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Welcome



With body language screened off, the Editor relies on verbal communication alone

Talk is cheap. We've all heard it said, and certainly, if it's being offered in lieu of actual work, reward or something tangible, then yes, it certainly is of little value. But what is talk really worth? Clearly it depends on context. When you're trying to express yourself or you want to communicate some instruction on another, then it soon becomes clear that, as a resource, it's a pretty important one.

On its own, talk has the potential to get it wrong, as I'm sure we all know. How many times, as we stand amongst the smoking debris, have we thought that we'd made ourselves clear only to find, looking back, that assumptions had been made and now it's all looking like another expensive lesson. And if the price *was* only money, then it would be a lot easier to bear than more important things like people's feelings and broken friendships. Certainly for work-related communication there are fewer emotional expectations and we can be blunt and to the point with little worry; the job is the most important thing here and we all want to get it right. But unlike the interaction we have with friends and family, here at work we can (literally) draw on pictures and other visual aids to get our meanings across.

Successful communication is such an important part of a job that, with no history or familiarity between the parties concerned, any failings of making ourselves understood will invariably lead a project off the rails and into trouble. So what can we do? Certainly it helps if you know the parties concerned, but whether or not you do, frequent contact is essential, and any inclinations to make a decision on someone else's behalf should be strictly curtailed. Make that call and ask, you'll be surprised at the extra stuff you learn too.

With all the digital comms at our fingertips these days, communication has never been easier, so it's down to all of us to make the most of it and communicate as much as possible, both in our professional work lives but, perhaps more importantly, in our personal lives, too. Far from cheap, talk is worth inestimably more than we might realise.

Mark

You can contact Mark on editor.ww@mytimemedia.com



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March 2017

Published by **MyTime Media Ltd**
Suite 25, Eden House, Enterprise Way,
Edenbridge, Kent TN8 6HF

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mytime media
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The Woodworker & Woodturner, ISSN 1752-3524, is published monthly with an additional issue in summer by MYTIME MEDIA Ltd, Enterprise House, Enterprise Way, Edenbridge, Kent TN8 6HF, UK.

The US annual subscription price is 59GBP (equivalent to approximately 98USD). Airfreight and mailing in the USA by agent named Worldnet Shipping Inc., 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA.

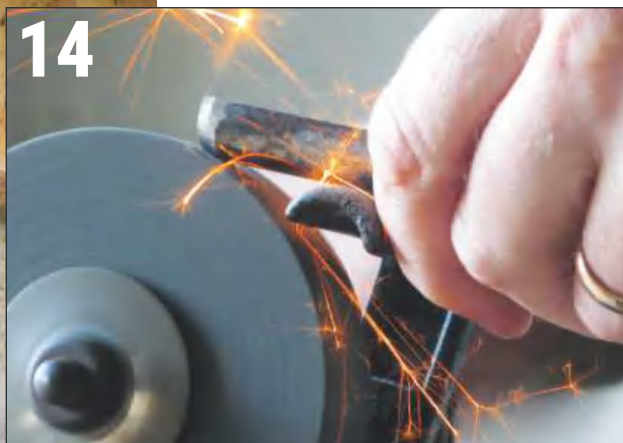
Periodicals postage paid at Jamaica NY 11431. US Postmaster: Send address changes to The Woodworker & Woodturner, Worldnet Shipping Inc., 156-15, 146th Avenue, 2nd Floor, Jamaica, NY 11434, USA.

Subscription records are maintained at dsb.net 3 Queensbridge, The Lakes, Northampton, NN4 7BF. Air Business Ltd is acting as our mailing agent



Paper supplied from wood grown in forests managed in a sustainable way.

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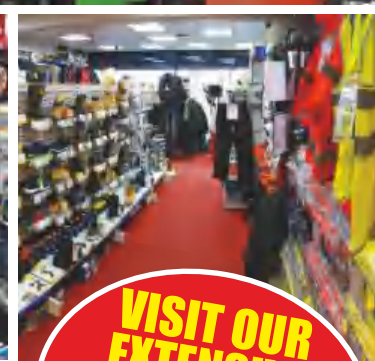
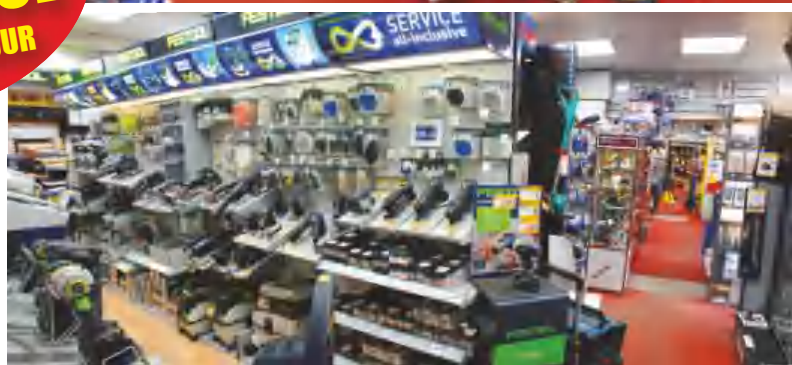
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In brief...

ANY OTHER BUSINESS

There's a lot to be said for efficient (and safe) working practices, and often it's not until you make a change that you notice an improvement. There have been a few welcome changes at *The Woodworker* workshop of late, and I've been pleasantly surprised to see just how beneficial they are proving to be.

Swift adaptability to change has long been a human characteristic, and has helped see us all through difficult times from the word dot, but it can be something of a disadvantage to people like me (and possibly you too). In a situation where you might be settling in to a new workshop, say, it can take only a day or two to become accustomed to a new setup. And although this new setup or working practice may be far from perfect, before you know

it you're using it every day and are soon entirely comfortable with it.

It's not until you make an enhancement or two that it dawns upon you that the old familiar working practice you've been putting up with for ages is actually hugely inferior to the new one. So it has been with me; now that I've invested in some new organising equipment and built a new tool rack or two, my eyes have been opened to a brave new world of efficiency.

Finally, I'm experiencing the ease and speed of a fully organised workshop (well, almost fully), and I'm kicking myself that I didn't make the changes long ago. Still, it's better late than never, so my advice would be to start your planning straight away and get efficient now.

Mark



SAW LIKE NEVER BEFORE

Festool is launching the NEW Kapex KS 60 – a mobile, compact and flexible sliding compound mitre saw, which is available from mid-February. With ergonomically placed carrying handles, a practical cord holder and a transport safety device, the new KS 60 is the perfect tool for assembly work. These benefits are combined with an extremely compact design and lightweight handling.

Thanks to the mitre angle of up to 60° on both sides and an inclination angle of up to 47° on the left and 46° on the right, the compact sliding compound mitre saw also enables excellent cutting with maximal precision and

versatility in mobile use. The saw slides forwards and backwards on the two column guides, but the columns do not extend backwards during this process. This saves space – particularly in small working areas.

The new Kapex KS 60 offers numerous other clever details. These include an LED spotlight, which projects the shadow cast by the saw blade onto the point that is to be sawed on the workpiece, precisely highlighting cutting lines without distortion. Even long workpieces pose no problem for the KS 60: these can be easily positioned and cut on the integrated pull-out extension table. With the additional feet, the KS 60 can be raised to the height of a Systainer (size: SYS 1), therefore allowing this to be used as the support surface.

The speed can be quickly adjusted to the material that is being processed, which will remain constant during the sawing process. The angle finder enables all of the interior and exterior angles to be precisely gauged and directly transferred 1:1 to the saw's angle setting, and thereby adjusted to the bisecting line. The spindle stop is also practical and can be used to change saw blades in an instant.

Various versions of the new Kapex KS 60 will be available soon; more information is available at www.festool.co.uk/kapex.

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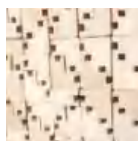
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MANUFACTURER: Festool

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When sparks fly

The spring equinox finds Robin Gates at the grinding wheel, restoring bevels with a honing guide, and applying a village carpenter's remedy to a damaged digit

To a serial deserter of New Year's resolutions like me the spring equinox (20 March) offers a second chance to put good intentions into action. The day is now some three and a half hours longer than in the depths of winter, and the extra light filtering through shed windows really stirs the instinct to get organised. The question is, what to do first?

In the shed I know I'll find rummaged timber leaning in all directions, and tools hibernating dangerously in the shavings, abandoned in my haste to get indoors when the days were short and bitter. To attempt a new beginning without sorting out this mess would be to invite disaster to the simplest task. I couldn't cross-cut a toothpick on the bench without triggering an avalanche.

But having safely stowed, stabilised and made space, nothing sets me up better for the coming year than a spell of spring sharpening.

Philosopher's stones

What is it about sharpening that turns woodworkers into philosophers? Perhaps the answer lies in the stones. Indeed, the moment the steel kisses the dark oily surface a little Socrates surfaces inside me to fill the vacuum of silence with dubious wisdom. It's a good thing sharpening is a solitary activity.

My sharpening routine is based around an assortment of old stones acquired more by accident than planning, yet it works – and how could it not work? Whetting the edge of a metal tool on a stone has been standard practice since the iron age, tried and tested by generations of woodworkers.

At the hub of my sharpening kit is a vintage hand-cranked grinding wheel. Its coarse carborundum stone is particularly useful for restoring bevels that have gone astray or taking damaged edges back to sound steel. As an example of what the wheel can do, I used it to restore an elderly



1 The damaged gouge before grinding



2 A test of eye and hand coordination



3 Next, the damaged end was ground back to a thick edge



4 Shaping the bevel by pitching and rolling the blade

cast steel gouge, which had been badly chipped. I'd delayed the job because I didn't know how the gentle convex of the original shallow bevel could be recreated on a wheel that grinds a hollow, but threw caution to the wind and decided to experiment.

Presenting the blade in line with the wheel's radius, the first somewhat drastic step was to grind back the damage to a thick, straight edge (**photo 3**). Proceeding to rock the gouge smoothly up and down and tip it side-to-side on the apex of the wheel, I was relieved to find an approximate if coarsely striated convex bevel taking shape (**photo 5**).

From there I moved to medium and fine oil stones (**photo 6**), using a rolling, meandering motion to smooth away the corrugations left by the grinder. Finally, I tilted the edge a few degrees steeper on a very fine natural stone and honed a secondary bevel (**photo 7**).





The result wouldn't win a beauty competition but within half an hour of putting this gouge to the grinding wheel, I was carving perfectly acceptable dimples in a piece of wild cherry (**photo 8**). All it needed now was a polish.

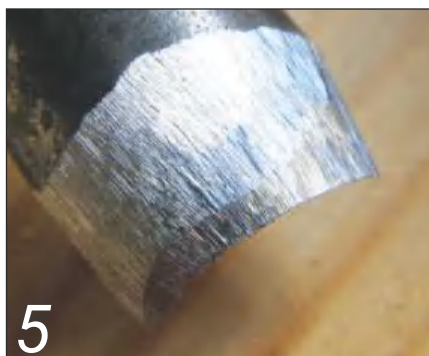
Nostalgic turn

The rhythmic whine of the old grinding wheel takes me back to my Dad's workshop in the 1960s, where I stood marvelling at its showers of orange sparks fizzing in the shadows. There's as much nostalgia as logic in me choosing a hand-cranked grinding wheel over a powered version, not to mention a measure of that make-do-and-mend attitude familiar to anyone who grew up hearing stories of domestic life in World War II. But as a hobbyist with relatively few edges to grind, I can afford to indulge in sentiment, taking the extra minutes to do the job by hand with a tool whose movement – albeit geared up – reflects my own.

This grinder is a Black Knight A-70 from the Carborundum Company of Niagara Falls, USA, bearing a patent date suggesting it was made some time after 1911. The Carborundum Company is interesting for being founded by the chemist Edward Acheson who earlier in his career worked with Thomas Edison on the development of the incandescent light bulb. It was

Acheson who coined the name 'carborundum' for silicon carbide, the first man-made abrasive, after patenting its manufacture by fusing clay and carbon in an electric furnace.

In good old-fashioned mechanical terms, the hand-cranked grinder is up there with the lever-operated bicycle bell and the clockwork railway engine. When I got this



Striations from the coarse wheel



Smoothing the new bevel by working on an oil stone



7 After honing a secondary bevel on a finer stone

one home I couldn't wait to dismantle it and investigate (photo 9). First I removed the carborundum wheel by gripping it with a rag and loosening the securing nut. The wheel is clamped to its axle by a pair of dished washers and the axle itself is driven by a large bronze gear wheel directly connected to the crank. The gear teeth on the big wheel are skewed, which is perhaps why the grinder runs so smoothly (photo 10). A modicum of oil applied to the lubrication ports guards against unnecessary wear.

The only problem was with the wheel itself, which had been worn to a bevel, but down the years I've almost levelled it by biasing grinding towards the higher side.

Steel to the wheel

Putting the thing back together reminded me of the solidly-built Meccano sets of old, but the real fun was still to come – putting the steel to the wheel and seeing sparks fly.

There's a short learning curve to using a hand-cranked grinder since it calls for multi-tasking and a degree of eye and hand coordination, which might be familiar to anyone who rides a monocycle while juggling. You've got to crank the wheel at a steady speed with one hand while manoeuvring the tool with the other. The power hand only has to keep turning but the grinding hand can be pitching and rolling like a boat in a seaway if the tool is a gouge or a hook knife.

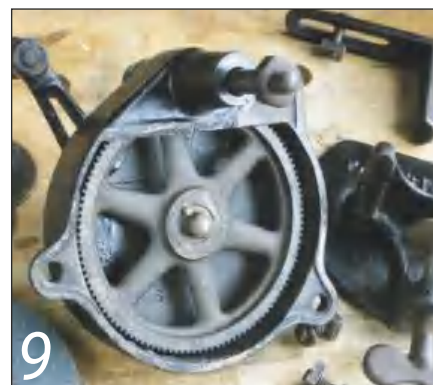
Grinding a bench chisel or plane iron is easier, although putting a wide blade to a narrow wheel does require it to slide smoothly sideways on the toolrest so the whole width of the blade traverses the wheel (photo 12). For this I place my forefinger parallel with the rest, with a drop of oil on my finger to help it slide (photo 13). Factor into this the need to bias grinding towards the high side of an unevenly worn wheel and you'll understand why my first attempts were an utter shambles. Like riding a bike, though, you need to fall



8 Testing the restored gouge on wild cherry

off a few times and get back on to find your confidence. At my normal turning speed, I was surprised at how fast the wheel spins. Cranked at about one revolution per second, the grinding wheel geared up around 11.5 times is moving at some 690rpm, which is approximately one quarter the speed of a powered grinder (photo 14).

Some suggest dipping the blade in water to prevent the steel over-heating and losing its temper but you would have to grind long and hard for this to be a problem. In practice, I find myself stopping



9 The Black Knight grinder dismantled

every few seconds to monitor progress, because it's all too easy to grind too far while enjoying the fireworks. The blade acts as its own heat sink and barely warms up.

