steel bar located behind the lathe and roughly level with its centre. Set each finger by loosening the screw and tightening over each required diameter on a sample piece. On subsequent turnings the finger will drop when the set diameter is reached. Once known as semaphore jigs, the design was improved by UK production turner Gary Rance who lengthened the fingers and added a cap screw which allows closer positioning on the bar. Now manufactured by professional turner and engineer Paul Howard, the jigs are available for £65 plus postage from woodturner Richard Findley via:

www.turnersworkshop.co.uk

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More information from Promac on 1800 773 267 or see www.promac.com.au



Mini Mitre Board ▼

The latest in Jim Davey's shooting board series, the Mini Mitre Board is designed for planing mitres on thin stock. Its 400mm big brother Mitre Board uses a full sized shooting or bench plane but the 260mm Mini Board requires a 40mm (preferably low angle) block plane. With the addition of a 3mm backer, there is minimal blow-out at the end of the cut. Made from marine ply with beech edging the board is set at 90°, but not glued to allow for fine adjustment in the future. The boards are available for \$95 and left hand versions can be ordered. Phone (020 4447 8822 or see

www.jimdavey-planes-sharpening.com





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YAFFA 10784

A Whiskey Wall Cabinet

Learn the fundamentals of cabinetmaking and make an attractive piece for your home. Story by Cat Cook.



Designer maker and woodwork teacher Cat Cook with the whiskey cabinet made at Perth Wood School.

Fig. 1 Exploded diagram

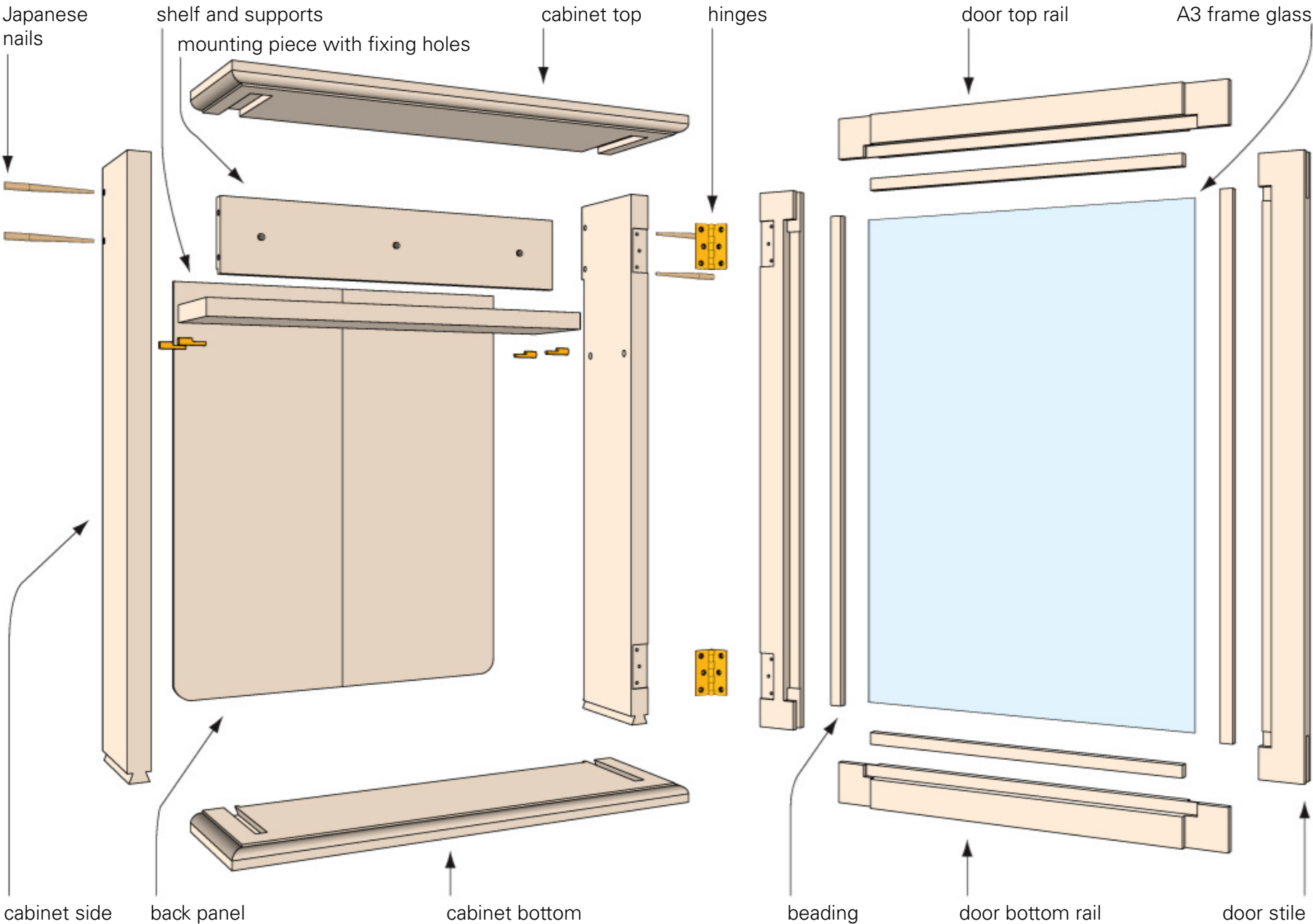
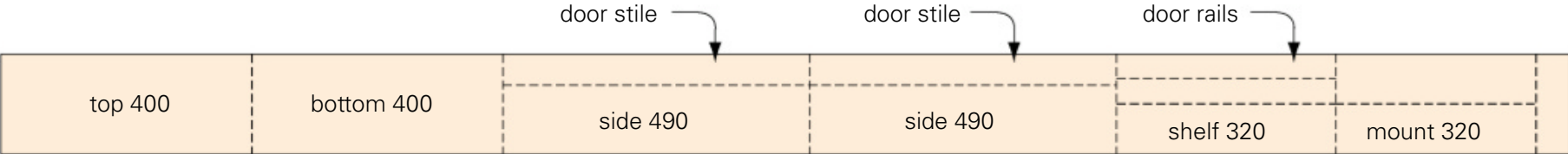


Fig. 2 Board breakdown not to scale (mm)



160 x 25 x 2500 board

This small cabinet can be built over a weekend or two and is an ideal way to store and display your favourite bottles of whiskey. Add a small shelf and there's a place for your glasses too. This is a great project to practise some fundamental woodworking skills on – the outcome is a beautiful and functional cabinet made with minimal expense.

Materials

I used American white oak for my cabinet both for its clear and attractive figure and for its workability. The glass for the door came from my local office supplier – a \$4 picture frame kit gave me a ready-cut A3 size piece (photo 1). Designing the cabinet around this known measurement works for our purpose.

CUTTING LIST				
PART	QTY	LENGTH	WIDTH	THICKNESS
Carcase	2	395	150	17
	2	487	110	17
Shelf	1	318	105	15
Back panel	1	415	332	4
Mounting piece	1	319	70	15
Door frame	2	354	35	17
	2	472	35	17
Glass	1	425	300	1.5
Beading	2	280	10	7
	2	425	10	7



1

1. For only \$4, a picture frame kit will provide A3 cut-to-size glass for the door.
2. Housing joints can be used for the carcass frame...
3. ...as can sliding dovetail or even butt joinery.
4. Using the router with a fence to create housing joinery.
5. Sliding dovetails can be cut on the router table.



2



3



4

Joinery options

The sides of the cabinet frame can be joined with housings (**photo 2**) or sliding dovetail joints (**photo 3**). No right or wrong here, it's purely down to what you can do in your home workshop. You could quite simply just butt the whole thing together if you wish.

For the housing joint I measured and marked out with a mechanical pencil and combination square and then used a 1/2 inch plunge router with a fence to create a 5mm deep housing (**photo 4**). I had to do some back routing in this process and suggest doing several test cuts on scrap first.

Once both housing joints are made, square up with a mallet and sharp chisel, test the fit and make adjustments accordingly.

To show you the sliding dovetail option shown in **photo 3**, I used a router table with a fence and dovetail bit (**photo 5**). You're aiming for a friction fit here, so once again a few test runs will make sure you have the right setup.

Test fit

The next step is to do a dry fit, that is assemble the carcass without glue (**photo 6**). At this stage it's good to also trial the best placement of clamps and check for square so you can plan any adjustments before the actual glue-up (**photos 7, 8**).

Profile the top and bottom edges

Once satisfied with how the frame comes together, take the whole thing apart again so you can profile the top and bottom edges of the cabinet.



5



6



7

I used a 9.5mm round-over bit, stepped down in a small trimmer router (**photo 9**). Of course you can use a different profile if you wish. Remember you only need to profile the sides and front of the top and base. Some back routing on the side edges will prevent any tear-out occurring.

Pre-finishing saves time

Pre-finishing the components before glue-up means an easier clean-up process further down the line as it can prove tricky getting into right angled joinery once glued.

Sand the faces and edges, working through the grits. You'll spend more time with 120 grit removing machine and pencil marks and then less following up with 180 and 240.

Gluing up

Having done a test fit you should be ready to glue up the cabinet frame using Titebond III (**photo 10**). After checking for square and making any necessary adjustments I used a damp cloth to clean up any squeeze out.

Making the back

A board of solid American oak was resawn to 6mm thickness for the back. The pieces were bookmatched and glued together with Titebond III (**photo 11**). You could also use 4mm/6mm plywood or veneered MDF. Masking tape was used to secure the join (**photo 12**).

The inside faces of the solid oak were planed first before cleaning up the outer faces to help prevent cupping though this cannot always be a sure thing.



8

6. For sliding dovetails the sides are machined to fit housings in the top and bottom.
7. Test fitting joinery can sort out problems before gluing up.
8. It can also help to figure out before applying gluing the best clamp placement to achieve square.



9



10

- 9. Profiling the cabinet top and bottom edges with a trimmer.
- 10. Showing the cabinet carcass glued and clamped.
- 11. Wood for the cabinet was bandsawn, then bookmatched and glued.
- 12. Tape secures the glue joins for the back.

When the panel was dry, I removed the masking tape and thicknessed down to 5mm, then sanded the back and front faces once again working through 120, 180 and 240 grits.

Door joinery

For this cabinet, slip joints cut on the tablesaw with a tenon jig were used to make the door frame (**photo 13**). Once again I recommend cutting and dry fitting some test pieces before diving into the timber you spent so much time carefully selecting and machining up. This helps to eliminate any potential issues without the stress of glue being involved.

Titebond III was also used to glue up the door frame and once again I had clamps, glue and a wet rag on standby. And again, I checked and double checked for square. I like to recheck for square after clean up, just in case I have unintentionally knocked my project out of square when removing squeeze out.

Cutting and fitting the shelf

I took measurements from both the front and back of the cabinet just in case there was any variation. A piece of solid timber was cut for a not-too-tight fit before machining down to 15mm thickness.

Placement of the shelf took into account bottle heights and brass shelf mounts were fitted into the sides 15mm in from both the front and back of the cabinet depth to carry the load of the whiskey glasses.

Wall mounting

For the mounting piece I measured the internal width and then cut and machined a piece of solid timber to a snug fit (**photo 14**). The back edge was rebated to house the back panel later on (**photo 15**).

Ct'd p.34



11



12

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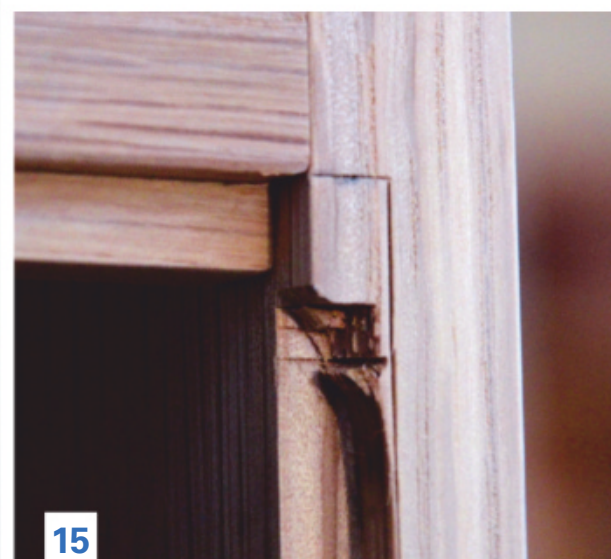
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13. Slip joints were sawn on the tablesaw using a tenoning jig.
14. A solid oak wall mount is sawn, fitted and glued into the carcass.
15. A rebate for the cabinet back is routed in, stopping short of the corners which are cleaned up square with a mallet and chisel.
16. Tapered Japanese wooden nails secure the wall mounting piece. After drilling and tapping in with glue they are later flush cut.
17. The back has been glued in and secured with tape. Japanese nails were used to strengthen the mounting piece join and are shown here before flush cutting.
18. The door frame rebate was routed, corners cleaned up and glass fitted leaving a small clearance.



Both faces were sanded, then clamped and glued to the carcase. For strength, I drilled and tapped in two Japanese tapered nails to each end. These were cleaned up with a flush cut saw (**photo 16**). I find the nails give a nice aesthetic too.

Carefully, I created a 5mm rebate to the back of the cabinet frame, stopping shy of where the wall mount was added. This was squared up by hand using a mallet and sharp chisel. Measuring the rebate width and length I then cut the back panel to size, testing the fit and making any adjustments where needed before gluing the panel in (**photo 17**).

Completing the door

After unclamping, I used an orbital sander to clean up the faces and edges of the door front. Testing that the door fitted well to the cabinet, I selected the back face of the door to make a 10mm rebate for insetting the glass. Again, a mallet and sharp chisel were used to square the corners of the rebate before checking the fit of the glass (**photo 18**).

Beading is used to hold the glass in place. Instead of glue, small tacks are used to pin the beading in place. If the glass is ever damaged, the beading can then be easily removed and replaced.

As a pre-caution I pre-drilled for the tacks into the beading using a pin that I had snipped the head off to create a chisel point. I drilled at a slight angle to help pinch the beading in place.

The tacks were then tapped in flush with the beading. A cabinet scraper was placed underneath to protect the glass (**photo 19**).

Finishing off

With the hinges selected, mortises were marked (**photo 20**) and the trimmer used to clear the waste. Three holes for wall mounting were drilled and countersunk into the back mounting piece of the cabinet. Finally I gave the cabinet a wax finish taking care to mask off the glass with tape so it wouldn't smear.

All that remains is to find a special place to mount your newly made whiskey cabinet...and of course don't forget to stock it up too (**photo 21**).

Photos: David Howlett

This whiskey cabinet is one of the projects you can undertake at Perth Wood School under the tutelage of Cat Cook and David Howlett. Learn more at www.perthwoodschool.com.au

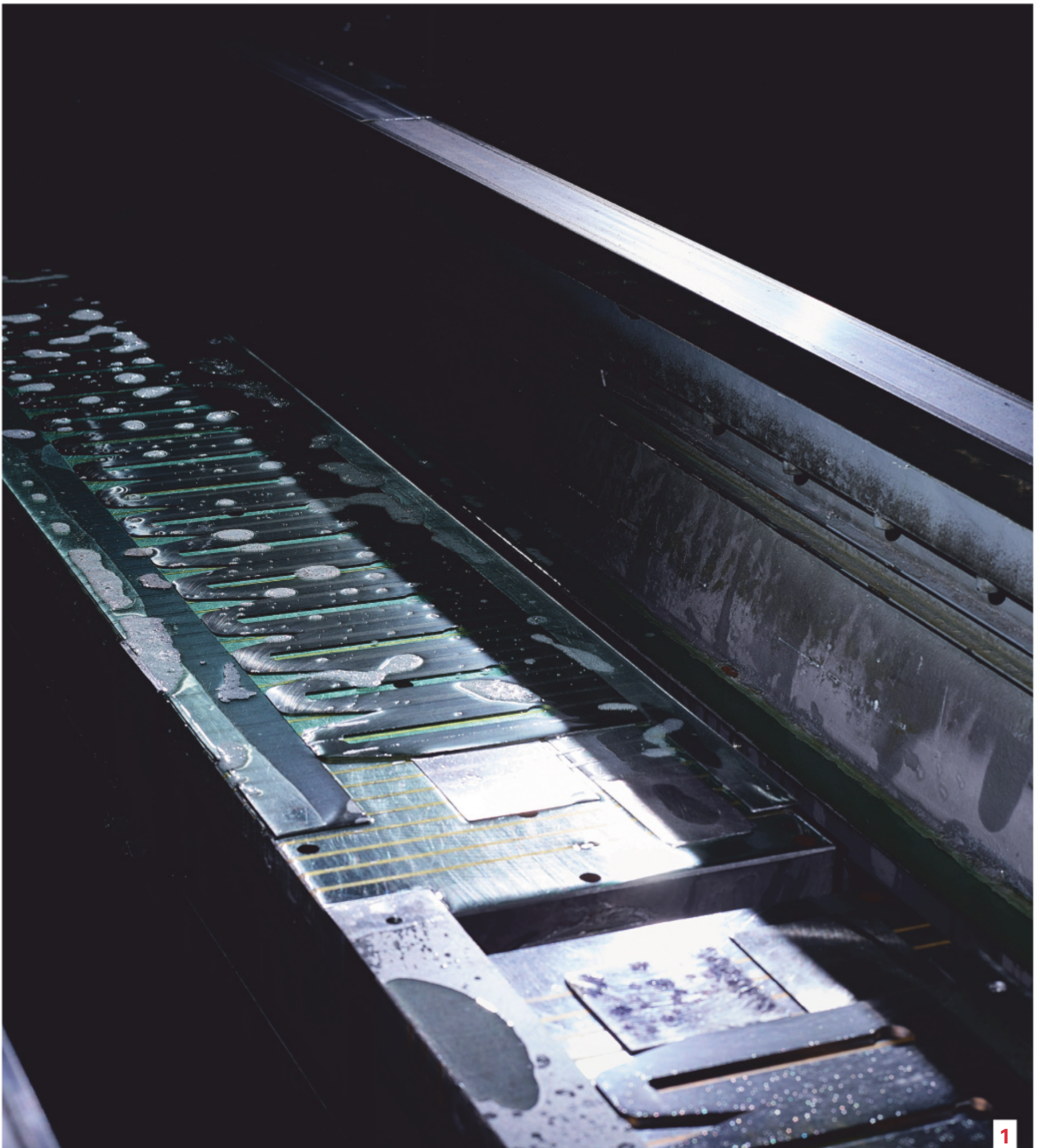
Cat Cook is a designer/maker living in Perth, Western Australia with a background in Creative Industries (Visual Art and Photomedia) as well as an Advanced Diploma in Industrial Design. She works full time with David Howlett at the Perth Wood School assisting in both the running of courses and workshops as well as various commission jobs and also helping students build their own projects.

19. The glass is held in place with beading that is held in with tacks but no glue. The scraper under the hammer protects the glass when tapping in the tacks.
20. Marking out the mortises for the hinges. A trimmer was used to clear the waste.
21. The completed cabinet, ready for wall mounting and for stocking with your favourite tipple.



Steel Selection for Chisels & Plane Blades

Peter Young outlines some of the differences among steel types in terms of how they are made, their cost, and how they hold an edge.





1. Veritas Tools (Canada) now manufacture chisels and plane blades in PM-V11 steel. Their own test results determined this alloy will provide a balance of edge retention, impact resistance and ease of sharpening. *Photo: Lee Valley, Canada*
2. Good quality high carbon steel chisels like these from Titan are good value and perform very well. Avoid the upper example (firmer chisel) as you may have difficulty fitting them into a side-clamping type of honing guide.
3. There are many examples of high quality Japanese chisels of the water quenched high carbon steel type. If you use a honing guide be aware that some examples are either too short to fit into a honing guide or have a triangular section which also does not fit. *Photos this page: Peter Young*

There is now a confusing array of steels available for both chisels and plane blades and choosing the right steel for your purpose can be daunting. I am not a metallurgist but I do have some experience with various types of steel in different applications, so what follows is my personal take on this issue. Other experienced people may have different views so it's always good to get a number of opinions. A good source of information about steel types and sharpening techniques is Ron Hock's book *The Perfect Edge* published by Popular Woodworking Books.

The important take-home message is that choosing a suitable chisel or plane blade is a compromise and there are a number of factors which need to be taken into consideration. Different people will place a different emphasis on each of these factors.

In many magazine reviews there is a very heavy emphasis on edge retention because logically the better the edge retention the longer the period between sharpening. However

it's also true that the better the edge retention, the more expensive the item is going to be. All cutting tools need to be frequently sharpened to perform at their best, it's just a question of how often you sharpen and how long that takes.

Steel types

Steel is essentially an alloy of iron and carbon. The addition of only very small amounts of carbon (as little as 0.2%) turns iron into an incredibly strong but malleable material and most of the steel we come across is in this low carbon form. Adding more carbon increases hardness (resistance to compressive deformation) and tensile strength (resistance to elongation).

With about 0.8% carbon, steel is easily able to be hardened with heat treatment. With improved hardness comes improved resistance to abrasion or for the woodworker, improved ability to hold a cutting edge. However if too much carbon is added (more than 1.5%) the steel becomes brittle with fracturing of the cutting edge.

There are three important steps in steel manufacture. Firstly the ingredients must be heated for the alloy to form. Secondly, the steel must be cooled (quenched) but in such a way as to retain hardness. Thirdly, the hard (but brittle) steel needs to be tempered to reduce brittleness.

Tempering must be done in a very controlled manner as uncontrolled tempering can reduce hardness and thus edge life. A good example of uncontrolled tempering (heating) is when blades are being ground on a grinding wheel. It is very easy to overheat the thin cutting edge and thus lose hardness exactly where you want it. Cooling the blade in water when grinding is also a common practice but this should be discouraged for all except high carbon steel. A2 steel is especially prone to losing hardness with uncontrolled heating and you should only use a heat sink, for example, a metal block for cooling.

Tool steels are described according to the method used for quenching.



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5



4. Blue Spruce Toolworks (USA) uses A2 tool steel hardened and tempered to Rockwell Hardness Rc60-61. A primary bevel angle of 25° with a 30° micro bevel is recommended, which may be increased to 35° for extremely hard woods. *Photo: Blue Spruce Toolworks*
5. Clifton tools are made in the UK by Thomas Flinn & Co in Sheffield, UK. Their plane blades are no longer forged but made from O1 steel which is then cryogenically treated. *Photo: Thomas Flinn & Co*
6. Forging Japanese steels using hard and soft steel. *Photo: Japanese Tools Australia*
7. Hock Tools (USA) offer blades in O1 and A2 steels. Company founder Ron Hock is regarded as one of the foremost experts on tool steel. His research and writings have added considerably to our knowledge base of steels for woodworking. *Photo: Ron Hock*
8. The stages of blade manufacturing at Lie Nielsen Toolworks, USA involve grinding and heat treating. *Photo: Lie-Nielsen USA*

Water quenched steel (high carbon steel)

These are simple alloys of only iron and carbon which are quenched in water. These steels have been around for a very long time with the quality varying and improving over time. Sheffield steel, Swedish steel and Japanese steel have long been the acknowledged leaders in the field. Buying second hand chisels is an excellent way to get good quality tools of this type. Expect to pay \$30–60 per chisel.

You can also buy new chisels from makers like Crown, Marples and Stanley Sweetheart. You may have to spend some time flattening the back of new or second hand chisels but because the steel is relatively soft this is not a hugely difficult task on a diamond stone or coarse water stone. All the older planes, as well as cheap new models will have high carbon steel blades.

Oil quenched steel (O1)

A small amount of manganese (Mn) added to high carbon steel reduces the quench rate requirement so that they can be quenched in oil. These steels distort less with heat treatment and can be hardened to a greater depth. They are an excellent choice for

woodworking tools being harder than water hardened steel but still easy to sharpen and are relatively inexpensive.

Most of the better known current manufacturers offer O1 chisels and plane blades and you can also buy O1 replacement blades for older Stanley and Record planes. (Note Lie-Nielsen no longer offers O1 chisels and blades in their range). Expect to pay about \$50 – \$60 per chisel.

Air quenched steel (A2)

These steels have additional alloying elements such as chromium and silicon and allow the steel to be quenched in air, a much gentler process which results in less distortion than either water or oil. However there is a possibility of creating large carbide particles that may interfere with precision sharpening and the durability of a cutting edge so a balance is needed between hardening stability and a fine cutting edge.

Because air quenching is a relatively slow process and the hardening process may be incomplete, some manufacturers like Lie-Nielsen apply an additional cryogenic treatment to A2 steel to improve toughness and aid edge retention. The steel is cooled to – 195C in a computer controlled process.



A2 was considered to be a big advancement over O1 because it is much harder and holds an edge for longer. But I've found there are some issues with A2 steel, the major one being that the edge shatters as it wears and you can just see this with the naked eye, or more readily with a magnifying glass. You might think that this is because of the harder woods that we use in Australia but the same effect is seen with European and North American woods.

The fix is to sharpen A2 steel at 35° instead of the more usual 30°. This works for most bench chisels and for bevel down planes. However for paring chisels and bevel up planes you do want to be able to use lower cutting angles of 25-30°.

A2 chisels and blades are available from Lie-Nielsen, Veritas, Blue Spruce and other high end suppliers. Replacement A2 blades are also available for older Stanley and Record planes. For chisels expect to pay \$80 – \$100.

High speed steel (HSS)

These steels have additional elements like tungsten, vanadium, cobalt or molybdenum which allow the hardened steel to resist softening at very high



working temperatures. They are called high speed steel for their ability to run at high speed, for example when cutting metal. The extra hardness also makes HSS more difficult to sharpen although modern composite water stones do so without too much trouble. In woodworking, HSS is most often found in lathe tools which are usually sharpened on a grinding wheel. HNT Gordon also offers HSS blades for their hand planes.

Powder metals (PMV)

Powder metal technology has been around for a long time but a more

recent development has been the addition of alloys such as vanadium. Vanadium carbide particles are very small and wear resistant but vanadium tends to fall out of suspension as molten steel cools.

To solve this problem high vanadium steel is sprayed through a very small nozzle into a vacuum chamber to cool into a fine powder. This powder can now be compressed and rolled into sheets like any other steel. The resultant product is incredibly fine grained highly wear resistant steel that will take a keen edge and hold it.



9. Rentetsu chisel (upper) is used for paring and flush trimming. Used correctly the yari kanna or spear plane produces long spiralling shavings. *Photo: Japanese Tools Australia.*

10. Australian toolmakers HNT Gordon use O1 for their handplane range, except for their palm smoother blades which are made from T1 HSS. M2 HSS is also offered for bench planes when a more abrasive resistant edge is required. *Photo: HNT Gordon*

11. Good quality O1 chisels made by Ashley Isles (UK) in a size range suitable for dovetailing. Not all makers offer sets in this range starting at 1/8" or 3 mm and increasing by the same amount. Making a chisel tray is a good way to safely store your chisels. *Photo: Peter Young*

Another major advantage is that PMV steel is not any more difficult to sharpen than A2 steel and it can be honed to any angle (20, 25, 30, 35, 40, 45 degrees) with no problems with shattering of the cutting edge. This makes PMV the steel of choice especially for blades used in bevel up planes.

Veritas have been the leaders in using PMV in woodworking tools with great success. The only downside is the cost; expect to pay \$120 – \$150 per chisel.

Choosing a set of chisels

So, with that background on steel types, what should you look for when choosing a set of chisels? This really is going to be a matter of individual preference and intended use. Cost is largely related to steel type which in turn is related to edge retention. You can save yourself a lot of money by becoming proficient at sharpening. All cutting tools need to be sharpened and it only takes a couple of minutes to sharpen a chisel and maybe a minute longer to sharpen a plane blade.

Preferred honing angle is an important consideration. I prefer to hone chisels at 25 ° which provides a lovely slicing action but that rules out A2 steel.

If you intend to do a lot of dovetailing or other fine work, look for chisel sets starting at 1/8" or 3mm and increasing in size by the same amount, up to about 1/2"–3/4" or 12–15mm. I rarely use chisels above that size but I use the smaller chisels all the time. There are a limited number of companies who provide sets of chisels covering the smaller sizes so this will limit your choices.

Choosing a plane blade

If you are buying a new plane you may have the choice of O1, A2 or PMV. If you have an old Stanley or Record plane you can buy thicker replacement blades in each of these metals. Replacing the old thin blades is highly recommended as is buying a more efficient chipbreaker.

Each of these steels will perform well. As noted above the main difference is the frequency of sharpening and the honing angle. With A2 steel the recommendation is to hone at 35° and for bevel down planes the blades will perform well at that angle. However for bevel up planes either O1 or PMV are better choices as you can choose whatever honing angle you want to give more of a slicing cut (for endgrain) or a scraping cut (for difficult grain). Indeed one of the advantages of a bevel up plane like the Lie Nielsen 62 is that you can have two or three interchangeable blades each sharpened at different angles to have the plane perform different functions. Veritas are now offering a wide range of bevel up planes in many different sizes, well worth considering.

The photos shown here illustrate some of many high quality options available for woodworkers.



Peter Young is a studio furniture designer and maker who lives in Brisbane. Last issue he showed how to vary a basic design for a side table in several ways. Email

Peter at pydesign@tpg.com.au

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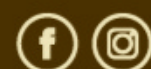
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The Human Touch

A love of design, machines and processes drive the work of Melbourne maker Byron Raleigh. Story by Linda Nathan.

As we witness the development of artificial intelligence, robotics and machine learning, things made by human hands are likely to become more surprising.

Byron Raleigh, 43 trades under the name Artefact Furniture, a name that draws attention to its essence and is spelt out on his website: 'Artefact: An object made by a human being, typically an item of cultural or historical interest.'

It's a positioning statement for a business that espouses traditional values: solid timber furniture, traditional joinery, high quality, made to last.

And yet, while Byron sees that touch of humanity as the defining element for what he makes, he loves machines and is inspired by what they offer. He speaks quietly but has strong views, many of which at first seem opposing.

He owns older but top of the line machines to produce not volumes of work but, it seems, for the joy of appreciating the consistency and accuracy of what they can do. He loves their build quality: it's likely he'll never have to replace them.

He designs furniture with production efficiencies in mind, but is not concerned with producing those designs en masse.

He wants to make affordable furniture and objects, even though the scale of his production is small and high profit margins are not possible.

He is a country person who lives in the city...and sometimes wonders why, but accepts that he is now a 'hybrid'.



Around four years ago, with some income from the central Victorian farm he grew up on, Byron had the ability to take his workshop from home to a small factory that he leased and has now populated with fine 'mid-century' machinery and other tools.

For those who appreciate such things it's a beautiful space. It gleams with the pride of order and considered arrangement. On the walls and shelves are jigs, templates and prototypes for designs that have been developed and constructed over time.

What is it he likes about making things? 'I like the autonomy; being a master of your own time, and it's the discovery of making as well', said Byron. Without being totally reliant on income from furniture making

Opposite: Byron Raleigh in his well ordered workshop in Northcote, Victoria.
Photo: Linda Nathan

1. Byron's *Femur* chair started with an idea for a form that would be 'flowing, seamless'. 'The shapes are nested somewhat to come out of 150 x 38mm without too much waste, and the front leg comes out of the offcut.' *Photo: Marc Buckner*
2. Design is a process that starts with sketches and then moves into scale cardboard models like the ones shown below. The next step is full scale prototypes which allow joinery techniques to be nipped out. *Photo: Linda Nathan*

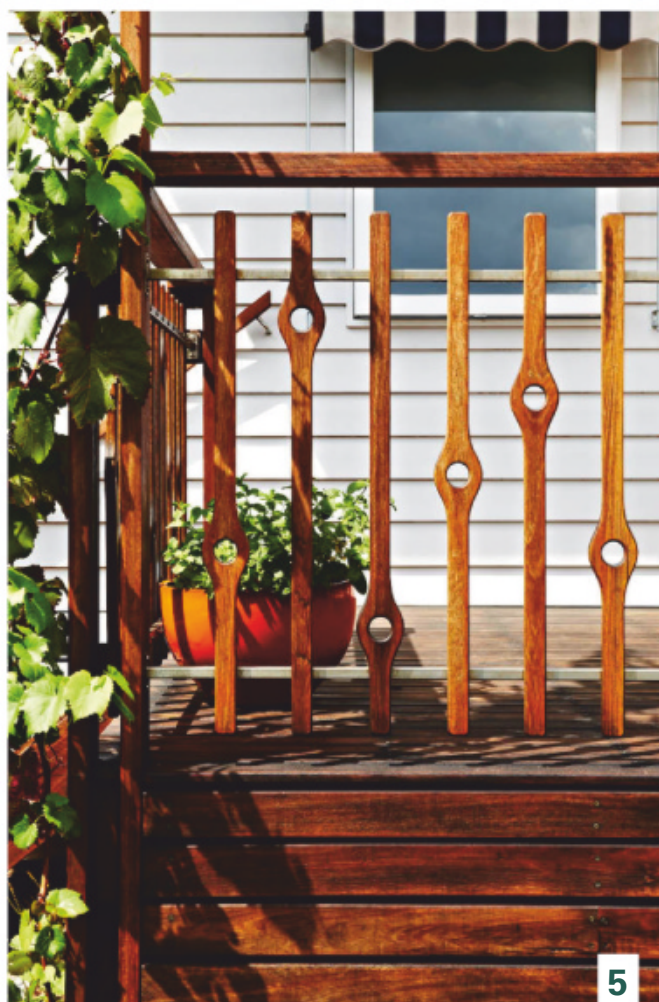




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he has the wherewithal to 'have this workshop, have machines, and say no to jobs that don't interest me'. Besides furniture making, Byron takes on some custom architectural joinery jobs and unique projects like the recent wood fired hot tub.

Moving the workshop made all that possible. In large commercial setups the trade-off between technology, machinery and efficiency is a loss of flexibility because small runs are not economical. However for Byron the workshop is 'a huge step...a balance between efficiency and productivity (with) the efficiency to repeat, but the flexibility to do different things'.

There's no desire to churn things out, but nutting out production efficiencies is Byron's happy place. 'The joy for me is the discovery of the processes and solving it all. Doing the same thing over and over again, it becomes not interesting.'