Recently I've been re-grinding my bevel edge bench chisels on the wheel to correct edges that have gone awry down the years, and also a block plane iron as the last step of fettling after flattening the sole (photo 17). A noticeable characteristic of the grinding wheel is the hollow bevel it imparts to the blade (photo 18), and I wonder what the pros and cons of this are. Removing steel in this area must make the tool weaker, but



10 The skewed gear teeth mesh smoothly with the axle



12 One hand for the chisel and one for turning while grinding a 25mm chisel



11 Distinctive maker's plate of the Black Knight A-70



13 Finger positions while grinding



15 The 25mm chisel is mounted in the guide's lower position

also quicker to hone as the secondary bevel moves up the blade with subsequent sharpenings. In any case, the blades have been performing well enough for me, with the block plane (photo 19) now taking a 0.05mm shaving (photo 20).

Hone alone

Honing alone for any length of time calls to mind Thomas Hardy's description of copse-work in *The Woodlanders*, 'an occupation which the secondary intelligence of the hands and arms could carry on without requiring the sovereign attention of the head'. Lulled by the reciprocating motion of the blade and the whiff of warming oil, I find myself



14 690rpm at one crank per second

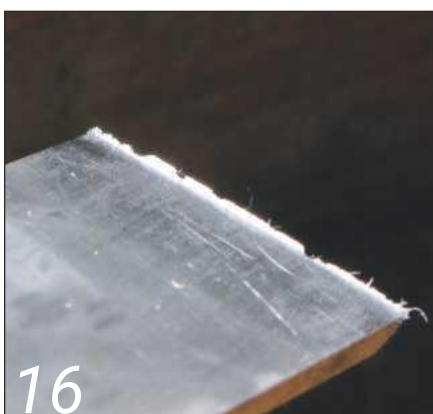
in a rose-tinted pre-industrial paradise and my mind wanders pleasantly.

The stones I use are as much a co-ordinated set as a bunch of Liquorice Allsorts: some coarse and medium carborundum stones in odd sizes, and a couple of fine stones, which really are of natural stone. What these equate to in particle sizes is a mystery but to the naked eye they range from something like soft dark brown sugar to wholemeal flour. I also have a 20-year-old Tilgear diamond-impregnated plate and for sheer convenience this is the best of the bunch, requiring no lubricant and never clogging.

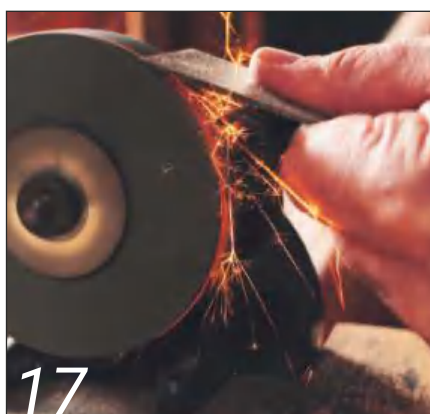
In any case, the limiting factor to my honing isn't the tools so much as my

technique, which has been sadly lacking. Honing is all about angles, and after developing what I thought had been a good eye for the standard angles of 25° for the primary bevel and 30° for the secondary (photo 21), a recent examination of edges proved otherwise. My bevels have been sloping off in all directions.

But does this really matter, I ask myself. With regard to the quality of my work perhaps not, and yet with regard to the efficiency and longevity of the tool, I think it does matter. A shallow bevel is weak, quick to blunt in hardwood and more prone to damage, while a bevel that's too steep and requiring more force to cut is on its way to becoming a splitter.



16 A wire edge developed on the oil stone



17 Back to the wheel for a block plane blade



18 Hollow bevel developed on the grinding wheel



19

Back to work, the plane takes a shaving from ash that is...



21

The hollow-ground primary bevel and 30° secondary bevel



23

Setting the projection for the plane iron in the Eclipse 36



20

... as thin as bible paper

Some old hands frown on honing guides, and with good reason because if you hone little and often a guide is slow to set up and cumbersome in use – it's more efficient to be working freehand. But if, like me, the virtual protractor in your fingertips is prone to error, I'd recommend rolling out the honing guide from time to time as a means of restoring a bevel before a visit to the grinding wheel becomes necessary.



22

Freshly honed and paring a twisting bevel in end-grain



24

Fingers maintain even pressure while honing

Stellar Eclipse

My honing guide is the absolutely stellar Eclipse 36, some 50 years old yet designed and made so well that it could pass for new (photo 23). Essentially it's a pair of stepped jaws connected by a screw with opposing threads, so that by turning the screw clockwise the jaws are drawn inwards and turning anti-clockwise moves them apart. A hardened steel roller turns around the centre of the screw. The top position in the jaws is for plane irons, the lower position is for chisels, and to compensate for the difference in height a plane iron is set to project further than a chisel by a distance indicated on the tool.

It's a little masterpiece of engineering and excellent value too – easily found for about £5 – but beware of imitations, as they say, because I've seen some inferior clones that wouldn't pass muster as toys for Kinder eggs.

As an alternative to the honing guide, when working freehand, I find that a sliding bevel set up nearby provides a good cue to the appropriate angle.



25

Light catches the 30° secondary bevel



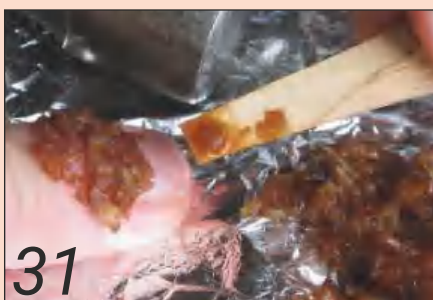
The slightly damaged digit

Carpenter's remedy

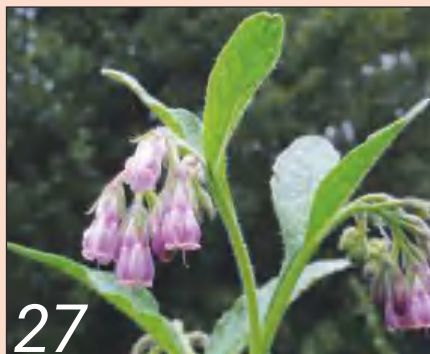
A consequence of using extra force to continue working with a blunt blade is that the tool is likely to slip out of control. This is what happened when I pushed on with a wooden jack plane, which had lost its edge. The plane skated over the wood and my little finger caught between it and the wall got squashed (**photo 26**). But never mind, I thought, because here was a convenient injury for testing out the traditional comfrey root plaster – a wholly organic form of first aid. I'd read about it in *The Village Carpenter*, Walter Rose's wonderful first-hand account of village carpentry in the late Victorian period. As a youngster turning skittles on a lathe he'd slipped and ground the skin off four fingers. His brother was sent to dig some comfrey root, which his aunt then made into a paste and applied to the wounds where it 'adhered like glue'



Peeling the root's dark covering



Applying the paste



Common comfrey has creamy-purple flowers and spear-shaped leaves

and remained until healing was complete. Rose went on to say that his father kept comfrey growing outside the workshop specifically for its 'double virtue of both sealing and healing a wound'.

To Latin scholars common comfrey's scientific name *Symphytum officinale* reveals its long use in medicine, with the *officinale* indicating it was sold by apothecaries, but I like its more evocative down-to-earth names of bruise-wort, bone-set and knitbone.

It's a roughly hairy perennial growing about chest-high, with large spear-shaped leaves and bell-shaped flowers, some cream, some purple, found almost anywhere that's damp (**photo 27**).

The leaves make compresses and infusions for treating aches and bruises but it's the root that makes the plaster (**photo 28**). Taking Walter Rose as my guide I dug a comfrey root, washed it, cut away the



The white tissue is sliced and then pulverised



Comfrey root sets like plaster to protect the wound



Comfrey roots are rich in soothing mucilage and healing allantoin

dark outer layer then sliced and diced the white tissue inside. It was made more workable by adding a little water, sandwiching between foil then pulverising with a hammer to achieve the consistency of sandwich pickle (**photo 30**). Now I could apply it directly to the wound, using a thorn wood spatula cut for the purpose.

Comfrey root, packed with soothing mucilage, works initially by reducing inflammation and then it sets like plaster (**photo 32**), covering the area affected like a natural scab. The actively healing chemical is allantoin, which otherwise works in the plant as a carrier for nitrogen used in protein synthesis.

Impatient to investigate progress I soaked off the first application after a day and, finding healing going well, applied another. That too was soaked off a day later, leaving the skin to continue healing uncovered. It was a rather underwhelming wound, but I'm sure the dollop of comfrey root worked at least as well as the usual squeeze of ointment and strip of Elastoplast (**photo 33**).

The only caveat was having to retire temporarily from washing up duties because the comfrey would disintegrate in water. But hey-ho, it's all in the cause of science. [www](http://www.getwoodworking.com)



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In your own write...

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MUSICAL KNOWLEDGE

Hi Mark,

I read with interest the archive article on making a xylophone (see WW Feb) – I wonder how many people actually made a successful instrument based on this article? The instrument as depicted in Fig.1 would be unplayable in any practical sense due to the irregular spacing of the 'natural' notes.

It would be OK as a toy, but not as a serious

instrument, as a percussionist expects to have the natural notes (the scale of C major) to be regularly spaced – just like they are on a piano keyboard.

In your commentary on the article, you write "no doubt we're all familiar with the standard metal-keyed xylophone...". I suspect that you are thinking of the glockenspiel, metallophone, or vibraphone, but there is no such thing as a metal-keyed xylophone; the word 'xylophone' is derived from two Greek words – xylon (wood) and phone (sound or voice) – so the xylophone is, by definition, the sound of wood.

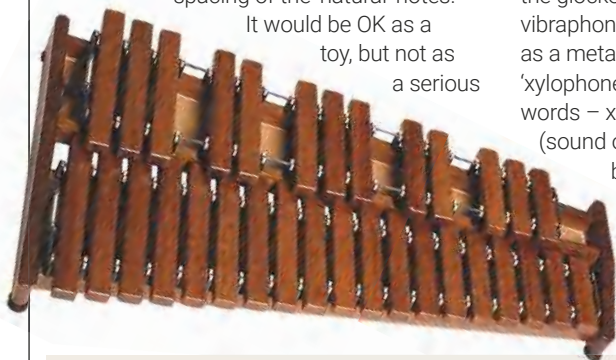
Finally, tuning musical instruments has become much simpler since the

advent of the smartphone. The article talks about finding a friend with a piano and musical ear, but there are many downloadable apps such as 'G-Strings' that turn your phone into a very accurate pitch meter, which makes tuning a doddle.

I would love to see more musical instrument articles in *The Woodworker* – even, perhaps, a better xylophone project. Regards, **Paul**

Thanks for that, Paul – very informative, especially the note spacing issue. I had a feeling I might have got my musical nomenclature mixed up with xylophone and will be studying pictures of the letter 'X' in children's illustrated alphabets a lot more closely now.

Mark



A 2.5 octave table-top xylophone – made entirely of wood

ROCKING HORSE PROJECTS

Hi Mark,

Thanks for another interesting issue of WW. Although I am primarily interested in woodturning, I find the diversity of projects in the magazine both informative and stimulating.

With regards to rocking horse plans, I am a bit surprised that you didn't point Tony in the direction of the Rocking Horse Shop – a regular advertiser in WW – who supply plans, instructions and kits/materials to make your own. They also regularly run courses where you can have guidance in the manufacture of a horse of your choice. (It was one of the instructors who tutored the course I attended at the Axminster Skill Centre.)

Best wishes, **Philip Hamilton**

Yes, you're right about the Rocking Horse Shop tip, Philip – that's been pointed out to me a few times now. It was as much for my benefit to find The Woodworker article, but I think I might have to put that archive search aside for a while. In the meantime, I will be passing on the contacts for this very popular shop. **Mark**



Philip's mini horse in birch ply

Hi Mark,

In response to your request for photographs of rocking horses, here's one that I completed recently. Like Tony, I believe my inspiration came from an article in *The Woodworker* many years ago. The horse has stood around incomplete in my workshop for about 25 years until I was re-inspired in September of last year. The leather tack and accessories were purchased from the Rocking Horse Shop in Fangfoss, York, who will also provide plans.

Alan Reynolds

Thanks for that one, Alan, and it looks like it was worth the wait! **Mark**



Alan's rocking horse – a late finisher in the rocking horse derby

GET IN TOUCH!

Don't forget, we're always keen to see your photos, so please don't hesitate to send them in if you've snapped something of interest recently. Email me at the new address: editor.ww@mytimemedia.com

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2704X

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No load speed	4,800rpm	
Input	1650w	
Net weight	34.9kg	

Cutting angle	Depth	90°
93mm		
45°	64mm	
Angle settings	-0.5° to 45.5°	

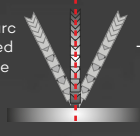


2704X

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Centre Blade Position

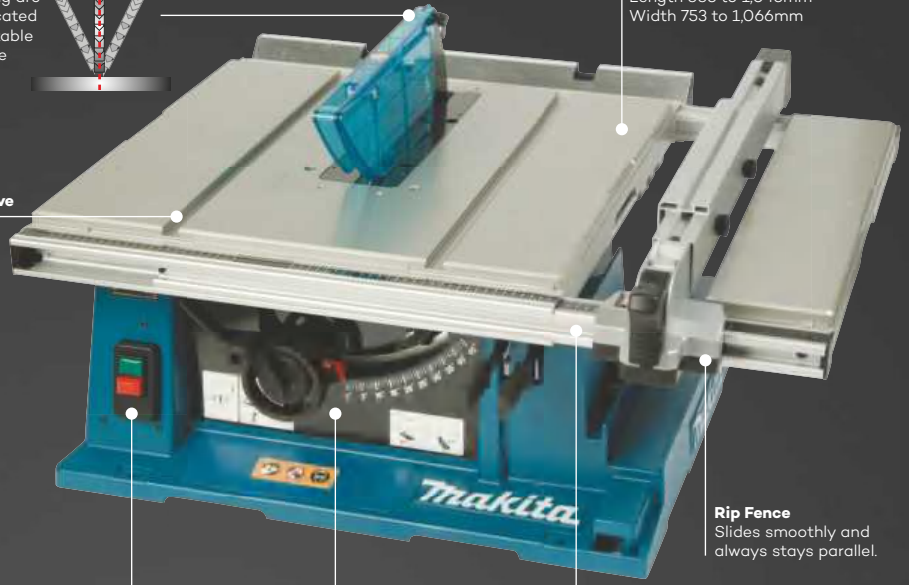
The centre of the swing arc of the saw blade is located at the surface of the table so that the cutting line is always at the same position for any angle.



3/8" x 3/4"
T-formed Groove

Table Size

Length 665 to 1,045mm
Width 753 to 1,066mm



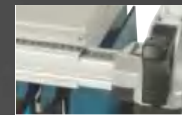
Rip Fence
Slides smoothly and always stays parallel.



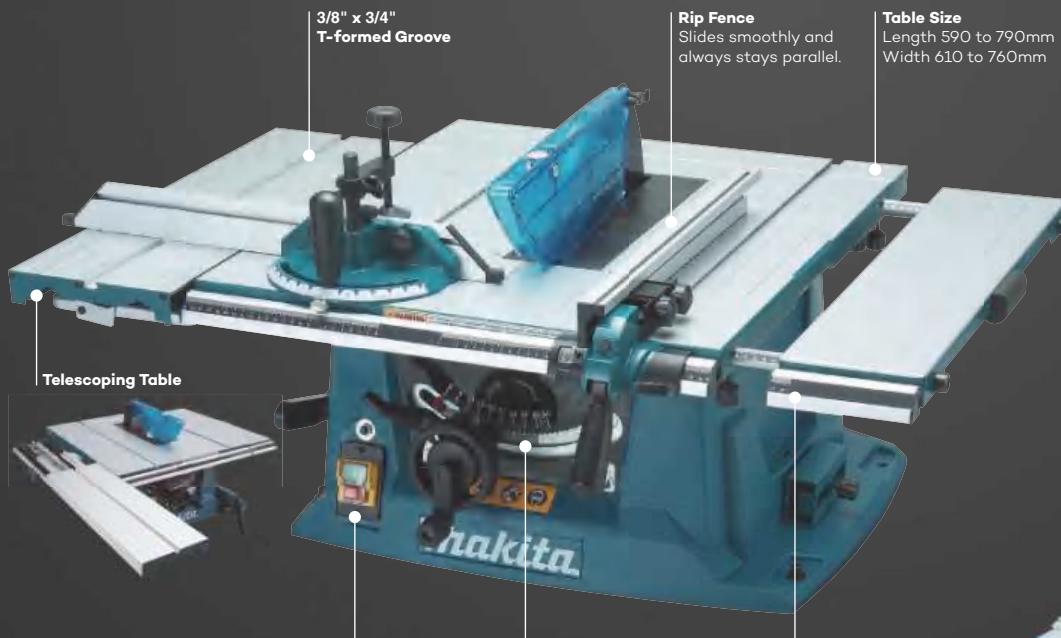
Power Switch
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Easy to Read Scale



Telescoping Guide Rail

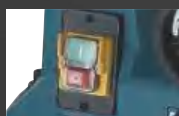


3/8" x 3/4"
T-formed Groove

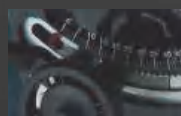
Rip Fence
Slides smoothly and always stays parallel.

Table Size
Length 590 to 790mm
Width 610 to 760mm

Telescoping Table



Power Switch
Electronic soft start and anti restart function



Easy to Read Scale



Telescoping Table

Table Saw

MTL100

MTL100X

Blade diameter	260mm	
Bore diameter	30mm	
Size	W	L
Main table	610mm	590mm
With sub table	760mm	790mm
No load speed	4500rpm	
Input wattage	1500w	
Net weight	34.1kg	

Cutting angle	Depth
90°	93mm
45°	64mm
Angle settings	0-45°



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- 1500W motor
- 0-60° mitre gauge
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Portable vacuum extractor for keeping work areas clean & free from dust particles, shavings, etc

- Quick release lid
- Air flow 183m³/hr
- 1100W input power
- Inc. filter cartridge
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- 4 dust bags

50 LITRE CAPACITY

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CROS3 450W RANDOM ORBITAL SANDER

NEW

- Adjustable front handle improves control
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Variable belt speed

Tilting head

Black & Decker

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PSR18

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MODEL	MOTOR	BATTS	EXC.VAT	INC.VAT
CCD180	18V	1	£39.98	£47.98
CCD240	24V	1	£47.99	£57.99
Bosch PSR18	18V	1	£54.99	£65.99
CON18NI	18V	2 x Ni-Cd	£69.98	£83.98
CON18LI	18V	2 x Li-Ion	£89.98	£107.98

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Record IV75B Clamped 180/205/78 £26.99 £32.39

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CON185

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MODEL	MOTOR	MAX CUT	EXC.VAT	INC.VAT
CCS185B	1200W	65/44	£39.98	£47.98
CON185*	1600W	60/40	£59.98	£71.98
CCS2	1300W	60/45	£59.98	£71.98

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CVAC20SS*	1400W	16/12ltr	£59.98	£71.98
CVAC20PP2	1400W	16/12ltr	£62.99	£76.99
CVAC25SS*	1400W	19/17ltr	£67.99	£81.99
CVAC30SSR	1400W	24/21ltr	£97.99	£117.99

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6" BELT/9" DISC SANDER

Includes stand

1 HP/ 230V/ 1ph motor

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1" BELT/5" DISC SANDER

Includes 2 tables that tilt & lock

Quality induction 300W motor

CBS1-5

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Includes two tables

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900W

No load disc speed: 1490rpm

305mm Disc Dia.

(1 x 60 grit sanding disc included)

Dust extraction port

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Max thickness cap. 125mm and 250mm wide

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8000rpm no-load speed

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78mm max. depth of cut

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Ideal for DIY & Hobby use

Dual purpose, for both finishing & sizing of timber

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INC.VAT

MODEL	PLANING WIDTH	MAX THICK. CAPACITY	EXC.VAT	INC.VAT
CPT600	6"	120mm	£184.99	£221.99
CPT800	8"	120mm	£209.98	£251.98
CPT1000	10"	120mm	£289.00	£346.80

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TC-SM2112	210/30	55/120mm	£57.99	£69.59
Einhell	210/30	55/120mm	£57.99	£69.59
TC-SM2131	210/30	62/130mm	£119.98	£143.98
Einhell	250/30	75/340mm	£159.98	£191.98
SM2534	250/30	75/340mm	£159.98	£191.98

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DEVIL 6003

BEST SELLER

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DEVIL 7003

MODEL	VOLTAGE	HEAT OUTPUT KW	EXC. VAT	INC. VAT
DEVIL 6003	230V	1.5-3	£49.98	£59.98
DEVIL 7003	230V	3	£59.98	£71.98
DEVIL 6005	400V	2.5-5	£74.99	£89.99
DEVIL 7005	400V	5	£84.99	£101.99
DEVIL 6009	400V	4.5-9	£119.00	£141.80
DEVIL 7009	400V	9	£139.98	£167.98
DEVIL 6015	400V	5-10-15	£179.00	£214.80
DEVIL 7015	400V	15	£199.98	£239.98
DEVIL 6025	400V	22	£289.00	£346.80
DEVIL 7025	400V	22	£319.00	£382.80
DEVIL 7030	400V	30	£359.00	£430.80

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Offering low cost, efficient heating

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MODEL	MAX OUTPUT KW	EXC. VAT	NOW
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Little Devil SSII	10.3	£84.99	£101.99
Devil 700	15	£94.99	£113.99
Devil 900	24.9	£139.98	£167.98
Devil 860SS	31	£149.98	£179.98
Devil 1600	36.6	£169.98	£203.98
Devil 2100	49.8	£259.00	£310.80

Clarke QUARTZ HALOGEN INFRA-RED HEATER

• 3KW instant, clean odour free heat.

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DEVIL 370SP

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CDP152B

• Range of precision bench & floor presses for enthusiast, engineering & industrial applications

NEW RANGE

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B = Bench mounted F = Floor standing

MODEL	SPEEDS	EXC. VAT	INC. VAT
CDP35B	350/5	£66.99	£80.99
CDP102B	350/5	£79.98	£96.98
CDP152B	450/12	£134.99	£161.99
CDP202B	450/16	£179.98	£215.98
CDP10B	370/12	£194.99	£233.99
CDP352F	550/16	£219.00	£262.80
CDP502F	1100/12	£249.00	£298.80

Clarke MORTISING MACHINE
CBM1B

• Accurately creates deep square recesses
• Table size 150 x 340mm • Max. stroke 76mm
• Robust cast iron base & column ensures stability & accuracy
• 95mm depth of cut

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Clarke CONTRACTOR JIGSAWS
CON750

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• DIY Professional

MODEL	POWER (W)	DEPTH OF CUT (WOOD/STEEL)	EXC. VAT	INC. VAT
Clarke CJS380*	420W	55/6mm	£14.99	£17.99
Clarke CON750#	750W	80/10mm	£27.99	£33.99
Bosch PST700E*	500W	70/4mm	£44.99	£53.99

Clarke MULTI FUNCTION TOOL WITH ACCESSORY KIT
CMFT250

• Great for sawing, cutting, sanding, polishing, chiselling & much more • 250W motor
• Variable speed

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Clarke 13" MINI WOOD LATHE
CWL325V

• Ideal for enthusiasts/hobbyists with small workshops
• 325mm distance between centres • 200mm max. turning capacity (dia) • 0.2HP motor

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Clarke MITRESAW STAND
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• Suitable for most sizes/makes of saw
• Inc. outriggers & rollers

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Clarke DETAIL SANDERS
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• Perfect for smooth and fine finishing along with hard to reach areas or curved surfaces

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ALL MODELS INC. SANDING SHEETS

MODEL	WATTS	EXC. VAT	INC. VAT
PS105	105W	£19.98	£23.98
RT-0513	130W	£22.99	£27.99
CDS-1V	280W	£28.99	£34.79

Clarke SCROLL SAWS
CSS16VB

NEW

• 50mm max cut thickness
• Air-blower removes dust from cutting area
• Table tilts 0-45°

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MODEL	MOTOR	SPEED RPM	EXC. VAT	INC. VAT
CSS400B	85W	1450	£79.98	£95.98
CSS16VB	90W	550-1600	£89.98	£107.98
CSS400C	90W	550-1600	£109.98	£131.98

Clarke 12" DOVETAIL JIG
CDTJ12

• Simple, easy to set up & use for producing a variety of joints • Cuts work pieces with a thickness of 8-32mm • Includes a 1/2" comb template guide & holes for bench mounting

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Clarke PROFESSIONAL BANDSAWS
CBS300

Top Quality Bandsaws - ideal for professional workshop use. Strong steel body with solid cast iron table

- Table tilts 45° • Adjustable blade guide
- Supplied with stand, 4TPI wood cutting blade, rip fence, mitre guide, mitre gauge and push stick • Induction motors
- Includes stand

MODELS ALSO FEATURE:

- MULTI-STEP DUST EXTRACTION OUTLET
- FLEXIBLE LED WORKLIGHT
- REMOVABLE DUST TRAY
- BLADE TENSIONING CONTROL

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MODEL	THROAT DEPTH	MAX CUT 90°	MAX CUT 45°	EXC. VAT	INC. VAT
CBS300	305mm/12"	165mm	115mm	£389.00	£466.80
CBS350	340mm/14"	225mm	160mm	£479.00	£574.80

Clarke ROUTER TABLE
CRT-1

Router not included

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Clarke CONTRACTOR ROUTERS
CR2

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CR2 INCLUDES 15 PIECE KIT WORTH OVER £20

MODEL	MOTOR (W)	PLUNGE (mm)	EXC. VAT	INC. VAT
CR1C*	1200	0-50	£44.99	£53.99
Bosch	1400	0-55	£79.98	£95.98
POF1400ACE				
CR2	2100	0-60	£119.98	£143.98

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• Stands come complete with bolt mountings and feet anchor holes

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CBG6SH	HD	150mm	£54.99	£65.99
CBG6SB*	PRO	150mm	£54.99	£65.99
CBG6RWC	HD	150mm	£59.98	£71.98
CBG6W* (wet)	HD	150/200mm	£56.99	£68.39

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WOODWORKING IN ACTION 16th & 17th September 2017

Cressing Temple Barns, near Braintree, Essex CM77 8PD

The European Woodworking Show is an amazing showcase of craftsmen and women from around the world. Set in the beautiful grounds of Cressing Temple Barns in Essex.

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In brief...

MIDLANDS SHOW IS ALMOST HERE!

This year's Midlands Woodworking & Power Tool Show will be taking place at the Newark Showground, Nottingham from 24–25 March. 2017 marks the show's four

year anniversary and promises to be bigger and better than previous years. See the official website – www.nelton.co.uk – for the full list of demonstrators, trade stands and to pick up advance tickets.

NEW ACCESSORIES FOR YOUR TORMEK

The Tormek RB-180 Rotating Base and RM-533 Rubber Mat have teamed up to become one kit, enabling users to carry out the easiest and cleanest sharpening with any Tormek sharpening system. The base enables you to rotate the machine easily through 180° and lock it with complete stability. This makes it effortless to alternate between sharpening and honing or sharpening towards or away from the edge.

The rubber mat gives you a waterproof,



non-slip surface and the raised rim, which measures 533 x 343mm, will retain any water spillage.

Priced at £49.96 inc VAT, the kit is almost half the price of the two items (if purchased separately). To find out more, see www.brimarc.com.

WINDSOR-CHAIRMAKING COURSES

Greenwood Days is offering five chairmaking courses during 2017, each lasting seven days. On the course you will create a Windsor chair using mostly traditional hand tools. Starting with freshly felled timber, you'll shape most parts of your chair while the wood is green and soft using an axe, drawknife and spokeshave and turn parts on the traditional pole-lathe. The course covers wood selection for steam-bending, cleaving smaller/longer pieces and bending the wood in two planes, and you'll use a selection of adze, scorp, travisher and scraper to shape the classic Windsor saddled seat. The courses are suitable for all, from complete beginners to experienced woodworkers. Beginners have the choice of a simple side chair or a continuous armchair with its more complex steam-bend. More experienced or returning students have a choice of chairs they can make. Whatever your experience, you'll finish and proudly take home an elegant Windsor chair of your very own.

Peter Wood set up Greenwood Days nearly 20 years ago as a woodland centre for teaching traditional crafts, running courses in a host of different skills. The tutors are all highly skilled professional craft workers and teachers who share a passion for preserving, promoting and passing on these crafts and techniques. They teach a wide range of

students and run day, weekend and week-long courses for the general public, courses for Universities and schools and teambuilding/reward days for companies.

This year, Greenwood Days is offering over 30 different courses as well as 1-1 sessions and bespoke days. The centre nestles in the heart of Spring Wood (in the heart of the National Forest) in a mature 90 acre birch woodland and has all the facilities you will need for a memorable time. There's plenty of cover in case of rain, all the tools and materials you'll need, the kettle is always bubbling on an open fire, with tea, coffee, biscuits and a hot, home-made lunch provided.

Peter has been creating traditional and contemporary chairs for 25 years using crafts

that date back thousands of years. He shapes green (unseasoned) local hardwoods, working in his woodland workshop using an ancient foot-powered pole-lathe, shaving horse and hand tools to create beautiful furniture. He's taught around the country including at West Dean College and Rycotewood Furniture Centre and is also the current world champion pole-lathe turner!