It's as though the forces of attraction between man and machine can also repel. 'Manufacturing now has become more and more specialised. Companies often make one thing over and over again. But for me, for someone who loves machinery, the question is have we given up too much in the quest for efficiency

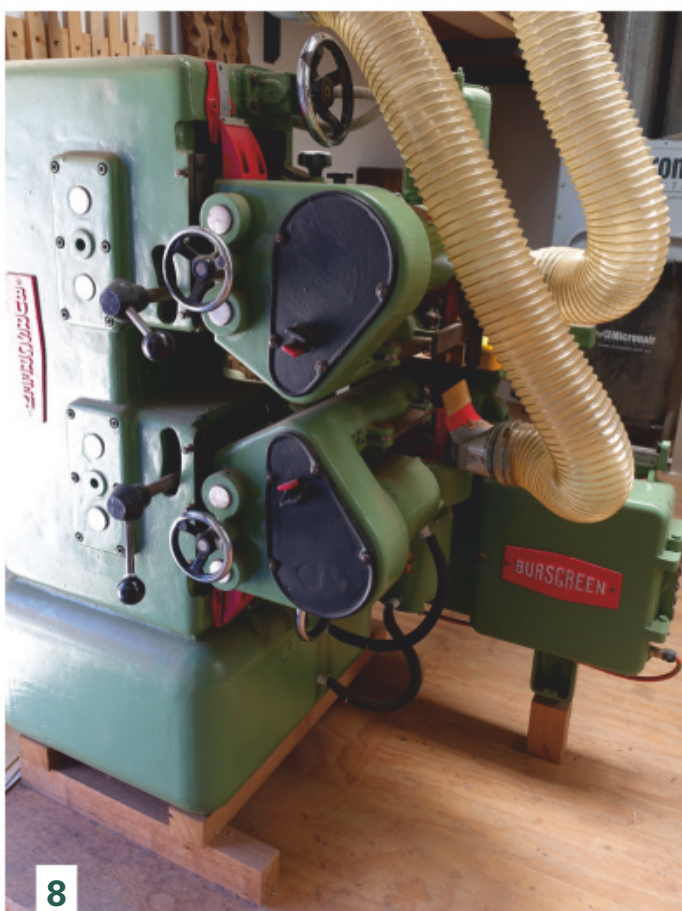
3. Drift bed in salvaged Otway Ranges blackwood.
Photo: Fred Kroh
4. Cantilevered bed in 'shearing shed' messmate.
Photo: Armelle Habib
5. Byron also takes on some custom joinery work.
Photo: Armelle Habib
6. Making this wood-fired hot tub from salvaged materials was an interesting and challenging diversion from the world of fine furniture.
Photo: Byron Raleigh



6



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and profit. I find the world of mass production fascinating, but also scary and de-humanising.'

Design ideas are another process of discovery to be enjoyed and here the human touch wins again. 'I don't use computers', he said. 'I start with pencil and paper. Then I move into scale models, rough cardboard models, full scale prototypes and then start to nut out the joinery techniques. For example, sitting in it I'll find that needs to tilt 2°. But the closer it gets to the end destination the more fiddly it gets. Getting the last five per cent of the chair right takes as long as the first ninety-five per cent, I reckon.'

7. A lot of machines in a relatively small space – thought and planning make this possible.
Photo: Linda Nathan
8. Highly prized: this Bursgreen tenoner delivers accuracy, efficiency and the flexibility to easily change set ups for anything from dining chairs and doors to the odd hot tub.
Photo: Linda Nathan
9. The English-made Robinson chisel mortiser is a favourite machine. With levers operating on three axes 'driving' this mid-century classic is a practical workout.
Photo: Fred Kroh
10. From the 'cast iron age' a Bursgreen tenoner sliding table detail with quick action cam-operated work clamp.
Photo: Linda Nathan



10

Q/A

Why do you make things?

The act of making quietens the many questions and thoughts that wizz around in my overactive mind. Just like a form of meditation, I become completely in the moment. There is nothing like being near a sharp blade spinning at 3,000 rpm to focus the mind!

If your work could talk, what would it say?

I'm in it for the long haul.

A successful design in wood is...

When everyone in the orchestra is in tune.

When you make a piece, what's your overriding priority?

How can I make it better?

Favourite machine?

Robinson chisel mortiser, English 1967, weighs about a tonne. What I love about this machine is it's a very bodily experience. It's a bit like driving a steam train and using it is a practical workout – you're operating on three axes with the levers. It's probably the machine here that requires the most coordination, it's a bit like playing an instrument I suppose.

Favourite hand tool?

My #7 Stanley handplane. I had the base reground and fitted a custom blade from Academy Saws.

Most used hand tool?

A 150mm ruler.

Favourite wood?

I'm not going to say walnut, although it probably is. It's the wood I'm using at the time. Because you just fall in love with it.

Favourite maker?

I couldn't pick one, but I've been thinking a lot about Matthew Harding.

What's easy and what's hard about this profession?

Easy is the autonomy and the independence. The hard part is not going bonkers – the risk of spending too much time in your own shed that woodworkers face. You start believing your own bull dust.

What's your best advice for someone who is starting out?

This is going to sound like 'do as I say, not as I do'. Find a niche. You can't be all things to all people. Dining tables can be a great business, just do something like that if it's a business you want. Sell the story, sell the timber. Apart from that, don't let anyone tell you that their way is the only right and true way.

Can you give me a random fact about you?

I love the smell of diesel and freshly tilled earth.



Once again, the fun of making is solving the order of things. Away from the body of the chair the legs of the *Femur* chair really do look like their namesake. Square faces for joinery are buzzed and thickened, then a succession of machine setups and jigs do their work – tenoner, mortiser, bandsaw spindle moulder. 'A set of chairs is essentially a production run. There's a great joy in that for me actually – in the consistency. You can do a whole batch of components and pick up any piece and it will fit beautifully with any other matching component. Hand cut joinery is slower and requires laborious fitting of each individual join.'

Hand tools are here too however. Arranged in drawers it's clear they all have their place and 'there's things they can do that machines can't'.



13



14

Byron is not a fan of acquiring new tools for the sake of it though. 'These are all used', he confirms.

Byron's path as a maker started on the farm – fixing things and improvising is a known training ground. Encouragement from a technology teacher at high school led to furniture design and making studies at Box Hill TAFE in Victoria before completing a degree in furniture design at the University of Tasmania. Teachers John Smith, Kevin Perkins and Phil Blacklow espoused modernism and environmental imperatives to influence all who studied there. The poetry and humanity of Perkins' work is an inspiration to this day.

From there Byron took an independent path, guided by his love of process and design fused with

ideas and influences drawn from the stories behind the materials and machines themselves.

Shortlisted for Studio Furniture 2018, Byron challenged himself to create a new design for a floor lamp that he now also makes as a pendant light. 'The great thing about that project was carving out a space to just explore...that was play for me.'

His artist's statement summed up the ideas which are expressed in his work. '(My piece) is the result of a love affair with machinery...Despite the wonders of the industrial and digital revolutions, craftspeople offer something that no machine ever can. Objects unique and imbued with humanity.'

Contact Byron Raleigh at www.artefactfurniture.com.au

11,12. Hand tools have their place too and all are 'users'. Photos: Linda Nathan

13. On the walls and shelves are jigs, templates and prototypes for designs that have been developed and constructed over time. Photo: Linda Nathan

14. Byron Raleigh with his *Glide* stool made from salvaged Otway Ranges blackwood. Photo: Fred Kroh



Left: Evolving designs, the first drums were made from blackwood with following ones made from celery top pine and myrtle.

How to Make a Tongue Drum

Native species are combined, tweaked and tuned to create a musical instrument you can vary in countless ways. Story by Raf Nathan.

Tongue drums are a relatively simple instrument that acts by way of 'tongues' or keys which vibrate with a box that acts as a resonator.

Many designs for these can be seen on the internet. The simplest and most common way to make them is to cut the keys with a jigsaw, although some people now use CNC routers to cut the key outlines. The keys can be cut straight as rectangles or you may add a flourish by shaping the keys in a more organic way.

Most of the tongue drums you see around the lower price end are not tuned. Some will have a random tuning as they have been made without planning the lengths of the keys, and they can sound good. However higher quality drums will be tuned, and this makes a huge difference to the sound and playability.

The tongue drums you see in music stores are tuned to a pentatonic scale, and these have a clear, bright sound. Those made by Schlagwerk are particularly good and use padauk for the keys and what looks to me to be maple for the box.

I used blackwood for my first tongue drums and the sound isn't bad but better are my current favourites which are made from Tasmanian celery top pine and myrtle. The myrtle drum is pitched higher whilst the celery pine has a lower tone.

Two things are critical to sound production: rubber feet on the base and using quality sticks. Store bought sticks can come with balls of various hardnesses and these affect volume and brightness.

You can make your own sticks with dowel and toy shop rubber balls glued to the ends but these are rather soft and the sound produced is somewhat muted. Professional grade marimba sticks are a better choice. Naturally shop made sticks are preferable and I am still trying to source suitable rubber for this purpose.

Making the drums

The key size I have settled on is 32–35mm wide and 18mm thickness. You will need to do the math on the actual cut dimensions and there are no fixed sizes as far as the overall dimensions go. The drums shown here are around 420mm long and 140mm wide and 130mm high.

My research uncovered very little about how to build a tuned tongue drum. I did discover that apparently a key length difference of 6% raises or lowers the sound by a full tone. However different woods will have different sound characteristics and the 6% factor is not reliable. My own experimentation says 10mm difference in key length is sufficient to approximate a full tone between keys.

Tuning

Tuning is critical to make a musical instrument as opposed to making a fun project. The pitch of a key can be raised by shortening it, and raised or lowered by removing material underneath. This is why you assemble the piece without the base – to allow access to the bottom of the keys.

To lower the pitch remove wood from the outer end of the key, to raise the pitch remove wood from the tip. This is a very slow process. Either make a quick adjustment in length and risk error, or spend an hour removing wood from the base of the key aiming for that sweet sound. Drilling a shallow hole with a forstner bit was the method I used.

To raise the pitch by shortening the length of the key I use a plunge router with a guide as it is a cleaner cutting process to not have to drill away waste underneath the key. For the higher keys however you don't want to make them too short, so drilling these is sometimes preferable.

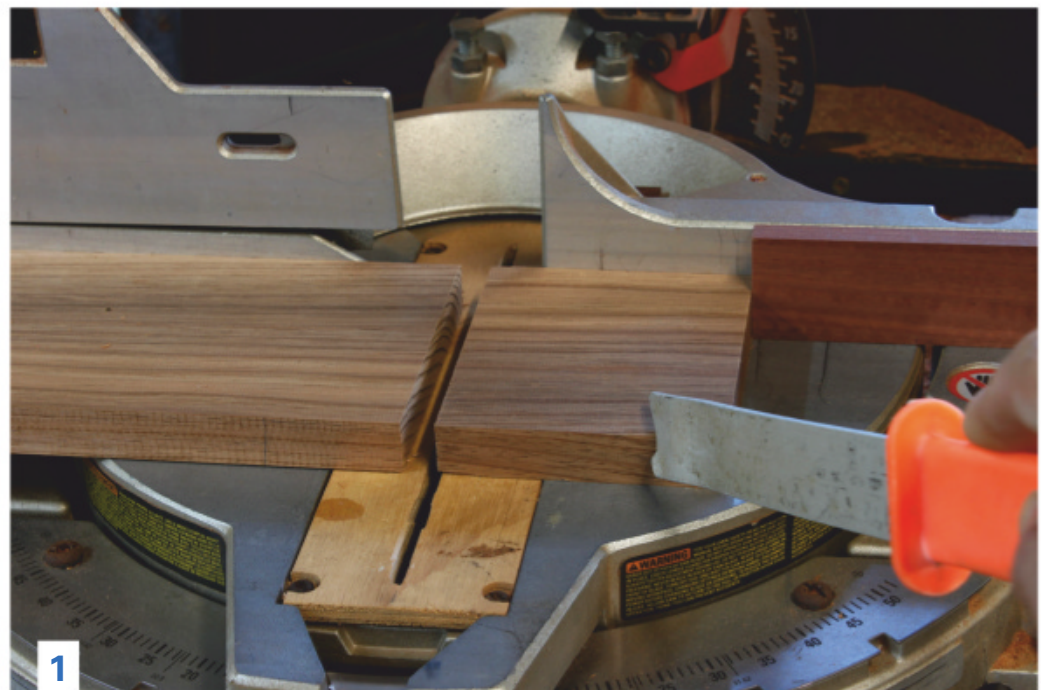
Pitch

I downloaded two tuning apps and tried to establish pitch correctly averaging the sound to both apps. However there was variance, for examples one tuner would read an A while the other app was reading an F. Then the original tuner would change again. Without a microphone and computer link or whatever this is out of my league.

Currently I tune them 'to themselves', that is I establish my lowest key first with what is to me a satisfying note. The following keys are then tuned to be progressively higher.

If you decide to make some of these drums you may find other ways to construct and tune them that suit you better. As a small project they are fun way to combine contrasting woods and the bonus is you end up with a musical instrument as well.

Photos: Raf Nathan





4

Step by Step

1. Do the maths and work out the lengths and widths needed to build the box. Currently for a six key drum, I use key lengths of 155, 145, 135, 125, 120 and 110mm.

2. Don't underestimate wood movement. Most tongue drums have the smaller end piece with the grain running horizontal, that is running the same way as the sides, however this allows no movement for the top and base. Run the end piece with grain matching the top and bottom, that is vertical, this way the assembly can expand and contract without issues.

3. When all the pieces are perfectly dimensioned glue the top, ends and sides together. This is a bit tricky to do. Ensure all the measurements are correct, particularly the size of the end pieces. Do a dry assembly first then proceed with glue. Apply glue and rub the parts together till they tack up and then apply the clamps. The base is glued on later after tuning. This photo shows one of my own designs being prepared prior to gluing. Note the base is not glued on initially.

4. You can't have too many clamps. Note this is an early photo when I was experimenting. I don't glue the base on at the first glue-up now.

5. Remove the clamps and give everything a trim to flush the sides and top level.

6. Strengthen the joints. I used Miller dowels here which when sawn flush also give a point of detail. Position these neatly, I have the dowels in the top lining up with the middle of the keys.



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7. A straight piece of wood clamped down provided a guide for the jigsaw to run against during the long cuts. Drill an entry hole for the jig saw blade and ease up against the guide to make a clean and straight cut. You can freehand jigsaw the keys but it won't be as neat a job or have as straight a line.

8. The longer keys can be sawn to length again using a guide. A right angle guide is clamped and keeps the saw straight. The two shorter keys have to be sawn freehand. The endgrain on these will need to be straightened up with a file. Or do as I now do and use a plunge router to dimension the keys to length.

9. I sand the top now to 180 grit. The ends and side can have their final sand after the tuning. These drums always need rubber feet to sound well, so for the tuning process I fit rubber feet to the base.

10. Establish a key you are happy with the sound of and progressively work through all the keys lowering or raising the pitch. It is a slow process sounding a note, drilling and repeating. It took me hours to tune my first drum.

11. Remove the rubber feet fitted for tuning and ensure the lower edges of the sides and ends are flush. No matter how careful you were when initially gluing them these areas won't be perfectly level now. A handplane is tool of choice to flatten the surfaces so the base will glue on as perfectly as possible. Before gluing the base on I give the internal surfaces a light coat of polish. The solid wood base, sized to the opening can then be glued on.



12



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12. Remove the clamps and flush the base to the sides.

13. To be honest, when I level up the ends I now prefer to clamp the assembly in the vice and use the big Makita sander to complete the job.

13. A large bevel on the edges is formed with a router then fine sanding happens.

14. The ends of the keys can also be chamfered. Polish the outside with your favourite finish and go home.

15. Rubber feet are applied to the base.

16. This photo shows my own new technique. I now make the keys as separate units and glue them together with a 4mm spacer of contrasting wood between. For this drum myrtle was combined with celery top pine. With this technique the keys can be very neat and straight. For the end pieces I use 40mm or so thick wood to give more glue area for the joint, and double dowel it.



15



16



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

Chasing Lines

An interview with wood sculptor Hape Kiddle reveals some of his design influences and work processes. Story by Linda Nathan.

‘Sometimes I’m simply lost in form,’ said wood sculptor Hape Kiddle, 46 a few months ago when I phoned him to learn more about his work. It’s not hard for the viewer to also get lost in the fluid and meditative quality that defines his work. Spirals and coils that remind of tendrils and unfurling plant forms reveal a deep connection to nature that extends to the stylised whales, fish, birds and even human imagery that also appear.

These are forms that tell stories, that glow with the kind of ‘simplicity’ that only technical mastery and clear artistic focus can achieve.

It was enjoyable to hear about Hape’s background and some of the things that drive his thought and technical processes. Here is a summary of some of the questions asked and the replies given.

Who is Hape Kiddle?

When you work in the arts the idea of always defining yourself is always interesting. I actually refer to myself as a maker. I’m more of a sculptor who works in timber rather than a traditional woodworker, but I’m incredibly passionate about timber and trees and making natural forms.

What draws you to wood?

There’s a resonance there, something that just feels connected. I’ve worked in other materials – I’m a goldsmith and worked in jade as well – but everything else is secondary to wood for me.

Have you always carved wood? When did you start?

I’ve been playing with carving since I was six and a half, carving pumice near the Rangitikei and Hautapu rivers where I grew up. I was always fascinated by the traditional Maori carving back home but it wasn’t until I studied furniture making at the



University of Tasmania that carving really took off for me.

So you studied furniture design but went in another direction?

I was never too enthusiastic about the idea of making furniture but I loved the people at the university and the access to the knowledge. I consider myself fortunate to have come through in the early 2000s when Kevin Perkins and John Smith were teaching at the university. These people don't arrive at the place they're at by accident...you're in the shadow of big trees, so to speak.

Did you go into a related profession after leaving university?

By second year I was already making and putting my work into exhibitions, selling work and doing commissions. It took off rather quickly and I think that was because I'd always been shaping.

Visually and through hashtags, some of your work references the koru or spirals often seen in Maori work. Why is this?

My first carvings were in bone. Traditional Maori fish hooks (hei matau) and hei tiki – those sorts of things. But living outside of Aotearoa there are so many other experiences that have influenced my work. Maori design is what I grew up with and these lines are very much instinctual, they're in my DNA. But as time goes on, living in Australia, I've come to explore a different place,

different forms and other stories. The Aboriginal coolamon bowl, for example. For me, this simple form, so absolutely useful in day to day life of the indigenous people of this land, is a wonderful object. A form that speaks of connection to land.

What are you trying to say with your work?