Course dates for 2017

Each course costs £525, which includes all materials, use of all the tools and a hot lunch each day. The dates for 2017 are as follows: 15–21 May; 19–25 June; 10–16 July; 5–11 August and 2–8 October. To find out more, see www.greenwooddays.co.uk.



TREND EXTENDS CRAFT SAW BLADE RANGE

Trend's new craft saw blade is designed for use with the Mafell KSS40 cordless cross-cutting saw and the dimensions are as follows: 120mm x 24 teeth x 20mm bore with a thin kerf and alternate top bevel. The thin kerf anti-kickback saw blades are ideal for cordless trim saws. Designed for a professional finish in softwood, hardwood, plasterboard, stone fibre board, particle board, veneer, plywood, MDF and hardboard, the reamed bore helps to ensure a precise fit to the spindle. Silverbrazed ensures the tip is bonded securely to the body and each blade is body hardened and tempered to maintain trueness.

Laser etched on the reverse to European standard EN847-1/2, the high grade alloy steel plate body is precision ground to maintain flatness. Priced at £22.78; see www.trend-uk.com to find out more.





Techniques for **TURNING PART 1**

In the first of a two-part series focusing on woodturning techniques, Bob Chapman begins by looking at those techniques used for turning bowls, as well as beginning to discuss various finishing and colouring methods

In a magazine article it is impossible to cover all the differing techniques used in woodturning. To limit the scope I am going to restrict this discussion to the techniques I use for turning bowls, and then move on to some finishing and colouring methods. I must emphasise, before I begin, that I don't claim that these methods are necessarily the best way of doing things. All I can say is that this is the way I do them and, where possible, I have tried to explain my reasons for doing things the way I do.

BOWL TURNING TECHNIQUE

I think I have yet to meet a turner who doesn't make bowls and, not surprisingly, there are techniques to be learned, which may make the task easier.

Prepare the blank & drill a hole

Preparing a bowl blank involves little more than cutting it more or less round on the bandsaw and drilling an 8mm hole about 25mm deep in the centre of the face you want to become the top edge of the bowl.

The screws supplied with chucks are generally too long – cut them down so that a little under 25mm protrudes in front of the chuck jaws. The side with the hole will eventually be hollowed out thus 'losing' all trace of the hole. Don't drill the hole too deep or it will begin to dictate the depth of the bowl. If the bowl is to be 'natural-edged', then plane or otherwise flatten an area of the top surface large enough to let the chuck jaws sit flat when the blank is screwed on.

Turn, sand & finish the underside, leaving a spigot or a recess

For bowls up to about 350mm diameter, I mount the bowl blank on the screw held in a four-jaw chuck. Screwing the blank tightly up to the face of the jaws is essential to holding it firmly on the screw and, of course, make sure the screw is tightly held in the chuck. Start the lathe at a low speed and increase gradually to find the best speed for turning. If in doubt, use a lower speed and bring up the tailstock for additional support.

There are two common methods of holding a bowl blank in a chuck while it is being hollowed out. One is to form a dovetail

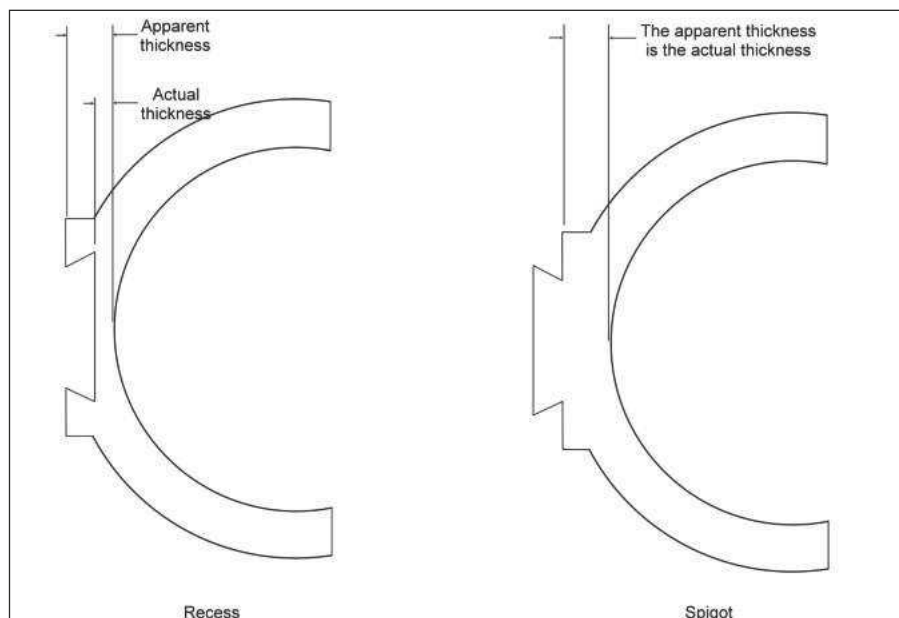


Fig.1 Recess or spigot? For most projects, the spigot has all the advantages

outward pressure and splitting the blank. When the chuck jaws are first expanded the bowl blank is still solid and able to withstand considerable outward force, but as the bowl is hollowed the walls get thinner and weaker, but the outward force of the chuck jaws remains the same... it may, literally, be an accident waiting to happen.

Secondly, I think it's quite possible to forget the recess is there. With the jaws inside it the recess is not very visible but it reduces considerably the thickness of the wood at the bottom of the bowl (**Fig.1**). It makes it all too easy to go through the bowl's bottom and into the recess.

Instead I prefer to form a spigot, which, I think, overcomes the disadvantages of the recess. It does not reduce the thickness in the bottom of the bowl and the chuck jaws can be tightened firmly onto the spigot without fear, although serious over-tightening should still be avoided as it may break the wood fibres and actually weaken the grip. Also, if the density of the wood varies across the spigot, over-tightening the jaws may cause them to bite more deeply

on one side than the other. This effectively moves the bowl offcentre and makes it impossible to hollow the inside concentric with the outside. This problem may also occur when expanding into a recess.

A supposed advantage of a recess is that the bowl will sit on the edges of the recess without any further work. This then tempts some turners to make do, and not bother preparing a proper foot. An imagined advantage of the spigot is that the bowl will sit on the bottom of the spigot without further work. This tempts... well, you see the problems.

Neither spigot nor recess will serve as a foot if you are in the least bit concerned with good design. Spigots and recesses are sized to accommodate the size of the chuck jaws, which must grip them. The size of the foot, on the other hand, should be determined by the size of the bowl – the bigger the bowl, the bigger the foot should be. From a design point of view, I think that if the diameter of the foot is approximately one-third the diameter of the bowl, then it will look about right. For many, if not most bowls, this means the foot should be far bigger than the chucking spigot or recess.

Rather than leave a spigot or recess untouched, some turners choose to rework them into something approaching a proper foot. While this might not address the issue of size, it does, perhaps, overcome the problems of appearance and is a distinct improvement on simply leaving them unaltered, but my own approach is to allow extra thickness for the spigot/recess and then remove all trace of it when the rest of the bowl is finished.

Forming a dovetail spigot

Strictly speaking, the diameter of the spigot should match the diameter of the chuck jaws when they are nearly closed – that is,

spigot (or tenon), which can be gripped by the chuck in compression mode, and the second is to form a dovetailed recess into which the jaws of the chuck are expanded. Almost without exception I prefer to form a spigot rather than a recess.

I think the big disadvantages of expanding the chuck jaws into a recess are, firstly, that I'm always a little afraid of applying too much

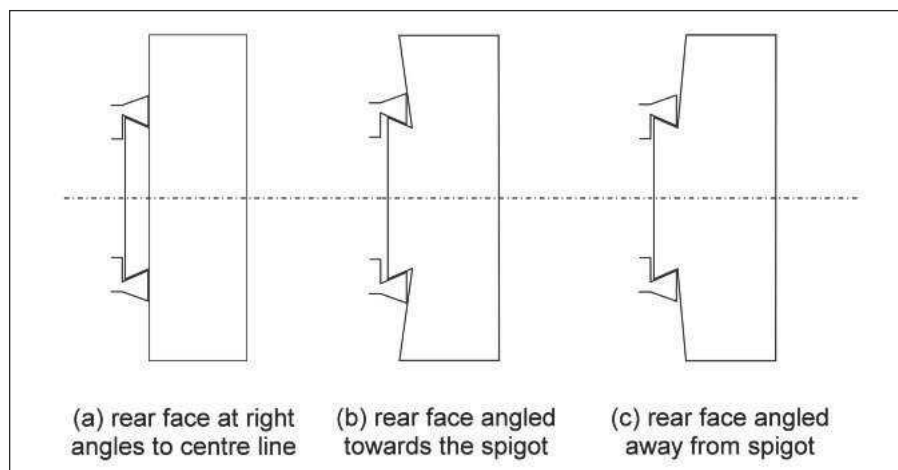


Fig.2 Factors involved in holding work in a chuck. The angle of the rear face is all-important



1 The face must be angled in the correct direction for the work to be properly supported

when they most closely match a circle. However, I always err on the side of caution and make the spigot a little larger rather than risk accidentally making it too small. It's so annoying to carefully cut a spigot and then find that the chuck jaws don't quite close down that far!

The angle of the dovetail should, ideally, match the angle of the jaws but a small discrepancy doesn't really matter except in the very hardest of timbers. When the jaws are closed on the spigot they will compress the wood fibres and deform the spigot to fit the jaws. Provided this is not excessive, it doesn't reduce the grip and may even improve it. However, excessive force may break the wood fibres and weaken the dovetail, and should be avoided.

In forming the spigot the role played by the rear face (**photo 1**) is often overlooked entirely. Gripping the spigot in the chuck jaws is enough to hold the workpiece on the lathe, but to prevent it wobbling it must be supported by the front face of the jaws (**Fig.2**).

In **Fig.2 (a)** the rear face of the spigot is at right angles to the centreline. The workpiece is fully in contact with the faces of the jaws and has maximum support. The situation is as good as it can be.

Fig.2 (b) shows the rear face angled in slightly towards the spigot; the hold is reduced slightly as less of the spigot is being gripped, but the support from the outer edge of the jaws is almost as good as in **(a)**. This slight angle is easier to obtain than the perfect right angle required in **(a)** and it works just as well; this workpiece should not wobble.

The situation shown in **Fig.2 (c)** is to be avoided. Although the grip on the spigot is probably sufficient to prevent the work coming loose, there is absolutely no support from the jaw faces. It would prove extremely difficult to mount this workpiece squarely in

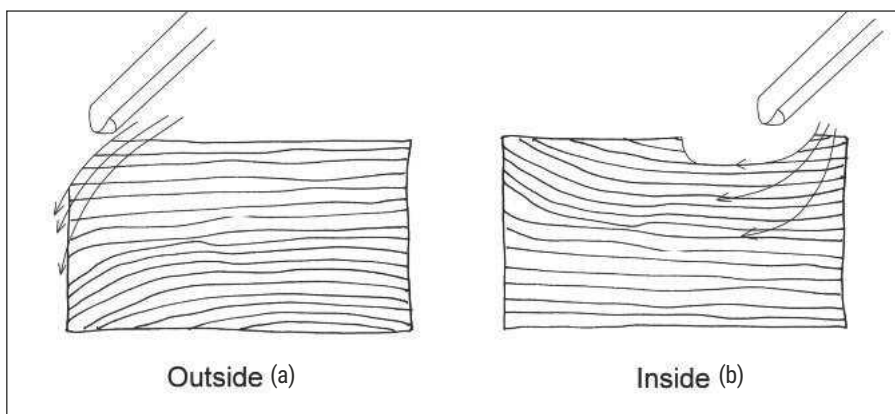


Fig.3 Deciding the direction of cut. Try to ensure that the grain layers are supported by those below

the chuck and it will almost certainly wobble when the lathe is switched on. This will make turning the inside of the bowl more difficult. At best the bowl will have uneven wall thicknesses at opposite sides and, at worst, it might vibrate out of the chuck.

Similar considerations apply to the rear face of a recess and in this case the chuck jaws should fit well, right into the corners of the recess.

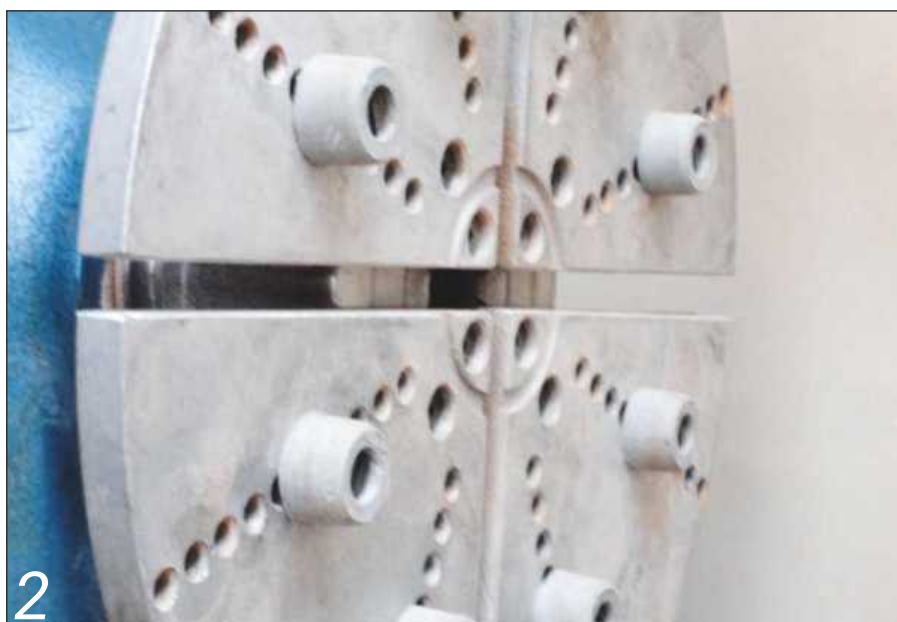
The direction of cut

A bowl blank is usually cut from the tree such that the grain direction runs from top to bottom across the blank rather than from face to face. In order to achieve a smooth surface on the wood when turning the bowl, it is usually better to cut 'with the grain'. This means slicing through the layers of the grain in such a way that, as they are cut, each one is supported by those beneath it. It is the direction that is commonly called 'downhill'.

Try to imagine using a mallet and chisel to carve a bowl rather than turning it on the lathe. I hope you would fasten the bowl blank down in some way and start to carve the outside in the direction shown in **Fig.3 (a)**. This is almost instinctive to anyone used to working with wood, and will result in a smooth cut surface on the bowl.

I don't suppose that anyone would entertain the idea of chiselling upwards from the side towards the upper face, at least I hope not. It would result in a horribly splintered surface as the wood fibres are torn out by the chisel.

Having carried out this little bit of 'thought carving', translate the conclusions to a bowl blank spinning on the lathe, about to be attacked with a bowl gouge. Exactly the same principles apply and the smoothest surface will be obtained just as before – by cutting in the direction from the centre of the blank, outwards and over the edge.



2 Adjustable button jaws are used for reverse chucking

Cutting in the opposite direction, inwards towards the centre, will certainly remove wood but the remaining surface will be rough in comparison. Don't just take my word for it, try it yourself on a non-critical part of the next bowl you turn.

In a similar way, hollowing the bowl is best done working from the edge in towards the centre, as shown in **Fig.3 (b)**. Again, the cut is 'downhill' and will result in a smooth surface. There is still a choice as to whether to begin hollowing near the centre and work back towards the bowl's wall or to begin near the edge, working towards the centre. I prefer the latter, because retaining the bulk of wood in the bowl keeps it sturdy and rigid while I'm working near the wall of the bowl. Working out from the centre means most of the wood has gone before you make the final cuts on the wall.

Reverse chucking a bowl

Reversing an almost finished bowl in order to remove a spigot or do further work on the foot is called 'reverse chucking' and it involves finding some way of holding the bowl without damaging the polished interior. There are several ways in which this might be accomplished although it is a step frequently omitted by the less experienced turner.

One uses a rubber-faced piece of plywood attached to a faceplate, which is made using offcuts from around the workshop. With pressure applied by the tailstock, friction is sufficient to drive the bowl round while the spigot is removed down to a small stub needed to maintain tailstock pressure. With the bowl removed from the lathe, the stub is removed by hand.

A variation on this is to use a jam chuck. A piece of scrap is mounted on a faceplate and a recess is cut in which the bowl is a tight fit. If the tightness of the fit alone is not sufficient to hold the bowl securely, try wrapping masking tape or insulating tape around the back of the jam chuck and over the front of the bowl to help hold it in place. Obviously light cuts are the order of the day.

Cole, or button jaws, may also be used for reverse chucking a bowl, holding it either externally or internally depending on its shape (**photo 2**). The buttons are adjusted to fit the bowl and it is gripped firmly by closing or opening the chuck jaws. Again, light cuts are best and, if in doubt, the hold may be improved by wrapping tape round the chuck and the bowl.

The method I use most often utilises a home-made vacuum chuck system, which grips the work very securely without marking it in any way. There is obviously an initial outlay involved in building the system, but the vacuum chuck does not require support from the tailstock and the underside of the bowl may be worked on unimpeded.

Reverse chucking is much easier than supposed. Remove the spigot/recess to leave a smooth, unblemished, slightly concave foot, which gives no sign of how the work has been held.

TECHNIQUES FOR EBONISING

It is a well-known fact that ebony is black, although it is commonly thought to be more evenly black than it really is. As a result, any method of colouring wood black has gradually become known as 'ebonising' it. I sometimes think the term owes much to

salesmanship – ebonising a piece of wood sounds so much more expensive than merely painting or staining it. Nevertheless, the most common ways of 'ebonising' involve exactly those two simple methods.

Paint

Black spray paint, either gloss or matt, can be applied from the can on top of sanding sealer and will give an excellent, evenly coloured, perfectly smooth surface. I keep an eye on my local 'pound shop', which occasionally gets in tins of matt black spray paint. Some manufacturers make an 'ebonising lacquer', which I've never used but which I take to be some form of black paint. Whichever you choose, follow the instructions on the can. The main drawback to paint is that it may chip or rub off if the item is ill-treated in any way.

Stain

Stains are applied to the bare surface of the wood and are more permanent because they penetrate the surface of the wood, but may not give as dense a black colour. Stain is more likely to allow the grain of the timber to show through, and this may be considered an advantage for some applications. Be aware that on thin-walled work some stains might penetrate right through to the other side and, even on thicker pieces, they can wick along the grain for quite large distances, forming coloured patches where they are not wanted.

Indian ink gives a very dense, light-fast black and does not obliterate the grain. Nor does it penetrate the surface so much, although, like stains, it may wick along the grain. For fine work a black felt-tip pen works well, but may not be as light-fast as other methods.

Take care when applying other finishes over stains and ink, as the solvents in the finish may cause the colour to move or bleed into other areas.

Steel wool & vinegar

A method specifically used for ebonising oak (and occasionally some other tannin-rich timbers, such as chestnut and walnut) is to treat the timber with a solution containing iron. The iron and the tannin chemically react together to form a black compound, which causes the wood to darken. The effect penetrates the timber a little way and is more durable than surface coatings such as paint. The exact colour obtained and how quickly it develops depend on the amount of tannin present in the wood and the concentration of iron in the solution applied.



Steel wool and 'white' vinegar make an ebonising mixture that works better than you might expect from such a home brew. I can't see why regular malt vinegar wouldn't do just as well



4 The bubbles make the iron float and show the reaction is taking place

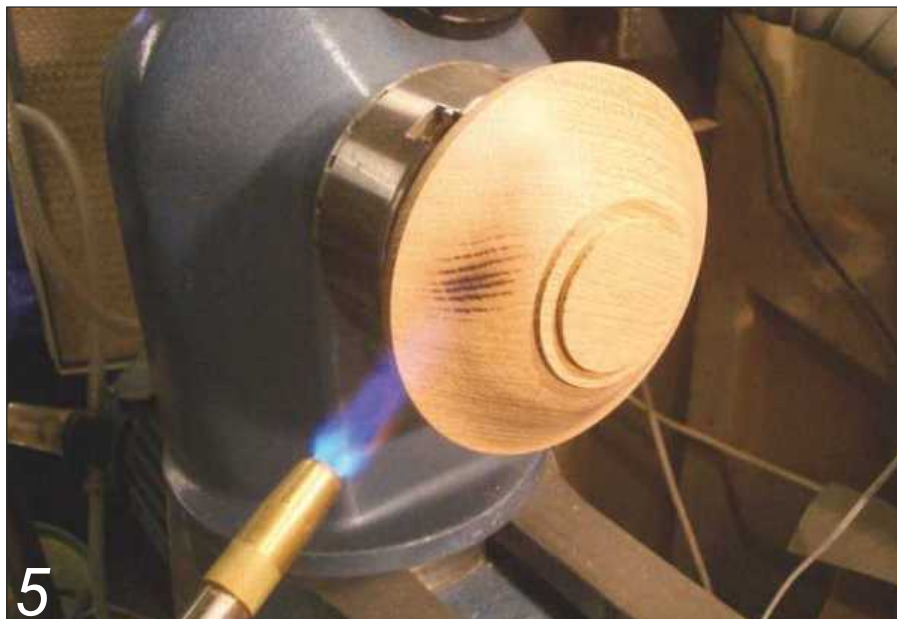
Embedded in the folklore of woodturning is the use of a mixture made by leaving steel wool to marinate in vinegar for a few days. Put a small wad of steel wool in a jam jar and cover it with white vinegar (**photo 3**). After only a few minutes you will see tiny bubbles forming in and around the steel wool. This is hydrogen gas released by the chemical reaction as the iron reacts with the acetic acid and dissolves in the vinegar. Leave it for two or three days for sufficient reaction to take place (**photo 4**).

Being water-based, the iron solution will raise the grain of the timber. This can be minimised by first wetting the wood with plain water and sanding smooth when dry.

TESTING FOR HYDROGEN

Hydrogen gas is flammable and I've heard other turners give dire warnings about the risk of explosion if the jar is opened near a naked flame. Fear not: the amount of acetic acid in vinegar is very small and unless you are doing this with gallons of vinegar and great wads of steel wool, the amount of hydrogen produced is tiny and the danger nonexistent.

The standard laboratory test for hydrogen, used by generations of schoolchildren, is to deliberately put a flame to test tubes full of the gas and listen for the 'pop' when it explodes perfectly safely. The amount of hydrogen contained in the test tubes far exceeds the volume produced from steel wool and vinegar in an ordinary jam jar



5 Don't let the flame linger too long in one place or it will burn more deeply there. A light touch and several 'coats' is the way to go

Repeat until further wetting no longer raises the grain. Alternatively, use cold tea instead of water. The additional tannin from the tea will help to improve the black colour obtained.

Decant off the almost colourless liquid and throw away the steel wool. The liquid, which now contains dissolved iron, is then applied to the surface of the wood with a brush or cotton wool, or whatever is handy. The wood will begin to darken quite quickly, and the colour will continue to get deeper over the next few hours. By the next day it will be a deep blue-black, varying to some extent depending on the tannin content of the timber.

The popularity of this mixture seems to

owe as much to the thriftiness of woodturners as to the particular efficacy of the mixture. The solution will keep for a while in an airtight jar, slowly turning a reddish brown colour as the iron oxidises and forms rust. It will still work, and may even give a better black, but it will eventually deteriorate. Always try a test piece and just make some more if it doesn't work.

Scorching

Scorching the surface of the timber in order to make it black will work on any type of wood. The blackening is caused by carbon in the charred surface layer. On close-grained timbers such as sycamore,



6 Touch in where necessary. Indian ink is good for this, applied with a small brush



7 Wire-brushing removes loose charcoal and emphasises texture



8 Very black and beautifully textured after sealing and polishing

the charred surface is smooth and, in my view, not particularly interesting. However, oak is a coarse-grained timber and the softer spring growth wood in the annual rings will burn away more rapidly than the denser and harder late growth. Thus scorching oak does not merely make it black, but also gives it a finely textured surface, which I find very attractive.

Before attempting to scorch your item, it is worth considering that you are probably standing in a pile of wood shavings, surrounded by bottles of sanding sealer, oils, polishes and various other highly flammable materials. To prevent the premature arrival of bonfire night, a little housekeeping might be in order before proceeding. For those readers outside the UK, 'bonfire night' is a UK celebration of an unsuccessful attempt by Guy Fawkes in 1605, to blow up the Houses of Parliament in London because he didn't like King James I.

Using a blow torch, start to scorch the surface of the wood. Keep the flame moving and try not to overheat any one place on the surface (**photo 5**). There is a great danger that the heat will cause the wood to crack or distort, and you probably want to avoid this if possible. You will find that, oddly, the flame will not penetrate into any corners or crevices there might be. Don't linger trying to get the flame into the corners – you won't succeed and could ruin the piece in the attempt. If in doubt, stop and let everything cool down before continuing. Go over the whole surface lightly until it looks evenly black. This may require several passes with the blow torch.



9 'Seed pod' – inspired by seed pods which have spikes to attach them to passing animals. Bleached ash and ebony, approximately 160mm on long axis × 70mm on short axis – spikes 25mm long

Using a fine brush and some black dye, colour in the areas that the flame could not reach (**photo 6**). This is the only way I know to colour nooks and crannies the same as the burnt parts. Gentle brushing with a wire brush will remove charred material from the grain and emphasise the texturing effect (**photo 7**). I usually repeat the scorching and wire brushing at least twice, letting the wood cool down properly between treatments.

After wire brushing, the surface of the wood appears a dark brown colour rather than black. However, a coat of sanding sealer, applied with a small brush to work it well into the grain, turns it jet black again

and after a light touch with some fine abrasive it can be waxed and polished (**photo 8**).

There is, of course, one absolutely certain, quite foolproof but rather more expensive way of ebonising and that's to use real ebony. The spikes in my 'Seedpod' sculptural piece are turned from small scraps of ebony that were offcuts from another job (**photo 9**). [www](#)

NEXT MONTH

In part 2, Bob will move on to looking at other colouring techniques, as well as those for polishing and bleaching wood

A sky mobile from SCRAP

Rick Wheaton's clever scrap mobile build features some bandsaw and fretsaw work, steaming and bending, a bit of lathe work and some nifty balancing at the very end

I recently took delivery of a shiny new bandsaw, and once the excitement had died down, I had to do something with the pallet it came on. Normally they're destined for the wood stove, but the chunks of 100 x 50mm were straight-grained and far too nice to burn. Some recycling was in order (**photo 1**).



1 Raw material – the old pallet



2 Turning the fuselage



3 Making the wings

Turning the fuselage & making the wings

Also that week I spent a day with my great-nephew Harvey, who gets very excited when he sees things in the sky. Planes, birds, clouds – he points and laughs at all of them. Fortunately he's allowed to, he's only 14 months old, and as he's about to move into his own bedroom, a toy plane to hang over his cot seemed like a nice thing to make.

I cut out a 50 x 50mm baulk, and turned it into a fuselage on the lathe (**photo 2**); cut some strips for the wings and propellers (that bandsaw was lovely!) and with the help of some BBQ skewers for struts, the little plane quickly took shape. I love making biplanes; the two strutted wings look quite authentic, and they're easy to make. Lay one wing over the fuselage to see where the struts go, mark these with a pencil, and lay this wing exactly over the other on the bench. Now drill eight holes (the same diameter as your skewers or dowels) and drill through both wings.

Before you separate them, mark each wing so you know which way is up and forward! Now cut eight struts to exactly the same length (**photo 3**), sandpaper a tiny point on the end of each strut (like a pencil) and push a strut into each hole on the lower wing – pointed end up (**photo 4**). Each hole has a dab of glue in it (stop the glue running through with strips of tape), and now put a



4 Gluing the struts

dab on the top of each strut. It's a bit awkward to push each strut through the matching hole on the top wing – this is where you'll like those pointed ends (**photo 5**).

Use a slow-setting glue for this slightly tricky bit, making sure the wings are parallel. In an hour or two you'll be amazed at how firm this structure is, easily strong enough to block sand each wing, getting rid of glue residue and pointy bits of strut.

Turning the pilot & outer engines

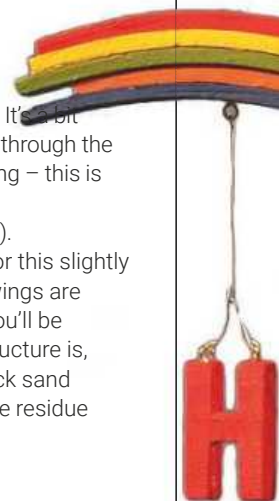
More turning made the tiny pilot and the two outer engines, and I used the lathe again to make the propeller bosses. You can use screws, but wooden bosses look so much more realistic, plus I wanted to keep metal hardware to a minimum. Even so, I had loads of wood left over, so why not some clouds, a sun, a moon? They're all up there in the sky, and little Harvey would love to see them hanging from his ceiling.