In my work I want people to gravitate to an understanding that they're of this place. That wherever you stand, if you look after it and engage with it, then that's your place.

I think I'm trying to point to our natural connection with the world and our place within it. I'm horrified about how we are walking on the planet at the moment. We need to lighten off how we use the earth. My work is all about trying to indicate the



Above: Hape Kiddle cradles a Huon pine bowl form from his *Holding Water* series.

Opposite: An explorative form in Huon pine for Hape Kiddle's *Holding Water* series, later scorched and wax finished.



value of what we've got. I have a very strong philosophy behind my work. I love to indicate those tensions between fragility and strength in my objects and in life itself. And it speaks to people.

On the more technical side of your work, how do you draft a piece? On paper, on a computer, or directly on the wood?

I call it chasing the line. Just get one line running and try to lock the feeling that you're trying to get across within it. A little bit of music can really drive where a carving is going for me, or a group of words from a poem. With those sort of things in the background I'll start drawing up an idea, most of the time on large paper, and I'll change the size of my pencils as to how I'm

feeling and where I want the lines to go, so it becomes a whole game.

I always start with a bit of drawing. Sometimes if I'm doing a netsuke I will draw it from several angles. I will then make a model out of plasticine which I keep in the freezer. I'll bring that out and make cuts into it using chisels because then I know I can replicate the cuts in the boxwood.

And then there are other times like the piece I'm working on right now which is a representation of that tension between strength and fragility – I just drew two lines on a piece of wood, picked up a chisel and off I went, just trusted what I was doing. But I never design on a computer, it never happens.

Everyone seems to do it differently – what's your sharpening method?

I use a completely different strategy when sharpening on a flat stone. I lock the tool into a soft jaw moving vice so I can see my angle no matter where it is. I use a lot of Spyderco slip stones that are about 120mm long, or 1200 wet and dry paper on a flat stick.



Sculptural forms by Hape Kiddle, clockwise from opposite page:

Koru (spiral) forms in mahogany and Huon pine

Water Vessels, Tasmanian blackwood and Huon pine, finished with shou sugi ban technique

Rain Dance, Huon pine

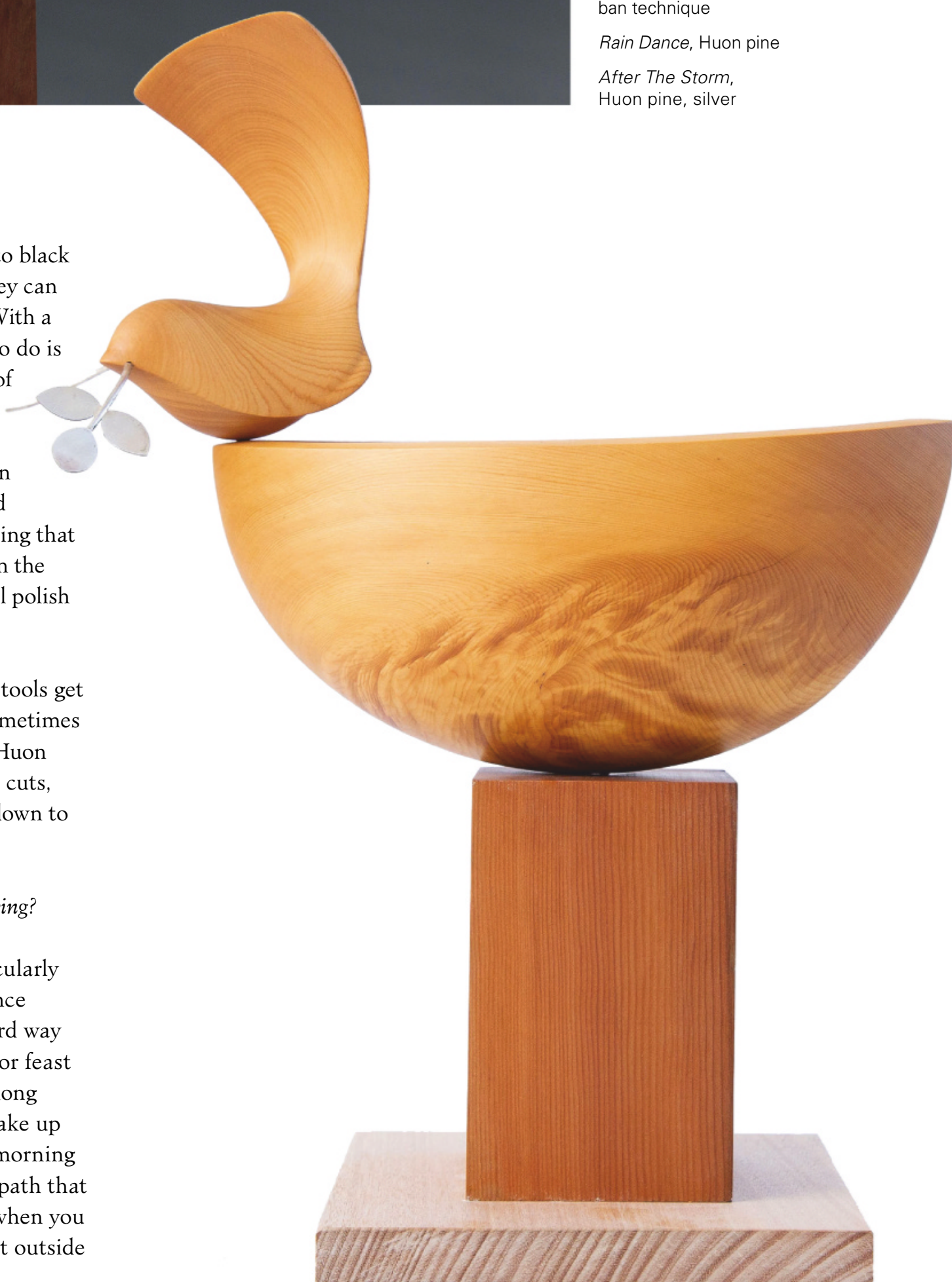
After The Storm, Huon pine, silver

When I teach I get students to black text the entire surface so they can see where they're touching. With a new gouge chisel first thing to do is to cut a straight line in a bit of pine to the maximum depth of the chisel so you build up the cut to the full depth. Then you put on a bit of compound and you've made a jig for honing that chisel. You just drag it back in the saddle of that jig and that will polish the edge exactly every time.

It's important to not let your tools get blunt, it takes 30 seconds (sometimes only 10) to hone a chisel; in Huon pine every couple of hundred cuts, in harder wood it can come down to every 100 cuts.

Is this a hard way to make a living?

Sometimes I think I'm particularly dull in terms of my intelligence because it's an incredibly hard way to make a living; it's famine or feast – it really is. It's taken me a long time from when you don't wake up those nights at three in the morning worrying. You're choosing a path that has no market, particularly when you step outside the norm. We sit outside traditional sculptors already.





Clockwise from above:

Flock of Whales, Huon pine, white beech, painted

Hape Kiddle with *Holding Water*, Huon pine

Song For Tao, a mobius form in Huon pine

Coolamon bowl form carved from salvaged Tasmanian rainforest burl

A lot of people think it's an easy lifestyle but if you're going down that path you've asked for a much tougher life than showing up nine to five.

Do you need a disciplined approach to make things work on a professional level?

Time strategies can help. I never work on the same element for longer than 50 minutes without stepping back and then away for 10 minutes. And if I am up against the wall I will actually set time limits, and what I've found is that it will usually take a third to half the amount of time to do something than you think. But when you use that timing structure you do not answer the phone, you do not reply to texts, you don't go and make a cup of coffee (do that before). You need to be one-minded, anything less is not respecting yourself and your processes.

What annoys you when you're working on a piece?

Disturbances. To get back into the zone is very difficult because when you've entered into it, to be pulled out of it is disastrous. That's why I don't open my studio to the public any more.

What's the most important thing to you when working on a sculpture?

A sense of quiet, that sense of enough space to let the piece come into existence.

Do you market yourself, or has the business just built up?

A bit of this and that, but I do subscribe to the theory that you do have to have your followers, not just financially, but they're in the conversation with you. There is a sense that I'm making for someone, but I'm not making for everyone. If you get trapped in the idea that you want everyone to like your work or you want to satisfy the masses, well that's production, and that's not what I do. I make for a specific group – I don't know who they are but they seem to appear.



15

Your favourite piece carved by Hape Kiddle?

I haven't made it yet. That's why I'm not attached to anything I make, because I never made one that I consider my favourite.

Does that mean you're never satisfied with your work?

That's part of it. But what drives me comes back to that zen practice, that I haven't made it yet. It's like having that piece of cake in front of you, you really want to eat it but someone keeps it on a rope. I'm a classic donkey chasing a carrot situation.

What happens if I get that carrot? I'm lost for life!

Best tip for other carvers?

If you want to learn to carve everything else is irrelevant. If you want to learn to carve, carve! Everything takes time.

Photos: Sarah Brown

Hape Kiddle's studio is in Griffith, NSW and he sometimes teaches workshops. He has exhibited widely and is currently working on a large commission for the National Museum of Canberra.



Five Tools For Design

Last year at Wood Review's live event, Tasmanian designer maker Laura McCusker spoke about her work process. This is an abridged version of her presentation.



The theme 'tools for design' has given me the opportunity to think on how I design and make. I've brought it down to five areas that influence me. These basically look at designing with and without restrictions, the way my work evolves, the people I work with and the ethos I try to maintain.

1. The blank canvas

Exhibitions: the freedoms, challenges and rewards. Exhibition work is great, when I was starting out I remember being so honoured and at the same time completely intimidated when I was invited to be part of a small local exhibition.

The freedom to design without a client in mind, or a budget, brief or material even sounds like a gift. It certainly gives you the opportunity to experiment with new ideas that may or may not work out, and sometimes it's good to allow yourself the freedom to play.

One of my favourite pieces which I've been making for 20 years is the *Barcode Screen*. This was imagined while on holiday, somewhere between staring at the barcode on a cereal packet and watching the light play as you drive past timber plantations and stands of gum trees. An invitation to exhibit meant that I could make these ideas a reality, take time to nut out the practicalities and see if it would literally stand up.

Exhibitions are great for creativity, publicity, engagement and connection to community and sometimes if you're really lucky there's even prize money.

2. Please fence me in

Boundaries. Having just waxed lyrical about the wonderful freedoms that



exhibition work affords, I have to admit that I actually prefer some boundaries.

When I was doing my education degree I came across a study that was trying to understand creative thinking, and work out if it was possible to teach creativity.

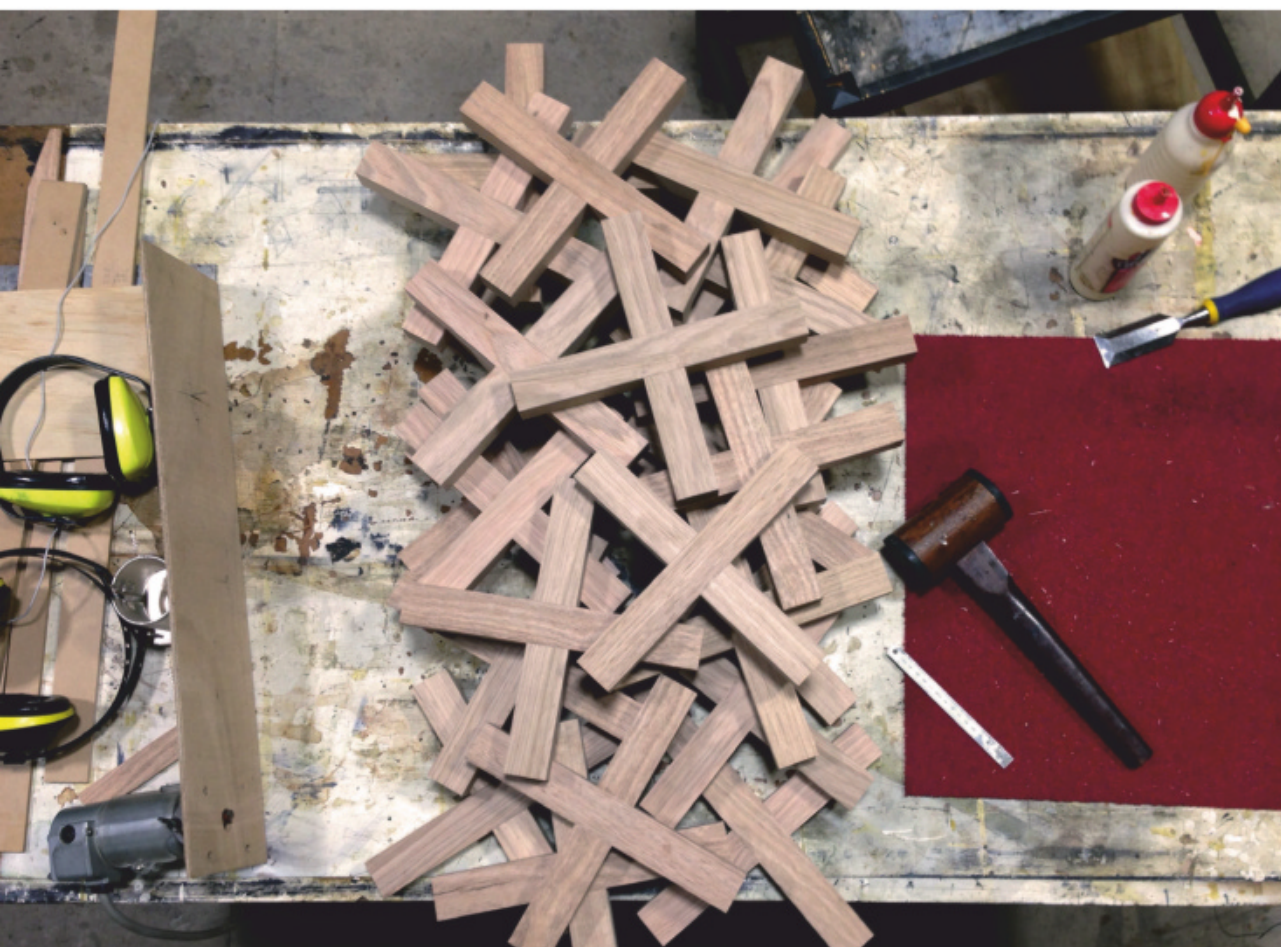
A bunch of kids were divided into two groups. One group was given an unlimited supply of Lego of all the colours, shapes and over-engineered little components. They told these kids to build something really amazing. They had all the time they needed to do this. No boundaries, no rules, just go. The other group was given an unlimited supply of white blocks only.

Presumably you can guess what happened. The kids with limitations blew the others out of the water when it came to designing and building something creative.

Boundaries for us can be budget, time, materials and function.

Main: Laura McCusker with the *Barcode Screen* she designed 20 years ago and still makes to order.
Photo: Peter Howard

Above: The *I-Beam Bench* was designed for the Tasmanian Museum and Art Gallery's need for public seating with a brief to reference the industrial history of the old Bond Store building. Winner of Clarence City Prize for Excellence in Furniture Design, 2013.
Photo: Peter Howard



Top: The *Cheese Trolley* for The Source restaurant at MONA had a detailed brief as the cheese has to be kept moist but not damp. It had to have just the right amount of ventilation, have a waterproof drip tray to collect condensation, drawers for cutlery and plates as well as full extension cutting boards. Food grade functionality was essential and aesthetics no less so.
Photo by Rosie Hastie

Above: Rinse and repeat: Repetition is practice and practice makes (closer to) perfect.'

The *I-Beam Bench* was designed to fill the brief from Tasmanian Museum and Art Gallery's need for public seating. They asked for a piece that drew on the industrial history of the old Bond Store building. The shape references the ubiquitous steel I-beams, but this one is made from eucalypt.

I wanted to highlight the beauty of industrial engineering forms, elevate Tasmanian oak from a structural timber very rarely used in fine furniture and at the same time provide robust seating which could withstand the wear and tear of high volume use.

To emphasise the shape, I painted the endgrain with a bright blue signwriters paint which is the colour of the graffiti painted on the walls from the early 1800s. There were about 50 benches in total for that job as well as another version for the other museum buildings.

The bar tables and benches I designed for MONA are another design that went on to have a life beyond the original commission, in domestic and residential as well as corporate settings such as the courtyard at Design Tasmania.

3. Rinse and repeat

Repetition. Repetition is practice, practice makes (closer to) perfect. You make money on the repeats and that repays you for the original investments into your research and development, but more importantly, repetition is where you adjust and refine.

While we don't do production pieces per se, our pieces do evolve over time as we repeat designs and adjust forms to suit different client needs. Each time we make a version, our fabrication process improves.

The first *Frank's Table* was small and made for a tiny converted barn in Hobart and used one of the original beams as the top. We've made numerous versions of this table, and



Above: CA Bench,
Tasmanian oak, 1830 x
450 x 450mm.

Photo: Peter Whyte

Below: The MONA
cellar bar tables and
benches are another
design that went on to
have a life beyond the
original commission,
in domestic and
residential as well as
corporate settings
such as the courtyard
at Design Tasmania.

Photo: Peter Howard

each one is slightly different. This not only keeps us interested but we keep learning. Each one comes from the same design concept and joinery detail, but we're able to streamline our processes and in theory learn from past mistakes.

If you imagine a line or a spectrum with boredom at one end and stress at the other, in theory there's a sweet spot somewhere in the middle. That's where the good work lives. The jobs that are challenging and fulfilling but you know that you've got the skills, knowledge and capacity to deliver. Repetition helps us find this zone.

4. Other people

Community. Collaboration is a term that is in danger of being overused – along with 'bespoke', 'tailored' and 'crafted' – but in my experience when it is done right the whole is definitely greater than the sum of the parts.