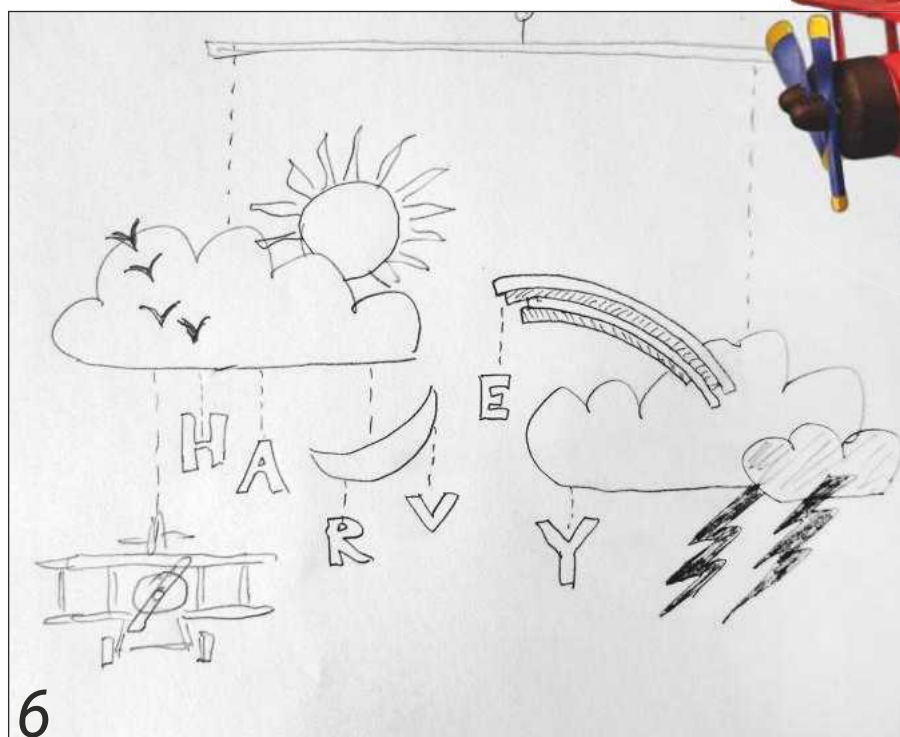
Making the clouds, rainbow & lightning

I sketched out a rough idea (**photo 6**) and marked out some clouds on the pallet planks (**photo 7**), with the rough grain adding a nice texture. The clouds looked pretty bare, some birds would help, and why not push the boat out and have some lightning and a rainbow? Interestingly, this



5 Pressing the top wing into place





6

Sketch – just for ideas; the finished job would almost generate its own momentum



7

Clouds marked out on pallet planks



8 The drain pipe steamer



9 Steam goes in at this end



10 A rainbow rod clamped around a waste bin



11 Rainbow rods are left in the jig overnight. They're not all the same length – note packing pieces to maintain the arc

project would now use several techniques: bandsaw and fretsaw work, steaming and bending, a bit of lathe work and some nifty balancing at the very end.

For the rainbow I cut five little bars, choosing the straightest grained sections, and cobbled together an easy-peasy steamer from a bit of 100mm pipe and my wallpaper stripper (photo 8). Some cardboard wrapped around the stripper tube got the steam in at one end (photo 9), and a block of wood made a door for the other end.

I wanted quite sharp bends so I cooked the rods for an hour, and bent them one at a time around the edge of a waste bin (look around the home or garage for long enough and something will turn up about the right diameter) (photo 10). They cool in seconds – you need to be quick with the clamps – and almost at once they can be unclamped and put in the jig to 'set' (photo 11). I left the five pieces for 48 hours so they'd keep their shape, and glued them together once they were sanded and painted (photo 12). And before anyone tells me, I know there are seven colours in a rainbow, but he's only 14 months old, right?

The lightning was easy, a bit more bandsaw work and some brilliant red acrylic, but they looked wrong coming out of white clouds. A small black cloud was the answer, the various elements easily glued together

with a few blobs of PVA (photo 13).

Making the sun & moon

A sun and moon (photo 14) and a scattering of 'V's for birds, and the last job was fret-sawing the letters. 'HARVEY' in caps is a doddle, 95% straight lines – easy to draw and easy to cut (photo 15). By the way, the only hardware in the whole mobile were the tiny brass eyes and thin wire to hang the letters and other elements, which are obtainable at any model shop. You can, if you wish, drill small holes in the top of the letters and glue fine string in them, but then you can't adjust the letters. Wire

is better, it bends nicely, and the letters can all be made to face the same way.

When you've made all the wooden parts, lay them out and make sure everything is ready to paint and glue (photo 16).

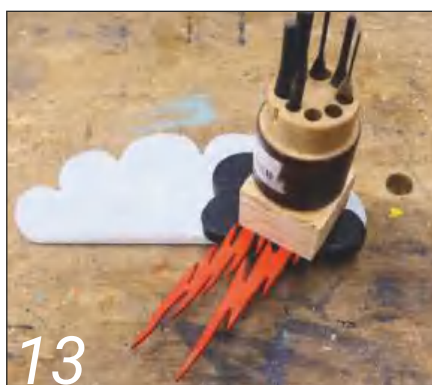
Painting, balancing & gluing

Painting can be fun, but these small pieces get messy, along with fingers (photo 17).

I prefer not to wear gloves when changing colours every few minutes. Using water-based paints (acrylics are best) you can wash your hands more easily than gloves. Now for balancing and hanging the various elements. This might seem difficult, but it's



12 Rainbow painted and clamped up



13 Lightning coming out of the black cloud. Not all clamping methods have to be complicated!



14 The sun and moon marked out



17 Messy fingers. Why we love water-based paints

almost the easiest bit. This mobile has four elements: **1)** cloud and rainbow; **2)** clouds with lightning and plane; **3)** sun; **4)** moon; and each one will hang at the end of two cross-pieces.

The sun and moon don't need balancing, but before you hang the other two you must find their balance point. For example: cloud with plane and lightning. Start by hanging the plane anywhere that looks right; the plane and cloud now form a single element, one that will hang from an eye screwed into the top of the cloud.

The position of this eye is obviously critical (the cloud needs to hang level) and you can find this point by holding it lightly between finger and thumb – really lightly so it almost slips out of your fingers (**photo 18**). Mark the spot under your fingers with a pencil dot, drill a small hole and screw in the eye. This should be the balance point. If you've got it a bit wrong, fine-tune by bending the eye sideways, or drill another hole and try again.

Use the same technique for the other cloud, first hanging the letters so they look right. Now you have two upward pointing wires from each cloud; simply hang each cloud on an eye at either end of the longest cross-piece. The only firm rule for the length of the cross-piece is to make sure the two cloud elements don't bump into each other as they swing about.



15 'Harvey' letters marked out. Set the angle for uniformity of slope



18 Finding the balance point

Now with a cloud hanging at both ends, find the balance point of the cross-piece with the same technique, i.e hold it gently until it sits level, then mark the spot. Next, find the balance point of the short cross-piece – with the sun hanging at one end, the moon at the other – and a nice touch is to half-joint the cross-pieces so they mesh together nicely (**photo 19**). Now



16 All the wooden pieces laid out



19 The cross-pieces

the whole mobile can be hung by one hook (**photo 20**), making sure it has a shank long enough to go through both cross-pieces.

Finally – in case the letters get mixed up in transport – I get ready for the phone call from my nephew who tells me his angel child is not called 'VERHAY'... **WW**



20 The completed mobile hung on one hook

Portable tool storage

In this excerpt from *The Woodworker* of yesteryear, we look at the design of a complete tool chest, which features enough storage for a carpenter's full kit

It's entirely possible that many readers will find this particular job reassuringly familiar and, if we've not made this actual model, then most of us will likely have made one kind of tool storage container or another at some point in the distant past. The plans for the chest depicted here were first published in *The Woodworker* of February 1936, and follow the lines of many that have come before and since. It's the sort of piece that a new apprentice would be expected to make as their hand tool skills improved over time, and would undoubtedly provide sterling service over the coming years.

Vertical-running saw till

The sliding drawer boxes (or tills as they're referred to) are a terrific device – especially for all your chisels and smaller bits of kit – and as I'm sure we all know, as well as sliding to & fro, can be lifted out thanks to the graduated support ridges which frame the entire inner carcass. While it's mostly a standard type of design, I for one found the vertical-running saw till a genuine novelty. It's a great idea, and for me, beats storing your saws under the lid as is often the case. Bearing in mind the weight of the average carpenter or joiner's tool kit, a couple of stout handles would be strongly recommended, whether crude rope versions or a securely fixed set of hardwood ones.

Impress your peers

Taken as a whole, it's the sort of thing you could really go to town on, and indeed, many makers do and have done just that, employing exotic hardwoods and fancy veneers to create a tool chest almost too fine to actually use. But imagine the impression you would make on your soon-to-be colleagues as you unpacked your kit at your new place of work; much better than any CV or set of photos...

Mark

YOUR COMPLETE TOOL CHEST

WITH SLIDING SAW TILL AND THREE DRAWERS

TOOL chests are still in constant demand: if not frequently, at least steadily. It is curious, too, that no matter what the woodworker may subsequently execute, nothing affords him greater pleasure than the making of a really good tool chest for his own use. The one shown here makes no claim to being a work of art. Its merits are its all-round usefulness and its lasting strength.

From Fig. 1 (and more particularly from the sectional elevation, Fig. 2) it will be seen that there are three drawers, or tills (A, B, C), which slide forwards and backwards on runners. The top drawer has a hinged lid (D). The saw till (E) slides up and down inside the front of chest. At Fig. 2 it is shown slightly raised.

THE CARCASE may be of clean white deal. Yellow pine would of course be preferable, but the price may be considered prohibitive.

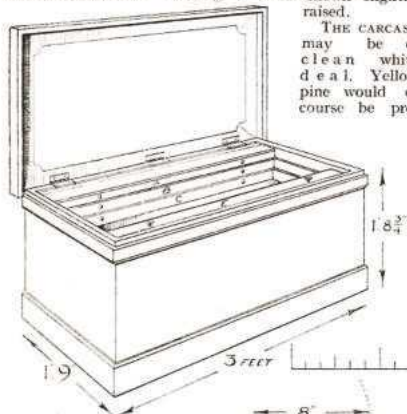


FIG. 1. TOOL CHEST. Size (approximately) 36 ins. by 21 ins. by 22 ins. high.

The fittings of the original chest described were of mahogany, the inside of the lid being veneered. Plain hardwood used for the fittings must be of the best quality. The over-all measurements suggested are about 3 ft. long by 1 ft. 9 ins. wide, and about 1 ft. 10 ins. high to top of lid. These sizes are approximate, and, after

the worker determines his carcass length, width and height, the other parts can be made accordingly.

For the front and back two pieces (approximately 3 ft. by 1 ft. 8 ins., and $\frac{3}{4}$ in. thick) will be jointed up to obtain the width. For the ends two pieces about 1 ft. 9 ins. by 1 ft. 8 ins. (also $\frac{3}{4}$ in. thick) are required. These four sides, after squaring up, are dovetailed together, the dovetail pins being about $2\frac{1}{2}$ ins. apart. Before glueing, trench both ends to take a length of stuff 4 ins. by $\frac{1}{2}$ in. (F, Fig. 2). This forms compartment G (Fig. 2) for moulding and heading planes.

The bottom, which will be screwed on, is of $\frac{3}{4}$ in. tongued and grooved boards, the boards running from back to front of the chest (not lengthways). Level the edges and mitre and sprig on the bottom plinth (H), $4\frac{1}{2}$ ins. high, with a $\frac{1}{2}$ in. ovolo moulding. The top plinth (J), $2\frac{1}{2}$ ins. wide, can be similarly fixed, keeping it down $\frac{1}{2}$ in. from top edge.

Around the top edge of chest it is wise to glue and sprig a mahogany slip, $\frac{1}{2}$ in. by $\frac{1}{2}$ in., mitred at the corners. Level it inside and outside. A good lock will complete the carcass.

FITTINGS.—These may of course be varied to suit individual requirements, but the suggestions here apply to the average kit. Reference has been made to the compartment

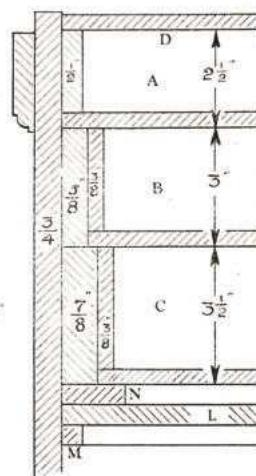


FIG. 3. ENLARGED SECTION OF DRAWERS

ment G (Fig. 2) for moulding planes. Alongside this is a larger compartment (K) for bench planes. For covering these compartments a sliding

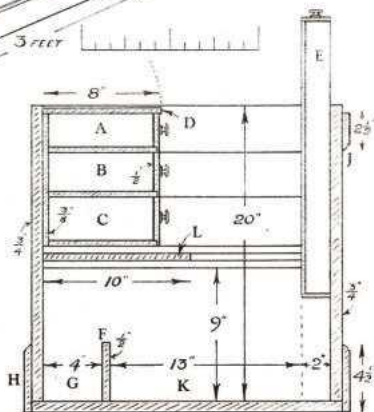


FIG. 2. CROSS SECTIONAL VIEW WITH DETAIL SIZES

DO GET IN TOUCH

If any readers have memories and photos of things they or their forebears made from *The Woodworker*, please get in touch as we'd love to see them. Just email me on the new address: editor.ww@mytimemedia.com and we'll get them in the mag

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Variety is the *SPACE* of life

Using 6mm thickened mahogany, Ian Wilkie sets about making this decorative fretted spice rack with a scrollsaw

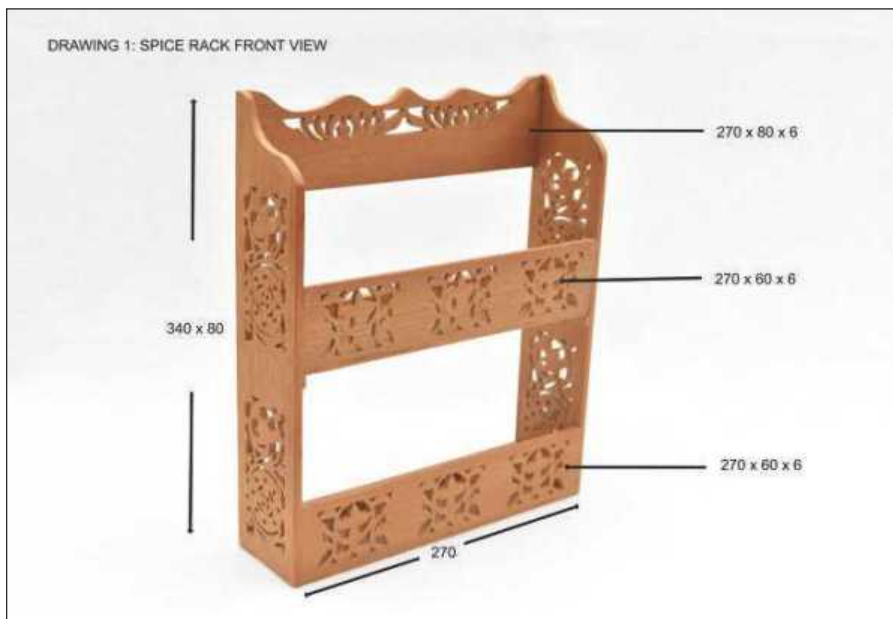


Fig.1 Front view

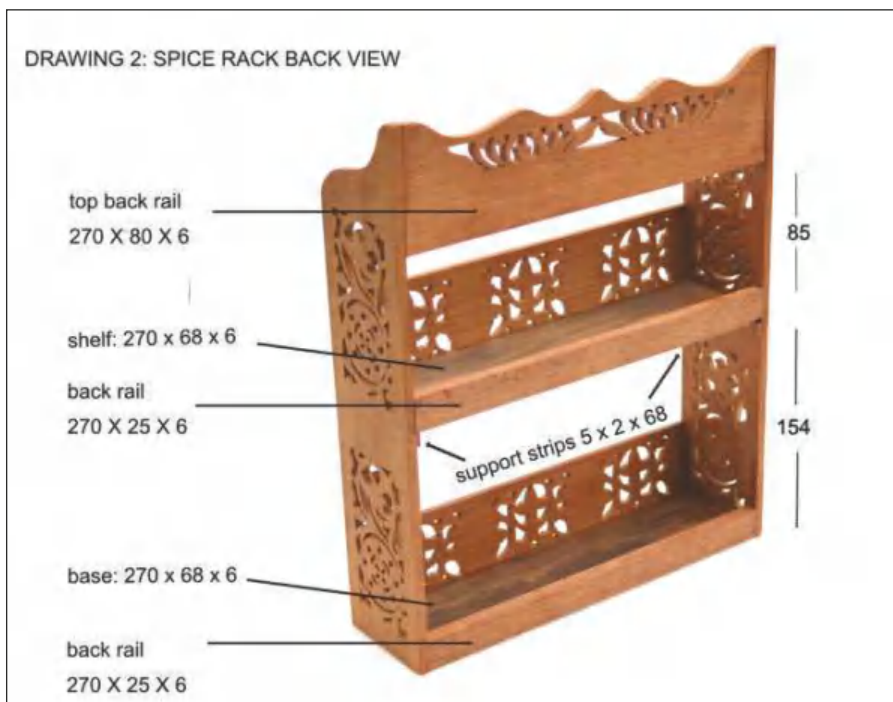


Fig.2 Back view

The spice rack shown in this article is made from 6mm thickened mahogany, which I reclaimed from some old desk drawers. It is designed to take spice jars with a diameter of 42mm overall and a height of 110mm; six jars will fit on each of the two shelves. This project could equally well be made using 6mm birch plywood and then varnished or spray painted. The construction is simple: the parts are butt-jointed together and glued with PVA. All the wood was cut and fretted out using a scrollsaw fitted with a No.5 Olson PGT reverse-tooth blade. [www](http://www.getwoodworking.com)

CUTTING LIST

All wood used is 6mm-thick

Sides	370 x 80 x qty 2
Front rails	270 x 60 x qty 2
Top back rail	270 x 80 x qty 1
Shelf	270 x 68 x qty 1
Base	270 x 68 x qty 1
Back rails	270 x 25 x qty 2
Shelf support	5 x 2 x 68 x qty 2

Thin scrap plywood

Sides	370 x 80 x qty 1
Front rails	270 x 60 x qty 1
Top back rail	270 x 75 x qty 1

FRETWORK PATTERNS FOR SPICE RACK

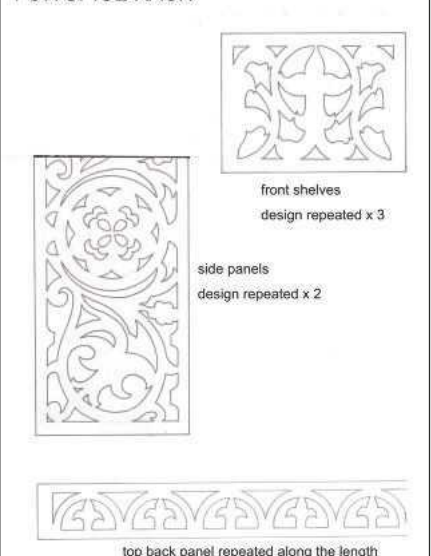


Fig.3 Pattern



1

If necessary, thickness the timber down to 6mm. I cut my wood in strips 80mm wide, planed one edge straight and then ran them through my Proxxon thicknesser; this machine takes boards up to 80mm wide



2

Many woodworkers think it is impossible to cut a straight line using a scrollsaw because you cannot use a fence and there is a tendency for the machine to run off-line. However, the Olson PGT blades are so well machined that, with practice, cutting a straight line can be achieved. PGT stands for Precision Ground Teeth and they are well worth paying a little extra for as these blades will last longer and give an excellent cut. My latest batch were purchased via Amazon (www.amazon.co.uk) and cost £4 for six blades – I used two blades when making the project. If necessary, the wood can be trued-up after cutting using a small plane or a disc sander. Whatever pattern or design you go for, enlarge the drawing to fit the wood. You will need one copy for the stacked side pieces, one for the front rails, and one for the back rail. I have shown the design I used (except for the top back rail)



3

Starting with the fronts, cut a piece of thin plywood and place it on top of the two stacked pieces of wood. Glue the pattern to the plywood with PVA. This plywood will be scrapped after cutting but it will greatly help to achieve a crisp, whisker-free cut without any glue residue or damage to the wood



4

Tape up the sandwich round the edges to hold everything securely



5

Drill entry holes to suit the No.5 blade. The entry hole size is $\frac{1}{16}$ in, which approximates roughly to 1.6mm. Drilling is best done using a small bench drill so that the holes will be accurately drilled at right angles. Most patterns will need at least 50 holes, so take your time!



6

Check that the scrollsaw table is at right angles and then commence work. I glued a small magnet to this inexpensive protractor and keep it on the side of the scrollsaw ready for checking

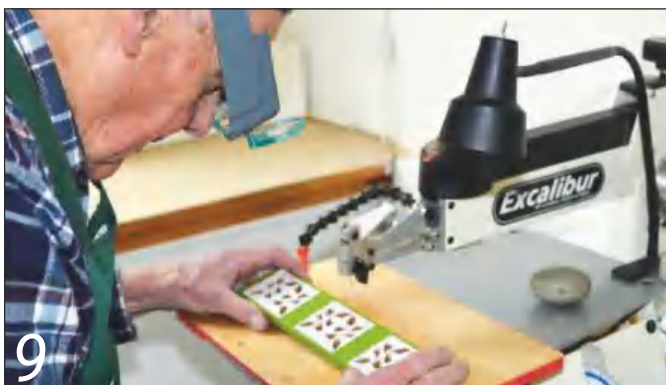


7

Commence fretting in the centre of the pattern and gradually work your way outwards



Complete an area and then move on to the next pattern and repeat. In this photo, you can see that there are still some areas to cut. Complete the fretted side panels in a similar way. Cut out the pattern on the top back rail, which you will see is a little more elaborate than the one I have shown in **Fig.3**



As the work becomes more intricate, I put on the Optivisors



I made 3mm mahogany dowels for my spice rack, tapping a length of wood through a dowel plate to achieve the diameter I wanted



Drill 3mm holes at the joints and insert dowels with a little glue to give extra strength to the construction. You could use small screws but the wooden dowels blend in and are unnoticeable



Separate the sandwiched panels and discard the plywood. Carefully sand away any whiskers if necessary. Glue the support strips to the inside of the side pieces, then assemble making sure everything is square before gluing and cramping up



The finished spice rack, which can be free-standing as shown or attached to a wall by means of the back rail and mirror plates

TIPS FOR SUCCESSFUL SCROLLSAWING

Good lighting

Good lighting is essential for fine fretwork and I am very pleased with the LED, long-necked lamp I recently purchased from John Lewis for £30. The lamp is clamped to the scrollsaw table and can be positioned as required without getting in the way



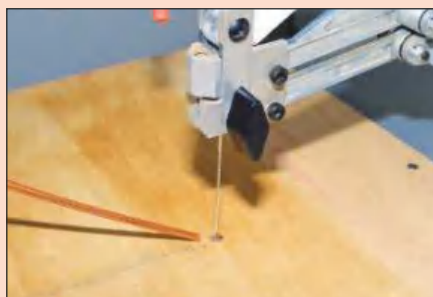
Magnify the work

Most of us eventually realise that we need some extra help with our eyesight for close work. I use inexpensive over-the-counter glasses for the workshop with reasonably strong frames because the lenses do get scratched and damaged and then need replacing. In addition, when fretting I often use simple $\times 3$ magnifiers clipped to my glasses, which flip up and down easily



Extra magnification

When I need to work for longer periods and concentrate on more complex patterns, I use Optivisor headband magnifiers, with or without an extra lens loop. These are more expensive at around £50 but with care they last many years



False table

In the photos, you may notice that I use a false table. On most scrollsaws, including the Excalibur, which is an expensive machine, the hole in the centre of the table through which the blade passes is too large. Small pieces of wood can be pulled down, thus putting unnecessary strain on intricate surrounding pieces. Some machines have replaceable throat plates; this seems a good idea but the plates are often badly fitting, not flush with the surface of the table and the wood can be caught as it passes over. It is a simple task to make a plywood false table, which can be sanded, varnished and polished, thus allowing the wood to manoeuvre without any friction. The blade hole can then be really small, just allowing the blade to pass through. Over time the hole may become elongated, in which case, plug it with a piece of dowel and re-drill



My plywood table covers the front two-thirds of the scrollsaw table with a slot from the hole to the front, which allows the false table to be lifted slightly and pushed back for blade changing. It is made from two pieces of ply glued together. The underside piece is cut so that it fits the scrollsaw table exactly. To make sure nothing will move, I have inserted two small rare-earth magnets at the front

Be comfortable

It is important to be comfortable. I sit on a stool and my scrollsaw is set up on a stand at the correct height. I find 30 minute sessions are about right for me before I take a break

Scrollsawing books

The New Scroll Saw Handbook by Patrick Spielman (ISBN 0-8069-78775) is an excellent book. Unfortunately it isn't in print at the moment but is available second-hand in good, used condition for around £18



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STC = Sliding Table Carriage. TWE = Table Width Extension. TLE = Table Length Extension.

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Eat your heart out

David Oldfield beautifies a set of Ashley Iles chisels with London Pattern boxwood handles

On my last birthday, I thought that I would spoil myself with some new chisels and my preference was for the Ashley Iles bevel-edge cabinetmaker's chisels, which are a really stunning set.

Having purchased the chisels, I had an idea for enhancing them even further and making them that extra bit special, so I

asked my turner friend Dave Roberts to produce some 'London Pattern' handles from boxwood. The result is chisels to kill for; hence, 'eat your heart out'.

I soon found that it wasn't the easiest thing to fit them and I spent the best part of a day planing in the octagons and driving the tangs accurately into

the handles. But success! I keep looking at them, not quite believing they are mine.

The photos below show the method for marking out and establishing the octagon. Dave drilled a 5mm pilot hole for the tangs, which was very helpful, providing straightness between the chisel and handle. [www](http://www.getwoodworking.com)



The handles started with me marking out the octagons for the London Pattern shape I wanted



Progress! Seen on the right-hand side is my old C. P. Ward paring chisel circa 1914, with original London Pattern handle



Great care had to be taken with planing up the facets so as not to tear up the grain



Voila – the finished result. I've since decided to call these chisels the 'Seven Sisters'

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(Purple)heart rules the head

Practice your hand skills this weekend and make Mike Riley's plane hammer – ideal for gentle adjustments



I have a few wooden planes in my toolbox, including a paint-spattered beast from Grandad's garage and a new, custom-built smoother that's as pretty as it is effective. The thing they all have in common, though, is the way in which they're adjusted. Unlike their metal-bodied cousins, wooden planes are adjusted by hitting them with a hammer at various points on the body in order to shift the iron one way or another. Obviously, the idea is to do this without causing damage to the plane, and the best way to do this is with a dedicated plane-adjusting hammer. These are available from various tool suppliers, and often boast shiny brass heads, inset leather faces and so on. It's quite easy, however, to make your own plane-adjusting hammer.

All you need to make the head is a lump of wood about 100mm long and roughly 40 x 40mm in section. I used purpleheart partly because I had a block just the right size and partly because I couldn't resist the prettiness of its shavings!

That said, purpleheart is a little on the hard side; I haven't put a dent in any planes yet, but you could always use something softer.

For the handle, meanwhile, you'll need a stick about 400mm long with a section of about 20 x 30mm. The important thing is that the stick fits your hand comfortably, bearing in mind that it has square edges, so pick a stick that's over-sized so that it can be shaped without becoming too thin. I used ash, which is good for tool handles; alternatively, you could use

hickory, possibly by reworking an old handle to give it a new life.

Making the head

Cut the head block to size (**photo 1**) and plane it so that it's flat and square on all six sides. Given the size of the block, you might find it easiest to do this on a shute board (**photo 2**). Next, plane the handle blank, so that it is flat and square on the four faces (**photo 3**). The ends don't matter so much at this stage as you will cut the handle to final length later. Once the handle blank is trued up it's time to carve it to shape. After clamping it in the bench vice, I started by using a spokeshave to take off the corners and create an oval section that sits nicely in the hand.



1 I used purpleheart for the head; it's hard and produces wonderfully decorative shavings!



2

A shute will help when planing the head so that it's flat and square on all six sides



3

Here's a chance to practice some simple bench planing as you square up the handle blank...



4

... which is then shaped to suit your own hand using a spokeshave...



5

... and then slotted so that it can be secured with a wedge...



6

... after the handle has been fitted to the hammer head

Final shaping is a matter of taste really: I do it by eye, removing stock at various points on the blank until I arrive at the shape I like. Keep an eye on the surfaces you create as you remove material; I find it best to try and match these surfaces on the other side of the blank so that the final handle is symmetrical (**photo 4**). Once the handle is shaped, smooth it out with a gooseneck card scraper, or with abrasives if you prefer.

Now we can move on to the hardest part – fitting the head. There are various ways of doing this. You could, for example, cut one face of the hammer away, chop out a handle-sized groove, fit the handle, and then laminate the side back on. Alternatively, you could drill a round mortise with a Forstner bit and shape a round tenon on the handle with rasps and files. The method that I used, though, was to chop out a through mortise in the head that was sized to accept the handle, which was then wedged in place.

The wedge is fitted by cutting a kerf into the head end of the handle (**photo 5**) and then tapping the wedge into place so that

it runs across the grain of the handle, which might otherwise split. Once the head is fitted (**photo 6**), cut the handle to length and chamfer the head with a chisel or block plane if you feel the urge.

So there it is – a couple of hours of pleasant work, some project scraps, a saw, plane, card scraper, and spokeshave, and you'll have another tool to add to the collection. [www](http://www.getwoodworking.com)



In brief...



LUBAN SHOULDER PLANE

The Quangsheng Large Shoulder Plane, available from Workshop Heaven, is a broader, heavier version of the other Quangsheng shoulder planes. Like its siblings it has an adjustable mouth and a super smooth Type 3 adjustment mechanism similar to those found on the current model block planes. 290mm long and 25mm wide the large shoulder plane tips the scales at 1.8kg or just over 4lbs. The body is cast from CR40 steel and precisely ground for squareness and truth and the swan-neck lever arm is cast stainless steel.