Genuine collaboration is a two-way street with egos put aside. Some of the most exciting and terrifying projects we've worked on over the last ten years or so have come through collaborations with architects, artists, metalworkers, engineers and scientists. It's always fun to play with others – as long as there's a no dickhead rule. This works quite well in Tasmania – because it's such a small community, word travels fast. Small communities encourage you to be the best version of yourself which suits me just fine.

5. Mingei movement

Mingei is a Japanese folk art movement that developed in the 1920s and 30s. Its philosophical



Right: Many different versions have been made of the original *Frank's Table*. This one is made from *Eucalyptus regnans* and measures 3200 x 1680 x 720mm.
Photo: Peter Howard

Below: Laura McCusker's *LXN* round table in oxidised eucalypt 1400 dia x 720mm.
Photo: Peter Whyte



pillar is 'hand-crafted art of ordinary people' and it's about recognising the beauty in everyday ordinary and utilitarian objects created by nameless and unknown craftsmen.

There are some caveats here. There's anonymous and anonymous – clearly I'm not hiding in a cave on some remote mountain. And there's quantity and quantity. I'm talking quantity on the human scale: muscle memory and production process refinement.

In terms of everyday there's inexpensive and inexpensive. Too cheap and the object/materials aren't respected – to many people perceived value is inextricably linked to cost. There should be a fair price for the work and materials, but the client shouldn't have pay for your excesses.

Everyone should be able to have beautiful functional objects for use; egalitarian rather than exclusive. Pieces that wear well and look better after years of use. Finishes and materials that age ensure longevity. Increase rather than decrease value. Like favourite old jeans, worn-in and loved leather boots, timber with the patina of time.

Things should be repairable – this means by me or someone else. The emotional attachment needs to be established first but repairs and maintenance needs to be considered at initial fabrication design stage. It's important to me that I don't make something that can't be opened up, pulled apart and put back together.

This is also why I use simple, old fashioned hand applied finishes. They're not as high gloss or bomb proof as some other finishes but, as I mentioned, that's not what I'm after, but nor should people be afraid to use my pieces everyday. Use coasters

if you like them, but they're not essential. The marks of daily use tell a story and stories are important.

The Mingei philosophy applies to objects that are representative of the place in which they were produced. Globalisation and homogenisation of design has meant there's been a loss of the vernacular.

I live in the real world, a world of Instagram and sometimes almost too much visual stimulation and inspiration. I tackle this by using local materials (where possible) for local people (mostly).

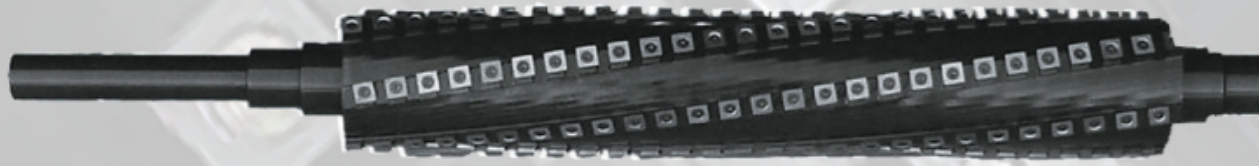
In conclusion, I've tried to give you an insight into some of the tools that I use when designing, for me it's mostly about authenticity and differentiation. There needs to be a point of difference. The piece needs to do its job well, age with grace and be respectful of the materials it's made from.

In issue 101 we presented an abridged version of Melbourne architect and woodworker Adam Markowitz's talk at AWR L!VE in Sydney, August 2018.



Laura McCusker was profiled in AWR#92. She lives and works as a furniture designer maker in Hobart, Tasmania. Learn more about Laura at www.lauramccusker.com

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Made by Hand...and Leg

Jeff Donne shows how the power of the ancient pole lathe lives on.

This guy at a village fair eyed me up and down. With a befuddled look on his face, his gaze moved to the contraption I was leaning on like a straw-chewing farmer on a lunch-time break.

‘Is that a guillotine?’ he said, scratching his chin. And so begins our beguiling journey into antiquity and kookiness that is a pole lathe.

These ancient contraptions with roots lost in the sawdust of time were the tools of bodgers, the itinerant woodworkers from 17th century Buckinghamshire who made chair parts from trees in the woods, emerging only after the sun had set on a day of hard graft.

Some say this is where the bodgers got their name, their profession being a corruption of ‘badger’, that stripy-headed, ill-tempered combination of wombat and Tasmanian devil that snuffles around English woodlands and gardens at night.

Others say the bodgers are responsible for the badge of dishonour bestowed upon fly-by-night tradies who build houses without roofs and other ‘bodgie jobs’, because bodgers, who made parts for chair builders, were masters of doing half the job.

What we do know, however, is that pole lathes are surprisingly efficient machines that are easy to use given time, and they offer a deeply satisfying way of working with wood.

How it works

A pole lathe is a reciprocating lathe, which means the blank being turned spins in alternate directions. The blank is driven with a strip of cord that’s wrapped twice around and attached to something springy at one end, and a foot operated treadle at the other.

When your foot pushes the treadle the blank is turned towards a sharp tool waiting to craft anything from chair legs to baby rattles, and when you lift your foot back up, the blank turns in the opposite direction.

That’s right, a pole lathe only cuts wood for half the time you are actually at the machine. So if you are spending a couple of hours turning some Windsor chair legs, about an hour of that is down time, albeit spread over about a thousand individual rest periods; it’s like work and smoko rolled into one.

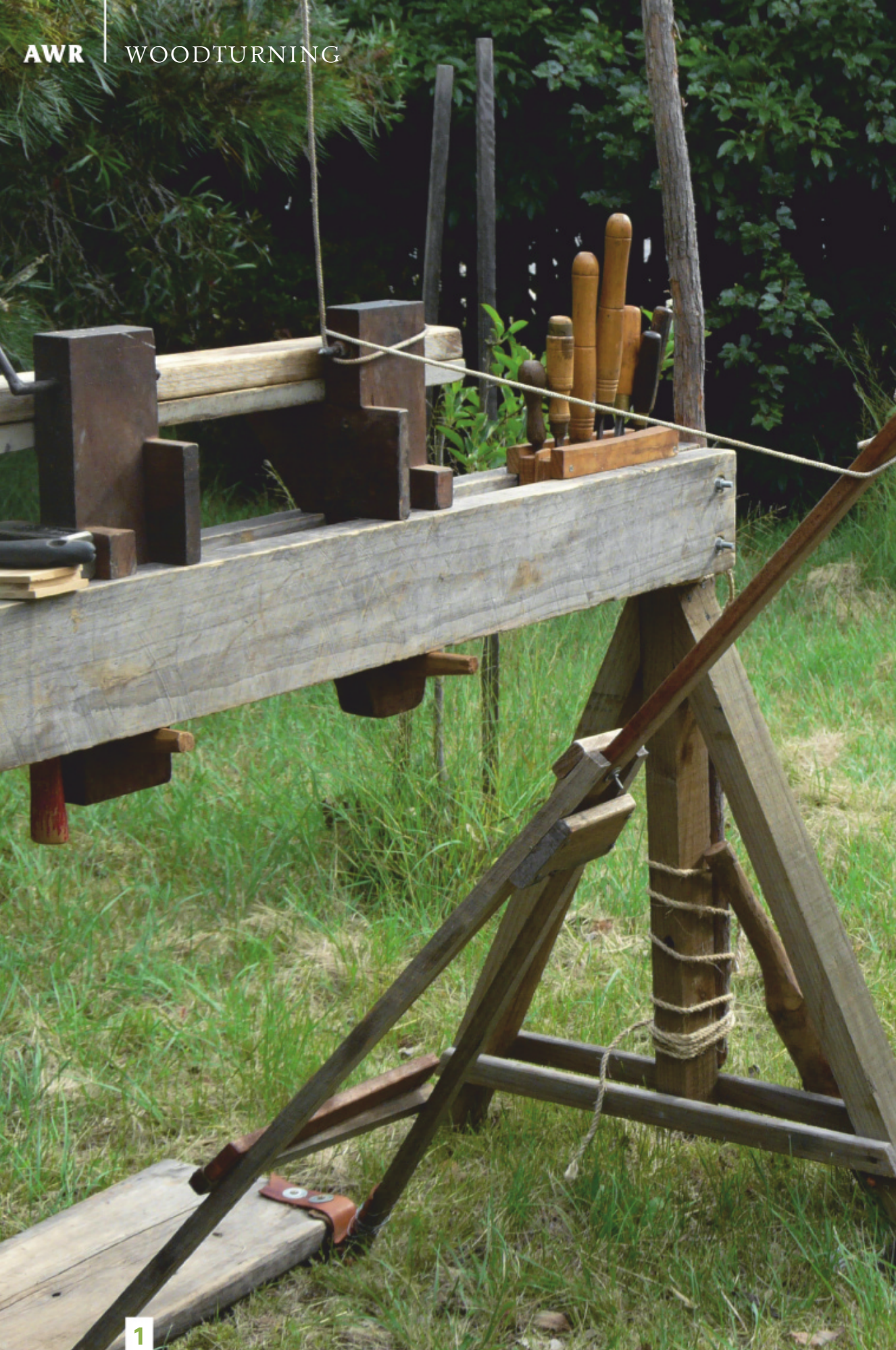
The rhythm you achieve with a reciprocating lathe is actually a beautiful thing. With some practice you develop a gentle rocking motion



For the pole lathe, two A-frames are joined by parallel planks (the lathe bed), in which poppets (head and tailstocks) are inserted. A cord runs from the foot treadle around the workpiece and then up to an elastic cord or sapling 'pole'.

The billet on the right is axed out and refined on the shavehorse (left) before turning on the lathe. All together, a basic bodger's setup.





1

1. A closer view of the workings of some traditional and minimalistic technology which is still highly efficient.
2. The axe is an important tool for bodging – use it to fell, split and shape blanks, and to access the bowl of a lathe made spoon.
3. Cranking the poppet centre into the blank.
4. Grab a straight log (green hardwood is best), and mark it into four pieces.



2



3

as your body guides the tool into the cut with the down stroke and then relaxes on the up stroke.

Mike Abbott, an English green woodworker who is largely responsible for rekindling a love of these peculiar contraptions, had a setup that used this forward and backward motion to gently rock his children to sleep when they were young and in a pram; not something you would try with a three phase lathe!

A speedy machine

But while sleeping children are bliss, a lathe that only works for half the time you are using it is surely inefficient. Not so.

The secret of how a pole lathe ploughs through wood so easily is down to the type of tools used and a technique that relies on slicing across the grain, releasing flying ribbons of wood.

I remember seeing Mike Abbott releasing such ribbons from his lathe just over 20 years ago, and my jaw dropped at the speed and efficiency of a pole lathe and bodger in action. Mike told us of a curious contest held regularly in the UK: the Log-to-Leg race in which competitors would start with a green log, split out a billet, roughly shape with an axe and drawknife before mounting it on a pole lathe to turn a perfect Windsor chair leg. Mike could do this whole process in eight minutes.



4

5. Splitting the log into quarters with some help from a branch mallet.
6. Using the axe to sever the fibres.
7. Splitting is the most efficient way to reduce the blank in size.
8. Axing the blank into a rough cylinder. Depth cuts help remove a uniform amount of wood along one face.

Getting started

First, obviously, you need a pole lathe. This is an easy weekend project that comprises two A-frames joined by parallel planks (the lathe bed), in which poppets (head and tailstocks) are inserted (**photos: main, 1, 2**).

The poppets are made from a dense hardwood, with threaded rod or coach bolts sharpened and screwed into place to form two dead centres. If you're handy with a welder you can weld on a crank (**photo 3**) to screw one of the centres into the blank, or just whack it into place with a club hewn from a branch and wedge the poppet in place.

And then onto the pole or poles. Traditionally, the pole would have faced the bodger. It would be attached and raised at its base about six metres away, and with the cord tied to the other end about a metre above your head. A young tree is perfect for this as it will still have flex to provide the necessary spring.

Now the pole lathe I use is fancy. It comes with about the only modern feature to be added to this particular pole lathe design in the last few hundred years. Instead of the one pole stretching out in front, it has two shorter poles (about 2.5–3 metres) attached vertically to each of the A-frames.



5



6



7



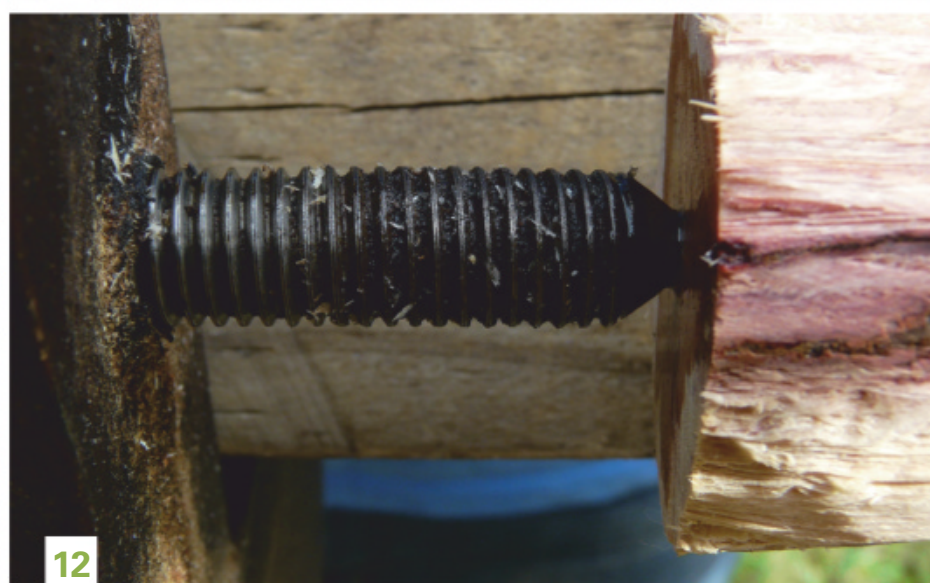
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11



12

A piece of elastic cord is then stretched between the two poles to again provide the spring you need. I much prefer this design as I can set it up in the shed in winter, and then move it out to the garden as things get warmer. No extension cord needed.

The final thing to make is the treadle. This can be made from a forked branch, or in my case hardwood tomato stakes attached to a wide piece of wood for you to stand on while pedalling. The hinge is just made from pieces of leather nailed to the base and treadle.

How to bodge

So let's use this thing. Grab a straight log, green hardwood is best, and split it into four pieces (**photos 4–7**) before shaping one of the wedge shaped pieces into a cylinder using an axe or drawknife (**photos 8, 9, 10**).

The turning tools you need are sharp and simple. For marking centres I use an awl (**photo 11**); stick it in, twist (**photo 12**), and then add a drop of oil to the holes.

When roughing out I use a basic carver's gouge (**photo 13**). I've used numerous sweeps and widths and they all work well if they are sharp. Use a gouge to turn a thinner section (**photo 14**); when the cord wraps around this it will spin the blank faster. **Photo 15** shows how it also holds the cord in place which helps to prevent slicing it with the tools!

For more detailed shaping I use a spindle gouge (**photo 16**) and skew chisel (**photo 17, 18, 19**). I use specific turning tools for these two as I find the longer handles give me more control. And that skew chisel, the much feared woodturner's tool that enjoys wrecking near-finished

pieces, shed walls and the occasional turner, is reduced to a gentle, but cheeky, puppy on a pole lathe because of the slower speed and high tech braking mechanism (you stop pedalling if it catches).

For smoothing flat surfaces a simple flat and wide chisel (about 25mm+) will do a fine job (**photo 20**); it will also do the job of a skew chisel if the last one you used is still embedded in the wall.

Using the tools is perhaps the trickiest part to get right. Commonly, when people are getting started, they tense their upper body and pedal using short pushes. Try instead to ever so slightly lean into the rotating blank as your leg pushes with long and confident movements on the treadle. As your leg returns, lean back and pull the tool a millimetre or two away from the blank.



Steer the tool with your dominant hand, placing your other hand on top of the blade to guide the tool into the wood. You need to slice from the top of the rotating blank, not plunge into the centre as is common with conventional turning. Hold the tool slightly twisted and at an angle to the blank, pointing in the direction you are cutting, being sure to move the tool from a high to low point.

Shaping is done with combined use of the spindle gouge and skew chisel. Use these tools to achieve tight curves, notches, beads and even captive rings. It's worth conquering the skew chisel because the sharp edge and pointed tip make it a versatile tool. When turning large beads for example, use the tip to mark it out and the edge to begin rounding over.

10. Refining the cylinder with a drawknife on the shavehorse.
11. Start a hole with the awl into the centre of the workpiece first.
12. Add a drop of oil to the centre hole before screwing it onto the poppet.
13. Using a basic carver's gouge to rough out the blank.
14. Gearing: use a gouge to cut a thinner section for the cord so the blank will spin faster.
15. The resulting gullet will keep the cord away from your sharp tools.
16. Starting to shape with the spindle gouge.
17. Using the skew chisel tip to begin a bead.
18. The slope of the skew chisel blade must match the direction you are cutting.



19



21



20



22

23

Always hold the skew with the slope of the edge going in the same direction as the curve you are turning, and then as the skew reaches about 45°, flip the skew over and finish the bead with the tip.

To smooth any long surfaces, use the flat chisel, bevel down, and held at an angle to the blank where you can imagine the fibres slicing off the closest corner of the bevel. This one takes a bit of practice and it's a notorious cause of shed based tantrums when it catches and rips out the fibres. **Photo 21** shows a detail you can add: with wire and leg you can burn in a decorative line.

And finishing is simple; no need for sandpaper, just grab a handful of fresh shavings, squeeze them around your finished turning and pedal like the clappers. The end result is a beautifully burnished piece (**photos 22, 23**).

Follow these instructions and you will end up with a pole lathe and a turning of your own. The first of many as this addictive ancient gizmo takes hold of your soul. I make spoons and scoops on mine these days, but regardless of what you make it's doubly satisfying because there really are few better feelings than making something from a tool that you also made yourself.

Photos: Jeff Donne

- 19.** Cleaning up the shape with the tip of the skew.
- 20.** For smoothing flat surfaces a simple flat and wide chisel will do a fine job.
- 21.** Burning a decorative line with wire and leg power.
- 22.** The end result – this is the casuarina scoop being made in the photos.
- 23.** A blackwood scoop made on a pole lathe.



Jeff Donne is a professional spoon carver and treecraft teacher from the far south coast of NSW. His roaming Spoon School travels to many parts of Australia. From

October 26 to 27 he will again host Spoon Jam, this year in Canberra. See: www.spoonsmith.com.au Photo: Matthew McKenzie

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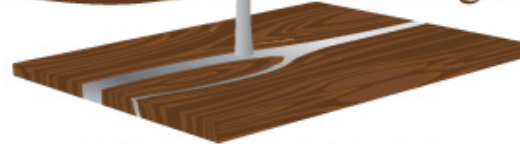
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New generation Bridge City Tools rear l-r: large multi tool (\$209), mini block plane (\$229), mitre square (\$169); front l-r: small multi tool (\$189), mini mitre square \$35, 200mm try square (\$139).

A New Generation

High quality Bridge City Tools are now made from on a stocked rather than a produced-to-order basis. Review by Raf Nathan.

The origins of Bridge City Tools go back to 1973, when its founder John Economaki was an industrial arts high school teacher. A batch of squares for the school were delivered but were out of true 90° by up to 1/4". In response, John designed a try square for his students to make as a project using wood and brass.

Around ten years later Bridge City Tools was operating as a woodwork toolmaking business and this early design became the basis for the production version of the TS-2 square. Bridge City's functional tools made with rosewood and brass were just so desirable, and Economaki was able to design them so well. That, coupled with good marketing and advertising, sold the product. By 1992 sales were a comforting \$4 million annually.

The range grew to include most measuring and marking tools as well as limited edition planes. Around 12 years ago BCT started making tools using less traditional and more state-of-the-art methods and materials. Aluminium and stainless steel and a more architectural design evolved the style.

Recently the company and its designs were bought by Harvey Industries of China, with John Economaki remaining as head of design and research. The owner, Jack Xu has been steering Harvey as a new face of specialist woodwork tool and machine equipment which in fact makes woodworking machinery for a number of other companies. With BCT now in their stable, Harvey Industries have a strong base from which to move

forward with new hand tool re-releases and innovations now available on a stocked rather than a produced-to-order basis.

Recently I was able to trial a few of the new releases and was impressed with the build quality. As an added bonus all tools arrive in impressive presentation boxes.

The large AS-24 T-square (or adjustable square as it is named), has a full 610mm span on the blade and fixes to a two-part aluminium fence. One part of the fence holds the blade at a fixed 90° whilst the other fence can be loosened and tilted to any angle.

It locks at the selected angle very securely with a camlock lever. It can only be used at one angle so to make



Left and above: Bridge City 605mm metric T-square (\$329) showing camlock and angle setting fixtures.

Above right: Available in two sizes (large shown here), Bridge City multi-tools offer several functions.

Right: The new generation try square in aluminium with dovetail marker and decorative orange inset.



a mirror angle you can't flip the tool but instead need to release the lever and re-fix at the desired angle. The blade has laser etched markings from 0–605mm although this was not quite perfectly zeroed to the fence and was out around 0.25mm over the full length. The blade is, against my reference squares, perfect at 90°.

The new TS-2 square is a big move away from the original tool that started BCT. Traditional brass and wood have given way to modernist aluminium and stainless steel however the new tool is very handsome and uses clever design.

Two L-shaped aluminium fence sections fold together to sandwich the 2mm thick stainless steel blade which is fixed to the fences with four screws. It's a very finely made, strong and sophisticated tool. The blade has laser etched ruler markings on both sides, although the ruler was around 0.15mm different over the length to my reference rulers. The blade to fence which is what a square is all about was, to my reference squares, a perfect 90°.

An included 8:1 angle dovetail marking cut-out is a nice touch extending the functionality. At \$139 I thought it quite well priced for a reference square.

The MT-1 Multi-tool offers, as the name suggest, many functions in one tool. Using hard aluminium for most of the build and a stainless steel blade the bevel function is the heart of the tool. It has a quick to use and secure camlock lever and 180mm reach. It's a good bevel gauge and the saddle square function is also good for folding over a pencil line on a workpiece for example. There are both 8:1 and 6:1 angled dovetail markers for joinery on wood from 8mm to 45mm thick.

As shown opposite, the collection also includes multi-tools, a 45° mitre square and the mini block plane which I reviewed in *AWR#101*.

So is the Bridge City name in good hands? Yes, the quality is spot on with build and angle accuracy. Moving to aluminium and steel is fun and a different take on

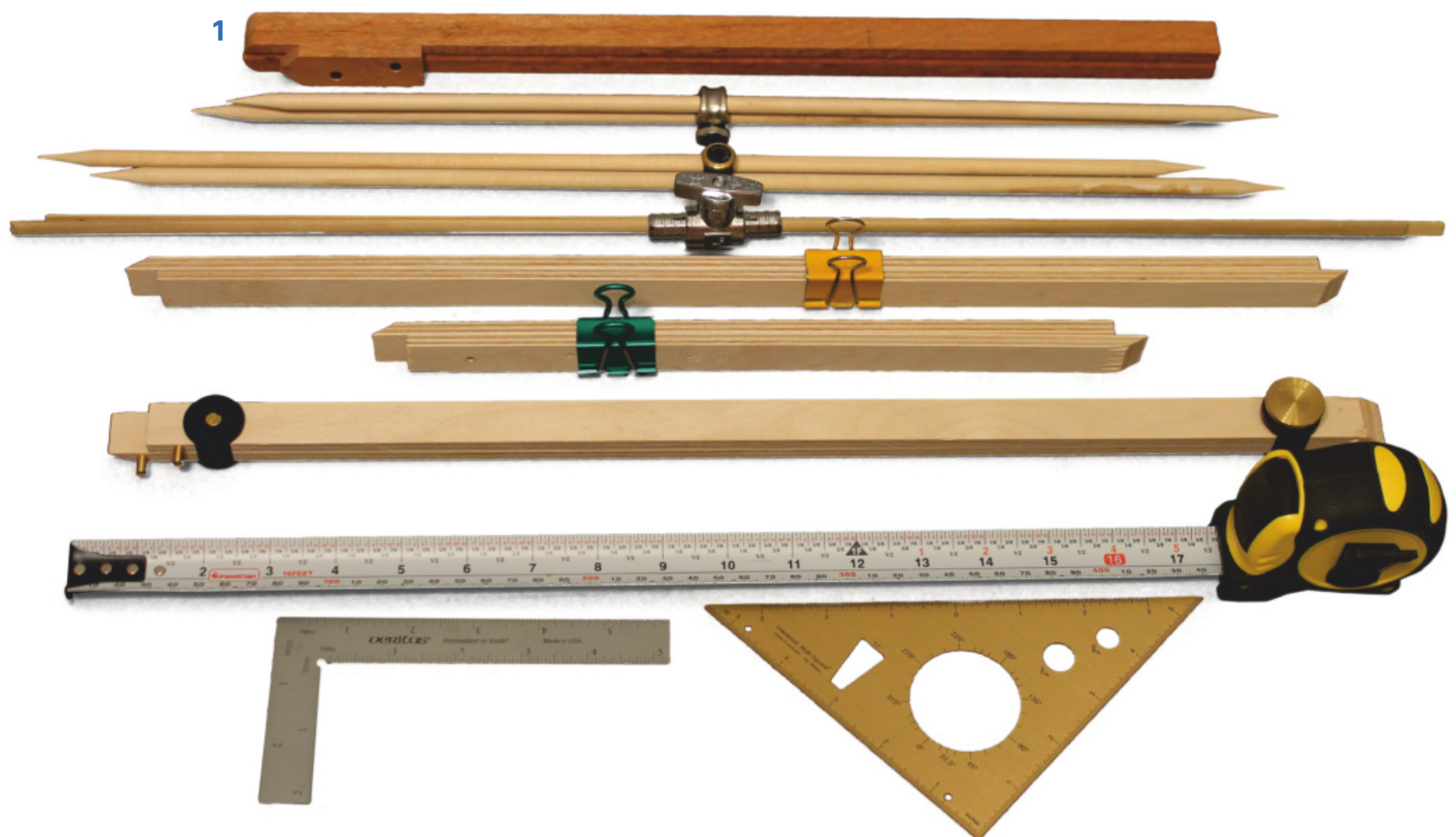
woodwork tools. These materials also won't rust or tarnish and offer more stability without the vagaries of wood movement affecting accuracy.

All the earlier BCT brass and wood tools are highly collectible, having not been in production for years. I do know of people who were not pleased with early BCT tool accuracy with regard to marking gauges and squares, and you may need to fettle older tools to get the best from them. Well priced and more readily available, the next generation of Bridge City Tools should now find its way into more workshops.

Bridge City Tools are available from Carbatec, see www.carbatec.com.au

Four Squaring Tools You Can Make

Here are some proven jigs and tools that help you to keep things square. Story by Charles Mak.



Many woodworkers check for square with a try square or a measuring tape (**photo 1**). I use them too, but only when they are the right squaring tools to use. However squares and measuring tapes used as a squaring device have some limitations.

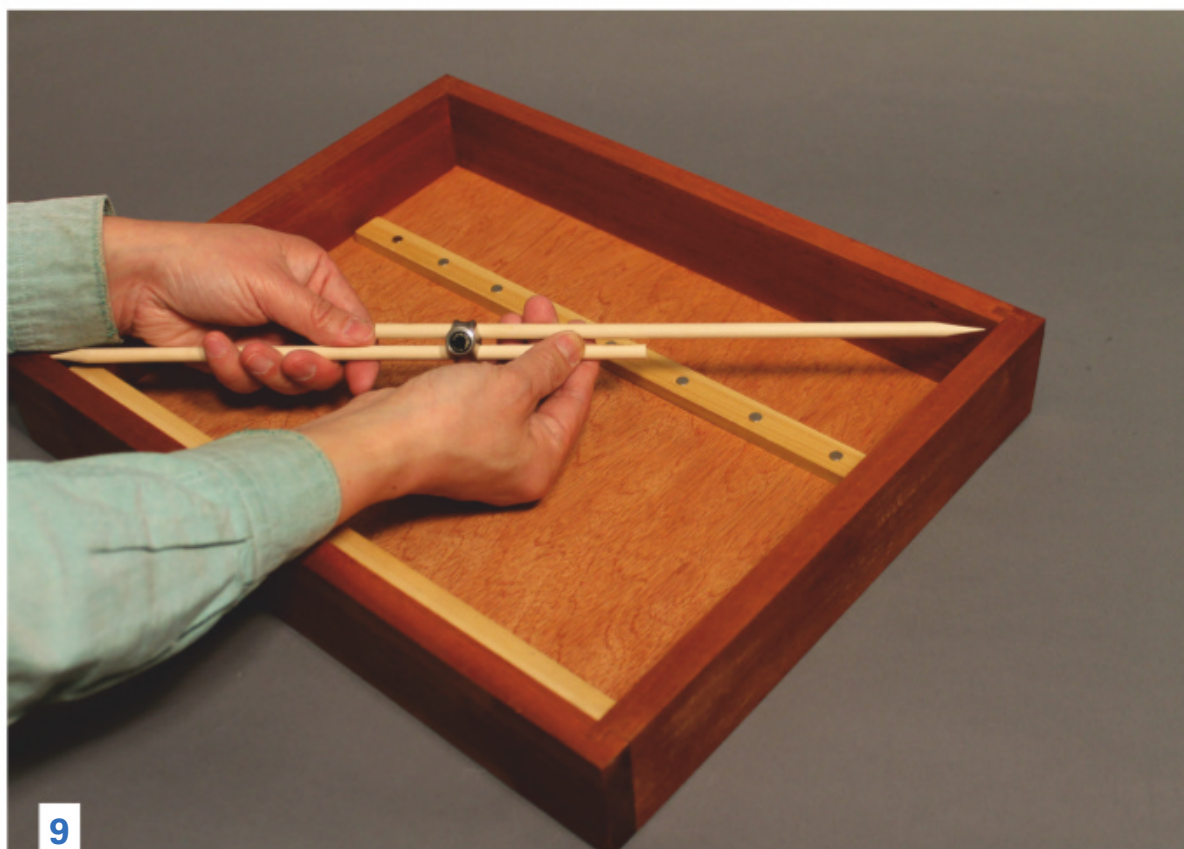
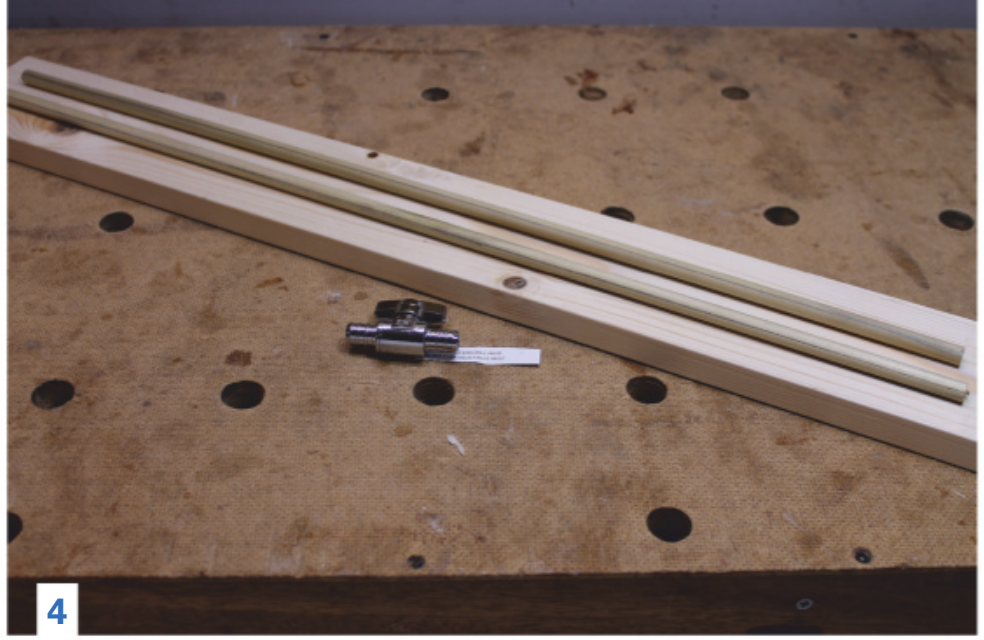
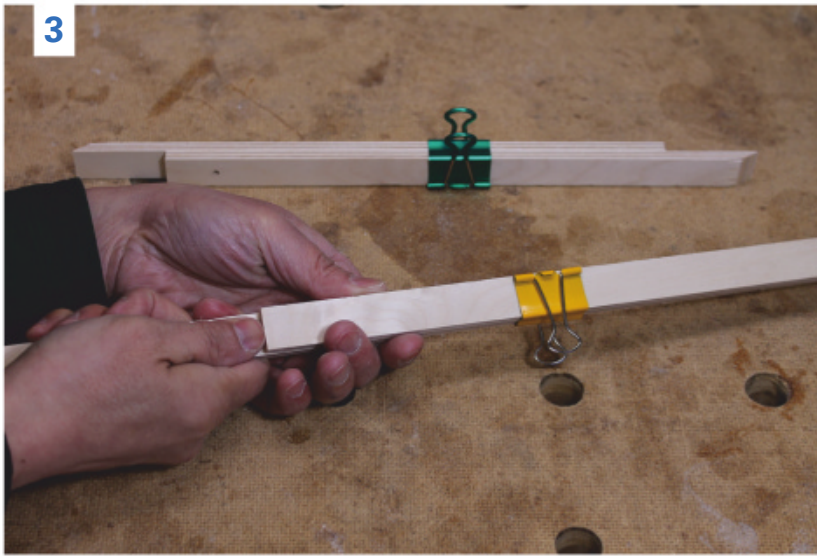
While a try square is good for checking small frames or drawers, it is not reliable for checking squareness of large areas. When a large piece is assembled, the clamps exert force to close up the joints that can also, unfortunately, bend the assembly. A tape measure would be a better choice to use in large openings, but it has its share of weaknesses and imprecision.

For example, tape sag can affect the accuracy of the diagonal readings. And then there are the clamps that get in the way... Lastly, odd diagonal measurements are hard to remember and compare, and that's why, if I do use a tape, I prefer one that allows me to mark the blade surface with a pencil (**photo 2**)



1. Pinch rods and diagonal beams complement squares and tapes for checking squareness.
2. When measuring diagonals with a tape, the author uses one that allows him to mark the blade like a story stick.





3. You can make minute adjustments of the clipped beams by pushing one end with a thumb.
4. Choose a rod of a diameter that will compensate for the saw kerf to fit into the ball valve.
5. Run a pencil line down the middle of the rod, and rip it in half on a V-groove cradle.
6. The author planed off the saw mark, while fine-tuning the rod's fit with the valve.
7. Cut the ends of the rods to a sharp edge so the pinch rods can reach the corners.
8. Wooden rods are used with the shaft clamp, but you can replace them with steel or aluminum stock.
9. Extend both rods to opposite corners, then lock them to take the first diagonal reading.

Diagonal squaring aids

Cabinetmakers can measure diagonal dimensions without the aforementioned constraints of a tape, using a direct reference method. In most cases, I turn to the oldest, basic tool to make sure the work is not out of square: pinch rods, or bar gauges. They use the same diagonal principle as the tape measure: set the tool to one diagonal, then use it to check the other. If there is no difference, bingo – the work is square!

Some woodworkers cut a pair of sticks and assemble them with commercial bar gauges – but why not make your own pinch rods using components that are widely available? Let me share four of those that I have built for occasions when neither a square nor a tape would do the job.

Binder-clip pinch rods

As the name suggests, pinch rods are two rods pinched together. The simplest way to keep two strips together is to use a binder clip. A clip gives enough pressure for the holding while, unlike spring clamps, still allowing you to extend either strip with your thumb (**photo 3**). Avoid using this method with very long strips as a pair of clips would be needed, which would make fine adjustments too cumbersome.

Ball-valve pinch rods

At an antique store, I once saw some homemade pinch rods clamped together by a copper valve. I found another type of ball valve at my local home centre, and the only small challenge I faced was finding a wooden rod and cutting it into halves to fit into the valve (**photo 4**).

You will find the bandsaw a safe way to rip the rod, followed by some hand planing work (**photos 5, 6**). In the last step, bevel the ends to about 40° (**photo 7**). To use, slide the strips apart until the ends contact the opposite diagonal corners, then lock them down with the thumbscrew.

Shaft-clamp pinch rods

I came across a neat idea of using a dual marking gauge's shaft clamp (designed to lock the relative position of the cutters) to pinch two dowel rods together (**photo 8**). The clamp holds the rods in position as the thumbscrew is turned.

First, find a pair of wooden rods of the right diameter (3/8" for the extruded aluminum shaft clamp, for instance), and cut them to desired lengths. To complete the tool, sharpen the ends with a pencil sharpener, and slide them into the clamp holes (**photo 9**).

Diagonal beams

Both Charles Hayward and Ernest Joyce have covered in their books the diagonal strip with a pointy end as a

10. The chisel-edge block is set back from the end of the strip so it can rest on the assembly.
11. Ripping a batch of beams before crosscutting them to various lengths, including a shorter piece for making the chisel-edge blocks.
12. Cut one end of the strip to a point like a chisel edge, at an angle between 45° and 60°.

10



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14



15

13. Flip the strip end to end on the saw to sharpen the opposite end.

14. Rip the chisel-edge block in half, and cross cut them to about 500mm long.

15. A round profile was traced on one end and then shaped on the shooting board.

16. The longest diagonal beam featured is about 150cm long; use thicker stock, 25 x 25mm, for example, if longer beams are made.

17. Find the centreline of the beam, and screw the chisel-edge block with its point in the centre.

18. Apply the same amount of pressure of the pointy end against the corners of the workpiece when marking the lines.

19. If the diagonal lines do not overlap, the work is out of square by half the amount of the diagonal difference.

20. Stop the clamping correction as soon as the corner lines up in the middle of the two pencil lines.



16



17

tool to test whether a carcass is square. But their designs share the same inadequacy as the pinch rods: after each adjustment of the assembly, you need to remeasure the diagonals and compare them, back and forth as many times as needed until the case is confirmed square.

Retired woodworker James Gauntlett had a clever solution to the trial-and-error method: instead of sharpening the beam to a point, he made a chisel-edge block and mounted it underneath the beam.

The modification allowed him to place the beam on the assembly and observe the changes in squareness as he repositioned and adjusted the clamps (**photo 10**).

This is more superior to other diagonal methods.

The modified diagonal beams are easy to make in a few steps. Choose a stable, straight-grained hardwood to make the diagonal strips of 200 x 200mm (**photo 11**). After ripping all the strips on the tablesaw, cut the chisel-edge blocks out of one of them to about 50° on the mitre saw (**photos 12, 13, 14**). Round one end of the beams to indicate where the blocks are mounted (**photos 15**). Finally, ease all the sharp edges and attach the blocks to the strips with glue and screws (**photos 16, 17**).

In use, place the beam diagonally across the face of a carcass and mark the first diagonal dimension with a pencil



line (**photo 18**). Reposition the beam into the opposite corners, and mark the opposite diagonal length (**photo 19**). If the pencil lines overlap each other, the carcass is square.

If the two pencil lines are apart, place the beam in the longer diagonal. Correct the out-of-squareness by shifting the clamps in the direction of the longer diagonal until the corner lines up to the middle of the two pencil lines (**photo 20**). Squaring mission accomplished!

Time-honoured cabinetmakers' tools, such as these pinch rods or diagonal beams, are a pleasure to make and a joy to use in the shop. Imagine that extra twinge of satisfaction you could derive from finishing the last part of your assembly with tools you made yourself. That feeling will return every time you use these shop-made fixtures!

Photos: Charles Mak



Charles Mak enjoys writing articles, authoring tricks of the trade, teaching workshops, and woodworking in his shop. Email: thecanadianwoodworker@gmail.com

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Alumni 2

New work by selected graduates of Sturt School for Wood formed a showcase for fine woodworking from February to April this year.

Sturt School For Wood is the only school of its kind in Australia. During the course of its 34 years it has established a reputation for excellence and produced some of the best and best known furniture makers in Australia.

In addition to a comprehensive program of short courses in fine woodworking, the school offers Certificate IV in furniture design and technology. This is achieved in a full time one year course which is intensive to say the least.

The first Alumni exhibition was held in 2017 and celebrated the work of 14 makers who studied at Sturt School between 1985 and 2005. This year Alumni 2 presented new work by 16 graduates from the years 2006–2016. Some of the work presented is featured here.

Sturt School For Wood resides within Australia's oldest craft centre and is located in Mittagong, NSW. For more information see www.sturt.nsw.edu.au



Left: Alumni 2 installation at Sturt Gallery, Mittagong. **Clockwise from front left:** Ian Factor, *Legato Chair*, American oak; Isabel Avendano, bowls in jelutong; Grant Robertson, *light (LED)* in American ash and acrylic; Darren Oates, *Chaise Lounge*, *Callophylum*, leather; Elise Cameron-Smith, *Lady* (white beech), *New Love* (Huon pine), *Dancer* (white beech); Ruth Thompson, *Gene and Leslie Lamps*, American walnut, ebony, rice paper, LED lights; Daryl Ingate, *Narrative Cabinet*, American white oak, Tasmanian oak, ebony.

Centre, clockwise from rear: Adrian Spano, *Drinks Cabinet*, American walnut, brass; Steve Harper, *Nautilus Table*, American rock maple, silky oak, resin; Bailey Farmer, *Coffee Table*, fumed oak.

Photo: Sturt School for Wood



Above: Christopher Neal, Acton Tables, Tasmanian blackwood

'These were originally designed for my sister who wanted a set of versatile tables that could nest beneath each other but also work in other configurations. She wanted a clean minimal look with no sharp corners – young children! The legs each had their inside angles cut before being glued together and turned on the lathe as one in order to give a uniform outer radius. They were then separated and joined by simple rails. For the exhibition the shaping, detailing and dimensions were all refined in the tables shown.'

Photo: Christopher Neal www.christopherneal.com.au



Left: Orest Danylak, Stool, American walnut, cast bronze

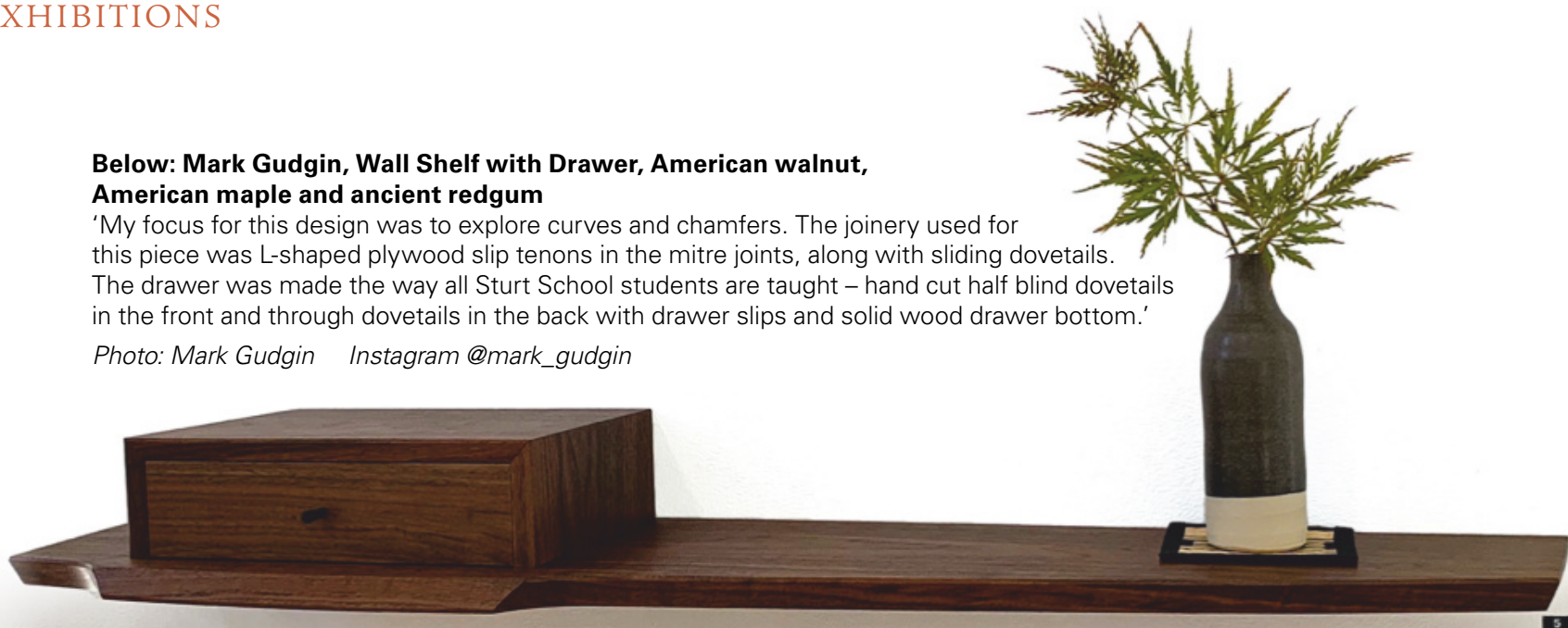
'Not many people will ever look at an object beyond its functional purpose. Beneath the traditional joinery of this stool is a beautiful bracket. This intricate structure was first 3D printed in plastic and then dipped many times into a clay slurry until a thick layer was formed. The clay was then fired at a temperature high enough to vapourise the plastic 3D print, which then create a cavity for molten bronze to be poured into. The bracket was then polished and fitted. I wanted to design a piece whose beauty would have to be discovered.'

Photo: Sturt School For Wood www.studiodanylak.com

Below: Mark Gudgin, Wall Shelf with Drawer, American walnut, American maple and ancient redgum

'My focus for this design was to explore curves and chamfers. The joinery used for this piece was L-shaped plywood slip tenons in the mitre joints, along with sliding dovetails. The drawer was made the way all Sturt School students are taught – hand cut half blind dovetails in the front and through dovetails in the back with drawer slips and solid wood drawer bottom.'

Photo: Mark Gudgin Instagram @mark_gudgin



Left: Ruth Thompson, Gene and Leslie lamps, American walnut, ebony, reed, rice paper, LED lights

'This pair of lamps were inspired by Gene Kelly and Leslie Caron in "An American in Paris", a wonderful movie with music by George Gershwin. I aimed to portray the fluidity of the dancers, the strength needed to make dance look effortless, and also the romance of the story. The shades have reed skeletons and rice paper skins'

Photo: Sturt School for Wood
Contact: Ruth@dontpanic.net.au



Left: Daryl Ingate, Narrative Cabinet and Objects, American white oak, Tas oak, ebony, mirror

'Several years ago, I made a small "keep chest" cabinet for my one-year old godson as a collection point for his story and the things he valued. We were all intrigued by his wonderment and joyful interaction with this piece of furniture as teddy was lovingly locked away in a little concealed drawer. It is the substance of this interaction that the narrative cabinet with puzzle locks and hidden compartments is designed to express and explore. The idea that a piece of furniture, fixed in time and space might hold representations of intangible experience, adventure, or identity. It is a cabinet that might journey with a person to collect and hold something of their life story.'

Photo: Bejae Ingate
Contact: d.ingate@westnet.com.au

Right: Elise Cameron-Smith, Lady and Dancer, white beech

'These forms embody the style and grace of the feminine body, focusing on the hips and shoulders, both capturing flow and movement. I hope they encourage their new owners to dance like no one is watching.'

Photo: Elise Cameron-Smith
www.elisecameron-smith.com.au





Above: Adrian Spano, Drinks Cabinet, American walnut, brass and mirror

'I enjoy working with a range of materials and wanted to create a practical piece of furniture with the focus on the solid brass panel doors. I had no real plan when I started this drinks cabinet, only a rough sketch, and it was nice to mainly freestyle this piece from start to finish. The brass was cut by CNC machine, and from there I worked on the shape of the door frames and the mitred cabinet using splines some of which were also brass.'

Photo: Adrian Spano www.500workshop.com.au



Left and below: Steve Harper, Nautilus Table, American rock maple, silky oak black epoxy resin

'The design comes from the shape of a nautilus shell. The underneath retains the 3D spiral shape but the top surface, needing to be flat, was machined down to almost flat and the residual "valley" replaced by the inlay. The bulk of the carving of the top, inlay and legs was done using a CNC router with hand work for the detailing. The starting point was a 3D file (STL) and this was edited and finally imported into the CNC software.'

Photo: Max Harper
www.reddoordesigns.com.au



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Why It's Time to Upgrade Your Dust System

For Troy McDonald finally improving his dust collection setup was a personal journey...

I'd like to open this article with two important confessions. First, I'll confess to having no formal qualifications in dust extraction or ducting design. Whilst I love my woodwork, I have little interest in the formalities of friction losses in ductwork and fan static pressures. So this is an account of my own personal journey in dust extraction shared in the hope that it may provoke thought about your own situation. Thoughts that I hope may have you questioning the adequacy of your own extraction systems as I did when I embarked on this journey a few years ago.

So why is this important? While effective dust extraction techniques are endlessly debated, there is one constant on which the science is aligned. That is the health risk presented by ongoing exposure to fine wood dust. Many of us woodworkers work to self imposed health standards not recognising that the risks of exposure to fine dust increases over time. The recent publicising of silicosis exposure to

those working in the stonemasonry and kitchen benchtop industries should serve as a sobering reminder of the need to manage our personal health risks over time. Like many, I remained accepting of the risks until I embarked on a redesign of my workshop several years ago.

It was then that I removed my trusty 2hp single stage collector from the corner of the room where it had stood for 10 years to find a caked layer of fine dust lining the wall. Only then did I realise my dust collector was a glorified chip collector and dust blower. That afternoon I dedicated a few of hours to relocating the extractor outside the workshop, piping it in through a makeshift arrangement of PVC duct.

I'm embarrassed to admit that it took me another two years to finally improve the system to a degree that I'm now satisfied represents an acceptable (but arguable) level

of performance. Along the way I've been the fortunate recipient of some sage advice on the topic. Which brings me to my second confession. The ideas for improvement listed below are not my own. Rather, they represent a summary of the guidance from the broader woodworking community that I found useful as I invested both time and money in improving my own system.

1. Extractor location and workshop layout

For those fortunate enough to be designing a workshop from scratch there is an absolute requirement to consider effective dust extraction as a critical element of the design. An early consideration should be where to locate your extractor. As noted above, I was committed to ensuring my extractor remained outside. By nature, this ensures that fine dust collected at the source isn't recirculated in the workshop environment.

Advice from a number of sources suggested that if you only make one improvement to your system, it should be the relocation of your extractor outside the workshop. If you're fortunate enough to be located in an open area there are some low cost solutions possible that can be very effective (**photo 1**) respecting that dense suburban areas can require greater acoustic and dust management to avoid impacting others. In my own situation, locating the extractor outside required an acoustic enclosure to be built (**photo 2**). If you can't locate the extractor outside then I would strongly recommend you vent the extractor external to the workshop (**photo 3**).

Recognising you will never capture all fine dust irrespective of your extraction should have you also considering ventilation as part of your design. In warm climates, designing a workshop that ventilates freely is much simpler. In hot or cold environments that require air conditioning the challenges to efficiently ventilating your workshop increase. Opening up your workshop to natural ventilation is a great option, but may not be possible for a number of reasons including climate, security and noise.

Forced ventilation is the more commonly used solution to remove airborne dust and can be relatively economic to install. The final and most expensive solution to removing remnant air borne dust is air filtration. For cold climates this may be your preferred option. I chose air filtration (**photo 4**) for my workshop as the suburban location meant managing external noise was a material consideration.

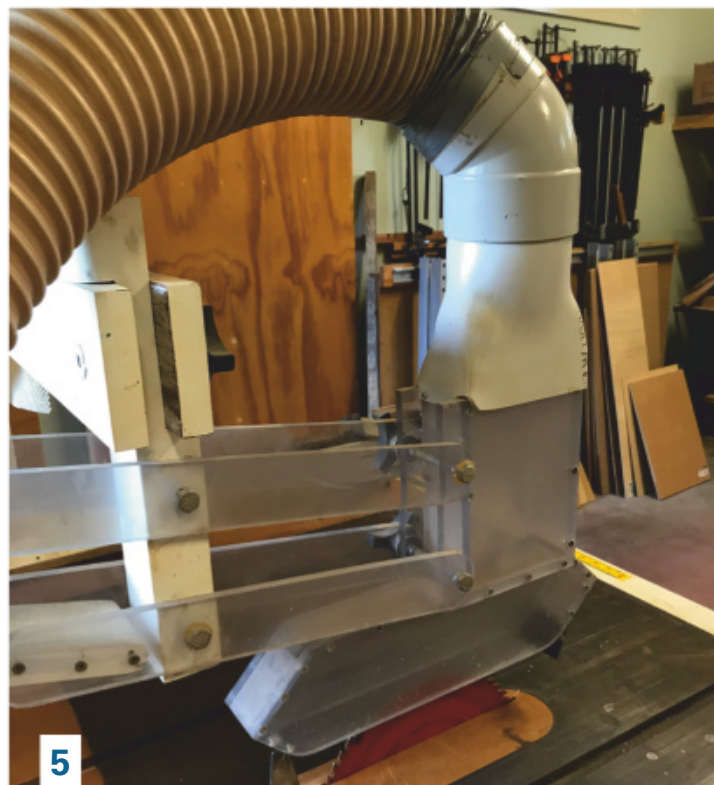
2. Choice of extractor and ducting design

When it comes to choosing an extractor and ducting it's generally a case of bigger is better. A 2hp extractor should be considered an absolute minimum connected to an individual machine. If you're intending to run duct to multiple machines then the advice suggests you'll need a system of 3 or 4hp and above.



1. An externally installed extractor in its simplest form. A stripped down 2hp impellor with inlet ducted through the workshop wall. The fine dust is free to disperse and the larger wood chips are later raked for compost. Photo: David Bedford
2. Cyclones can be noisy. Mine required installation in a soundproof enclosure. Shown here with the door open for viewing.
3. An indoor cyclone system with insulated exhaust duct being vented through the window in the upper right. This ensures there is no exhaust dust being recycled into the workshop.
4. Basic Air Filtration System to capture fine airborne dust.

5. Most blade guards allow for no more than 50mm ports. The upgrade here to 100mm is remarkably effective.
6. Modification of a big boy sander. The port is 150mm and the additional removable guarding allows for full dust collection when using the radius.
7. With the guarding removed, sanding the full length is possible. Note the upgraded port to the right.



There is a wealth of research to support these requirements. Because we're aspiring to collect fine dust with these systems (not wood chips), the volume of air we need to move through an extraction system becomes significant. Whilst 350cfm may be adequate for wood chips, 1000cfm or more will be required to collect fine wood dust (source billpentz.com).

There are two reasons for this. First of all, we need to understand that fine wood dust behaves like an aerosol. Unlike wood chips it becomes airborne immediately. Secondly, to collect these airborne particles at the source requires significant volumes of air to be drawn into your ductwork. Think of it as trying to create a bubble of low pressure air around the tool generating the dust. The science confirms this as something that's difficult to achieve. If you've used a garden blower you'll understand the challenge. When used as a blower, they're effective at blowing dust all over the place, however, switch them to suction mode and you'll find that you need the inlet right on top of the material you're trying to vacuum. Why is this? Because blowing has the benefit of efficiently forcing air flow in one direction.

This advantage is lost in a vacuum system as air is drawn in from all directions at once. Once again, collecting fine dust at the source requires large volumes of air to be drawn into your ducting, which requires significant motor power, large impellers and large ductwork.

Choosing a style of extractor is largely a decision between a cyclone (**photo 3**) or the more conventional single stage extractors with bags or pleated filters. Remember that both

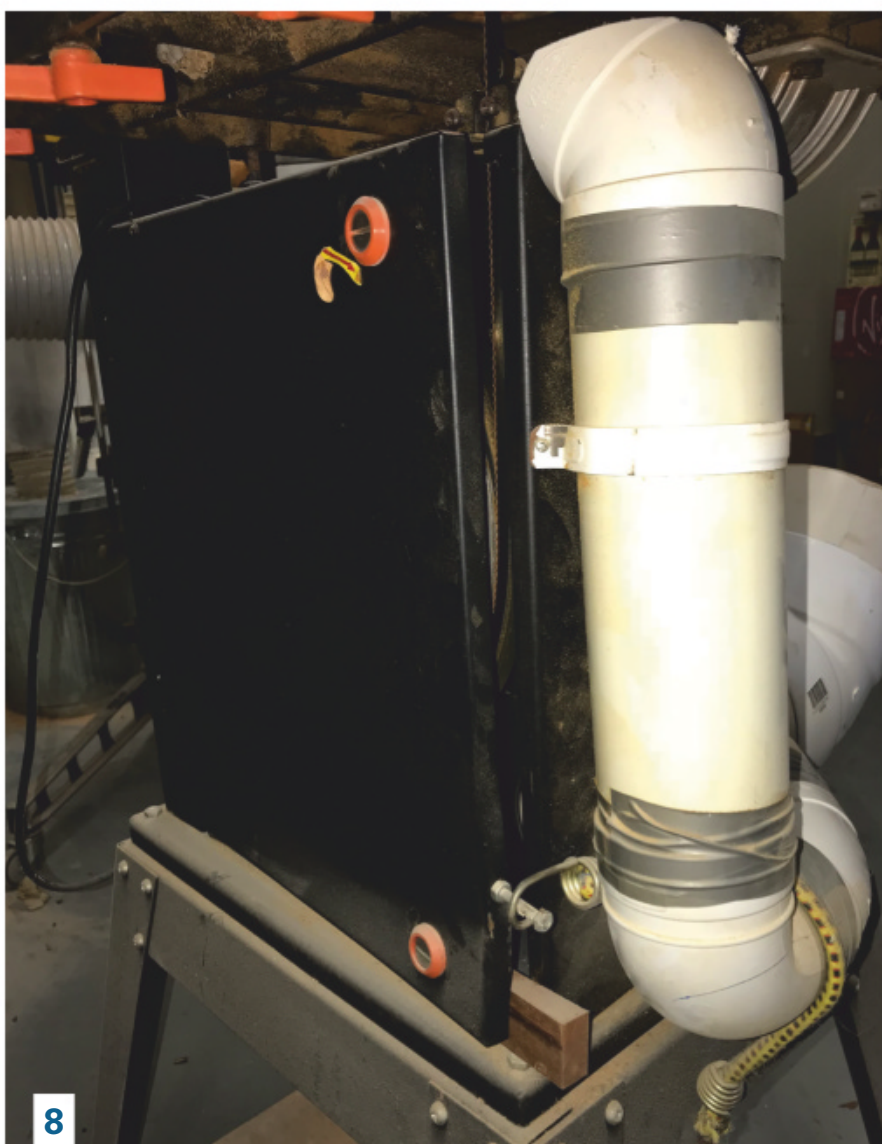
of these systems traditionally move exhaust air through some form of filter. As such, the performance of the system is entirely dependent on keeping the filters clean. If you're like me, this rarely happens at the required frequency.

For decades the majority of large workshops have used cyclone extraction systems for good reason. The inherent cyclone design ensures that separation of the majority of wood dust occurs prior to the impellor so that the exhaust air contains only the finest dust particles.

A single stage system in comparison has all the extracted dust passing through the impellor with subsequent impact on performance. Cyclone systems lose out on cost and noise, however, I chose a cyclone for my installation due to their performance advantage and smaller physical footprint.

The choice of ducting opens up a host of options in either rigid or flexible and metal or PVC. My choice was PVC, purely for the convenience and flexibility, however, there are some very professional metal ducting solutions available. Materials aside, the first consideration should be minimising lengths of ducting and maximising duct size.

Flexible duct should obviously be avoided wherever possible given the significant resistance to airflow. Recognising the research of Bill Pentz, most owners of standard 2hp extractors nominally rated for greater than 1000cfm of flow may be horrified to recognise that this will be reduced to something closer to 350cfm purely through the choice of 100mm ducting.



8. An extensive upgrade to a 14" bandsaw illustrates what can be achieved: 150mm main port and 100mm sub ports to both above and below the table.

9. Providing adequate ventilation to feed a larger port is critical. Here the front door on the bandsaw is slightly wedged open to ensure adequate air flow to the upgraded 150mm port.

Remember, 350cfm won't provide adequate flow for the collection of fine wood dust. For this reason alone, an early decision I made was to avoid 100mm duct and choose 150mm as standard. The difference is significant with the area of 150mm duct approaching three times that of 100mm. Of course 150mm ducting will not connect to the majority of standard hobbyist equipment which brings us to point three.

3. Modifying machinery to achieve greater airflow

Unfortunately, machinery manufacturers have for many years condemned woodworkers to ineffective dust extraction through the design and placement of dust ports. As such, choosing machines that provide for direct connection of 150mm ducting or more commonly modifying existing machinery will be necessary to achieve improved fine dust collection. Modifying professionally made machinery is a concept I personally struggle with. Nevertheless, with the types of inadequacy shown in some machinery the need becomes quite clear and there are considerations that extend beyond the physical upgrade of the port.

Just as important is ensuring there is adequate ventilation within the machine to support the airflow requirements of the larger port. Most of this can be learnt through trial and error, however, be prepared to dedicate time to this work if you are to improve the collection of fine dust at the source. **Photos 5–9** provide some examples of the type of modification required to deliver improved outcomes.

Clearly an article of this scope can only hope to introduce a number of the concepts specific to an effective dust extraction system. As a minimum, reflect on what was discussed in Point 1, i.e. ensure your current extractor vents outside the workshop and consider some form of forced ventilation to assist in the removal of fine airborne dust. Should these not be possible then of course ensure that you wear a properly fitted quality dual cartridge filtered respirator. These three things alone should significantly contribute to lowering your long term health risks. Beyond that, the unique nature of your own workshop and preferred methods of work will require a range of considerations and possible solutions outlined in points 2 and 3. The desire here is to create curiosity in whether your current extraction system is consistent with managing the health risks associated with your chosen methods of work.

In my case that curiosity was initiated on the discovery of the fine dust lining the walls adjacent to my previous extractor. Having made that discovery and subsequent investment in a number of the leanings shared here, I'm now appreciating a renewed enjoyment of woodworking through the long term health benefits that come from a more effective dust extraction system.

Photos 1–4: Troy McDonald

Photos 5–9: John McConnell

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

17 MAY–14 JULY

Synergy

Cross-discipline collaborations
JamFactory, Adelaide
www.jamfactory.com.au

7–9 JUNE

Timber Tools & Artisan Show

Rosehill Racecourse, Rosehill, NSW
www.timbertoolsartisan.com.au

14–16 JUNE

The Australian Woodturning Exhibition

Banquet Rooms, Kingston City Hall
985 Nepean Hwy, Moorabbin, Vic
www.awtex.com.au

13 JULY

Open Day & Craft Expo

Maryborough Woodturners and Woodcraftsmen Guild
Displays, demonstrations and sales
Maryborough Showgrounds, Qld
Trevor: 0427880015
www.mwmginc.squarespace.com

17–20 JULY

AWFS Fair

Woodworking equipment, technology, hardware, componentry, Fresh student competition
Las Vegas Convention Centre, USA
www.awfsfair.org

18–21 JULY

Australian International Furniture Fair

Retail displays and seminars, includes VIVID Design emerging makers
www.aiff.net.au

1–31 AUGUST

Craft Cubed Festival 2019

Exhibitions and public programs in Melbourne
www.craft.org.au/craft-cubed-2019

2–4 AUGUST

WA Wood Show & WA Craft Show

Includes Out of the Woods 2019 by Fine Woodwork Association (WA)
Claremont Showgrounds, Exhibition Centre, Claremont, WA
www.wawoodshow.com.au

8–11 AUGUST

Wood Dust Designer Maker

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FAB9 Makerspace
90 Maribyrnong St, Footscray, Vic
www.wooddustaustralia.com

23–25 AUGUST

Timber Tools & Artisan Show

Melbourne Showgrounds
Epson Rd, Ascot Vale, Vic
www.timbertoolsartisan.com.au

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

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 2019

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www.felder-group.com/au-en

22 OCTOBER–2 NOVEMBER

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26–27 OCTOBER

Spoon Jam weekend

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

26–27 OCTOBER

Annual Woodshow

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

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
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

Information and entry at:
www.woodreview.com.au/student-awards

12 DECEMBER–18 JANUARY

Graduate Exhibition

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Refinery Artspace, 3 Halifax Street
Nelson, New Zealand
www.cfw.co.nz

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13 JANUARY–21 FEBRUARY

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Nelson, New Zealand
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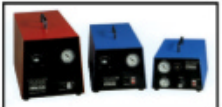
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An Overseas Investment

Travelling overseas to study is a considerable financial and personal commitment. An interview with Samuel Sheppard looks at the return.

Last year Sam Sheppard, 25 decided to put his career as a dentist on hold and travel to the UK to undertake a full-time course in fine furniture making at Waters & Acland. We asked Sam if it was all worthwhile.

AWR: Starting with the obvious question: why did you travel all the way to the UK to learn woodworking and furniture making?

SS: In my job I was constantly bombarded with the question, 'Why on earth would you want to be a dentist, why not do something else?' Perhaps this got to me, but ultimately I felt that it was time for a change. I was really impressed by Waters & Acland, and I have always wanted to spend time abroad, so it seemed like the right choice.

AWR: Your final self-designed piece is complex with all kinds of angles and

intersecting components. Did you have skills already? In brief, what's your background?

SS: I had always enjoyed tinkering in the shed, but my skills were limited to some pretty basic DIY projects. I did a fantastic Windsor chair course at Rundell & Rundell as a trial run before committing to the course, but I would say I was pretty much a beginner.

AWR: On a personal level, what's it like leaving your life behind to transplant yourself into an out of town location in a foreign country? Did you feel like you'd put yourself under pressure to return home with the goods, so to speak?

SS: It is an enormous challenge, and there are definitely times I felt homesick, but the experience has really broadened my horizons, and

I have had the opportunity to meet a lot of great people and explore beautiful places. I definitely felt the pressure to get as much out of the experience as possible, but I didn't really feel I owed that to anyone but myself.

AWR: What was the brief for your first self-designed piece? Did it have to incorporate certain elements or fit specific criteria?

SS: The brief was very open in terms of what piece of furniture we made, however it had to be primarily solid wood, and incorporate at least one traditional piston fit drawer.

AWR: Tell us about the inspiration for your design? What did the design process involve and how long did it take? Do you feel you have added your own personality and style?

SS: The design process we are taught starts with looking for inspiration from objects outside of the furniture realm, and I had seen a sculpture on my way here which formed the starting point for this project. It took around six weeks starting with collecting imagery, then breaking down and sketching details I liked in the sculptures. The next stage involved trying to put these elements together, and after a multitude of iterations and lots of tweaking this is what I arrived at. I definitely see myself in the piece, it's unconventional and playful, but (I hope) still a beautiful functional object.

AWR: *Not only was the design complex, but wenge is not the easiest to work with either. What were the main challenges encountered when making the piece?*

SS: Wenge certainly is a battle, a lot of sharpening and slow precise work is a must. The biggest challenge came from the interaction of the different elements, developing methods of cutting the compound angles that were created and jointing them with enough strength required a lot of testing and experimentation. There was also a lot of discussion involved in deciding on the glue-up order which often required multiple different elements to come together at once.

AWR: *What is the main focus of the course at Waters & Acland place that can take people to such a level in a seemingly little time? Is it their curriculum, the technical focus or some particular philosophy that really gets through to people on a deeper level?*

SS: There is a heavy focus on both sides of the designer/maker moniker here. Will and Olly control the design teaching with one on one discussions throughout the whole process, and constant pressure to go further, and refine designs.



Opposite: Sam Sheppard at the bench in the Waters & Acland workshop. Photo: Ben Butler

This page: Sam Sheppard's Jacobsen hall table in wenge and oak was inspired by work of Danish painter and sculptor Robert Jacobsen.



In the workshop we are taught by Graham and Tim who are incredibly patient and knowledgeable, with a wealth of cabinetmaking experience, which is important when they are presented with the often mind boggling designs that come out of the office. This environment means that all the students are focused on doing each project to the highest level they can, and so commit to a creating a small number of very high level pieces.

AWR: Are there any skills or methodologies that apply to both dentistry and woodworking? What are your plans for the future and will you be returning to dentistry?

SS: There are actually. Other than the obvious drill crossover, would you believe sometimes dentists actually use dovetails too? On a different scale a lot of the skills are very similar, but I do find that woodwork is a little less stressful for everyone involved. That being said I do miss working with and helping people when I am in the workshop, so I am hoping to try and strike up a balance between both careers when I finish here.

AWR: So what do you like most about woodworking and furniture making now?

SS: The opportunity to take an idea, and then from that create an object which is beautiful and will hopefully be used and cherished for a lifetime is hard to beat.

AWR: Just as an aside, why do you call yourself Hopmans Furniture ?

SS: It's because of my maternal grandfather, he was my father figure growing up and he sort of inspired my passion for working with my hands. So this is my way of honouring that, as Hopmans was his last name.

AWR: Do you have any advice for anyone thinking of taking the plunge and committing to a full time course, here or abroad?

SS: I would wholeheartedly say go for it! It might not be easy but if it is something you are truly passionate about then it will be more than rewarding enough to make it worth it.

Photos: Oliver Waters

Waters & Acland is a furniture making business and fine woodworking school run by Oliver Waters and Will Acland that is situated in the English Lakes District national park in England. Learn more at <https://www.watersandacland.co.uk/>

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Above: With its many angles and intersecting components, gluing up the Jacobsen hall table was complex and had to be done in stages.

Right: Sam's maple *Bubble Box* wall cabinet with rounded dovetailed carcass was made almost entirely with hand tools.

Below: *Monti* bedside cabinets, sycamore and oak. The design of the drawer fronts was inspired by imagery of draped silk cloth on marble sculptures.



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