Shoulder planes are used for finishing and fine-tuning the mating surfaces of joints. They are not really a core tool (although you do need at least one plane in your arsenal that can reach into the corner of a joint), but rather one that you invest in when you are ready to take the quality of your work to the next level. The additional mass of a large shoulder plane provides excellent registration to the batten, corresponding joint surface or planing block, so although they feel huge when you first pick them up, for many applications they are easier to use than a small- or medium-sized tool. Priced at £119.50, see www.workshopheaven.com.

IT'S ALL GOING ON AT YANDLES!

There is a range of upcoming events taking place at Yandles in February, including the Charnwood Road Show & Sale on 4 February, which features exclusive shows deals, both online and in store. Expect to receive free expert advice on all Charnwood machines and save 15% on all self-select timber. There will also be free bandsaw and planer classes throughout the day as well as a range of woodturning demonstrations. 9 February sees the Startrite Industrial Day taking place, which will also feature exclusive show deals and free expert advice on all Startrite machines – past and present. Again, save 15% on all self-select timber and a range of demonstrations will be available on request. Visit Yandles on 10–11 February for the Record Power Road Show & Sale, which will also feature a wide range of show deals, free expert advice on all Record Power machines and a range of demonstrations taking place over both days. To find out more, see www.yandles.co.uk.

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Very highly regarded in Japan, until recently the Atoma diamond plates have been virtually unheard of outside their country of origin. The Atoma plates differ from other diamond plates in that the microcrystalline diamonds are arranged in clusters as opposed to being a continuous covering. This diamond arrangement abrades much more aggressively than the more commonly available diamond plates and coupled with Atoma's high fracture resistance, results in a surface that cuts quickly, resists wear and produces far more consistent scratch patterns. The cluster pattern also minimises loading and hydraulic lock.

As with all diamond tools, the Atoma plates should be flushed with water or light oil while in use to prolong the life and performance. The diamonds are electro-bonded to a stainless-steel sheet that is mounted to a 10mm-thick aluminium block. This type of construction makes the plates durable, rust-resistant and extremely flat.

Range of grits

All Atoma plates measure 210 × 75mm and are available in the following four grades, with prices ranging from £79.99–£89.99.

140 grit: used for flattening sharpening stones that require significant correction or heavy steel removal.

400 grit: used for maintaining sharpening stones, correcting chips and minor blade edge defects.

600 grit: used for maintaining fine sharpening stones and minor blade edge work.

1,200 grit: used for final sharpening and flattening of blades.

The Atoma range is available now. For further details or to find your nearest stockist, see www.johnsonstools.co.uk.

Tsuboman ATOMA



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NEW IMPACT DRIVER FROM MAKITA

Makita has introduced a new operating mode with the launch of the latest 18V Brushless motor impact driver. The new Makita DTD170 impact driver is technically a six-function impact driver, with four speeds and matched impact power. T-Mode is used for tightening self-drilling Tek screws and the new A-Mode (Assist mode) which, when selected, starts the rotation slowly, allowing maximum control of the screw as it starts to bite into the material. Once the impact driver detects the screw tightening, it switches to full speed and full impact power to complete the tightening sequence. The A-Mode is designed to eliminate 'screw cam-out' and 'cross threading' caused by high speed rotation before the screw bites in the material.

The new Makita DTD170 generates a massive 175Nm maximum tightening torque with four impact speeds and power stages ranging from soft setting of 1,100rpm and 1,100ipm, through medium and hard setting levels up to a maximum of 3,600rpm and 3,800ipm. This impact driver also handles high strength bolts up to M14 and 22 × 125mm coarse thread screws.

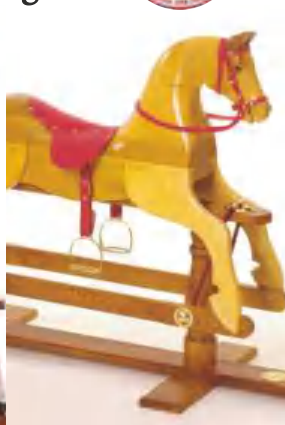
In line with all new Makita tools the performance increases while the overall size of the machines decreases. The new top-of-the-range Makita DTD170 impact driver has a compact overall body length of just 117mm and weighs only 1.5kg.

Two further replacement models are introduced to Makita's impact driver range: the DTD153 single-speed driver produces 170Nm of torque, 3,600ipm and runs up to 3,400rpm while the DTD154 three-speed model also has the T-mode for self-drilling screws. All three machines have Brushless motors; ½in hex; one-touch bit chuck; an electric brake; variable-speed control trigger; LED job light with pre-glow and after-glow, and ergonomically designed soft grip handle. To find out more, see www.makita.co.uk.



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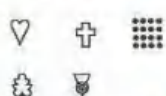
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In brief...

LIVING ROOF ARBOUR

Jeremy Harper is used to making something out of nothing. For 20 years he has worked as an arborist and commercial site clearer, which has taken him across the UK to remove unwanted trees and hedges, often repurposing would-be waste materials and giving them a new lease of life, but he admits that he has surprised himself with a personal project to build a living arbour in the garden of his family home in Milton Keynes, Buckinghamshire. "The idea came from a trip through Norway and Iceland where my wife and I saw quite a few green roof structures on sheds and commercial buildings," he says. "It triggered an idea that I wanted one at home. It was my first attempt at creating something like this in the garden and we made space by removing our grandchildren's play equipment, then writing down a few rough dimensions on some scrap paper. I looked at the size I wanted and decided on 200 x 200mm uprights and 100 x 50mm joists." On top of the structure sits the wild, green roof, which exploded with colour throughout a wet and warm English spring: "We put wooden stepping stones around the roof to avoid having to tread on the plants, then shook some wild flower mix into the top soil."



Jeremy in the garden with his living roof arbour

Jeremy says he was fortunate to have the materials available and the right tools for the job. He regularly mills wood for customers, creating bespoke sizes suitable for use in building, furniture and woodturning. He uses a Wood-Mizer LT40 mobile sawmill, which he bought second-hand about five years ago. It is housed in a barn across the road from Jeremy's home. His business owns five cranes for moving wood around on site, but he says that for this particular project, he didn't make it easy for himself. "We moved everything by hand!" he says. "The uprights were the heaviest part of the timber work but the gravel we had to carry up the ladder to put on the roof was the most labour intensive part."

The upright posts are sunk into the ground and secured with soil. They bear the weight of the structure, which is crossed



Milling up timber for a local order

with the joists. On top of the joists sit 25mm boards, which form the base for the living roof, which is waterproofed with pond liner, then protected with geotextile layer to keep the roof watertight.

Jeremy then put down the heavy gravel – bags of 30mm stone designed to improve drainage – and then covered it with a root barrier topped with a layer of carpet to help with moisture retention. The green roof physically grows in a mixture of composted wood chip and screened topsoil. To improve drainage, flat roof drainage points are glued to the liner and the run-off is carried down chains, which water the plants at ground level.

The end result is not only impressive but something the whole family can enjoy – whether that's sitting underneath it or weeding on top of it. To find out more, see www.arbwork.co.uk.



TOUGH WORKING CIRCULAR SAW

Hitachi Power Tools has introduced the powerful C9U3 235mm 2,000W circular saw, which is designed to cut through tough timber in double

quick time. With external brush caps and a unique angle setting system to ensure the accuracy of 90° cuts, the C9U3 circular saw is both easy to use and extremely precise.

The tool is also very sturdy and practical with an aluminium blade cover and heavy-duty aluminium base. The very long 4m power lead allows the C9U3 to be taken wherever needed and the cord holder ensures the mains lead is clear of the cut line, so it doesn't get in the way of the operator.

Soft grip handles make the machine comfortable to work with and a blower moves dust and debris away to ensure the cut line is always visible. The saw is also supplied with an adjustable metal cut line guide, spindle lock for easy blade replacement, plus a dust extraction adaptor, wrench and carrying case. To find out more, see www.hitachi-powertools.co.uk.

FURNITURE APPRENTICESHIPS GETS MINISTERIAL

We are pleased to announce that the new Furniture Manufacturer Apprenticeship Standard and Assessment Plan, which has been developed by employers, has been approved and is now available for delivery. The standard includes the following occupations:

- General Furniture Manufacturer
- Bed Manufacturer
- Modern Upholsterer
- Furniture Finisher
- Fitted Furniture Installer
- Furniture Restorer
- Modern Furniture Service Repairer
- Foam Converter and Upholstery Cushion Interior Manufacturer
- Wood Machinist
- Furniture CNC Specialist

The apprenticeship standard and assessment plan has been published and replaced current frameworks from 1 December 2016 as part of the Government's apprenticeship reform programme to make apprenticeships more rigorous and more responsive to employers.

The Apprenticeship Standard and

Assessment Plan can be found here: www.gov.uk/government/collections/apprenticeship-standards#furniture-standards.

Occupational Awards, who have provided support to the group, and will become the Registered Apprenticeship Assessment Organisation, said: "We are delighted about this announcement as it is testimony to the dedication and hard work which the employer-led group has put into this exciting apprenticeship reform," said Lisa Williamson, Managing Director. "The approval of the new Furniture Trailblazer standard marks a significant milestone for the furniture sector. We would encourage all furniture employers to join the illustrious list of those companies already involved."



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The machined mortises and loose tenons simplify a difficult joint



Reaching the moment of truth as I first assemble the mirror frame's mitre joints

these issues are intolerable by any stretch of the imagination, mind you.

Why aren't I using protective cramping pads between the clamp heads and the work? Well, I recall my tutor saying that if a job was any good, only minimal pressure should be needed to press the joints together, and I stand by that.

TIP

Make sure that your shoulder or rebate plane is sharpened with its edge dead square to the sides. It is essential that the sides project very slightly beyond the flanks of the plane

Cramp your style

Before fine-tuning of Jeff Gorman's mirror frame can begin, some clever clamp-work is needed to assemble the joints

I've recently reached the stage with a mirror frame made from recycled American oak where I could insert a loose tenon (photo 1) into each mitred corner, and was ready to check the fit with a dry cramp-up.

Although I do have a few steel sash clamps, I prefer to use ones I made from pairs of clamp heads that fit a series of 10mm holes drilled at 75mm intervals in stuff 65 x 25.4mm. I like to use them because I could fairly cheaply and easily

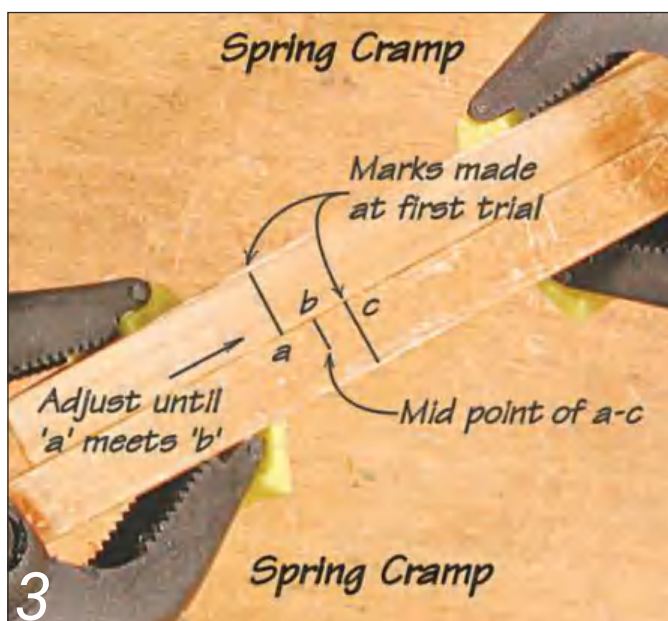
make up sets of varying lengths if required, and also because they're light and lack sharp edges that can dent the work during a hasty bit of gluing-up. They also eliminate the risk of dark blue stains from the interaction of glue and woods containing tannin (e.g. oaks) and the steel parts.

On the downside, there is the need to assemble cramp pairs of whatever length I happen to need, and the heads have a certain floppiness about them (though they actually firm up when in action). Neither of

Thinking diagonally

With the job mounted between two longitudinal and two transverse clamps, I alternately tweaked the screws of the clamp pairs to align each corner's inlay bands, trying not to disturb the other corners. Once this was done, I tested for square by seeing whether the diagonals were of equal length. For such jobs I usually select a telescopic aerial from an assortment I've salvaged from old radios, but this time it was more convenient to use a set of ready-prepared 'diagonal rods' cramped together with a pair of spring clamps (photos 2 & 3). I approached this by setting the rods across one diagonal and striking a line across the rod's upper edge. Following that, I adjusted them to fit the opposite corner and then followed the procedure shown in the photo.

I'd prepared the rebates on a cheap and



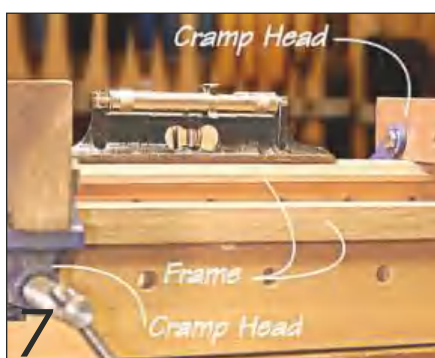
One of my famous dodges, this time for checking the diagonals of the frame



Improvising a tool for marking the difference in levels...



5 ... and making a mark to show how much has to be removed



7 A spirit level can be used to check for twists in the frame



9 A bull-nose rebate plane comes in handy for a narrow surface

rather tinny router table, so when turning the job over I was not very surprised to find some slight misalignment of the rebate surfaces. Now I'm firmly convinced that if ill-fitting parts of a job are to be tweaked, it is far better to plane or saw to a definite mark than to blindly fiddle away. Therefore, to define the level difference with a reliable witness mark (photo 5), I hit on the idea of sharpening the edges of a broken artist's spatula (palette knife) (photo 4).

Although the witness marks showed the ultimate limit for the shoulder plane's action (photo 6), I had to resist the temptation to work solely on the corners. For the sake of a good fit between the glass and the frame,



6 My shoulder plane corrects the router's less than perfect job



8 The support removes some of the risk in this tricky job



10 One or two strokes of this very fine file serve to trim the arris

I planed a flat surface the full length of the rebate. Being almost ready for the glue-up I remembered to check for the possibility of a twisted frame, easily overlooked. Seating a pair of winding rods on opposing frame sides (or even a quick sighting across the frame) would have been a sufficient check, but knowing the limitations of bifocal specs, the spirit level (photo 7) inspired greater confidence. It happens that my bench-top is fairly flat and generally free from wind, although the check revealed that I needed to prop up one corner by about 5mm to eliminate twist in the setup. In view of the possibility of a spring-back after gluing-up, I would have

been rather concerned if any significant force had been needed to do this job.

JARGON BUSTING

Arris: The sharp edge formed at the junction of two surfaces

Witness mark: The trace left by the passage of a tool

Gluing & cleaning

During some earlier tests not reported here, I discovered that when wetted, the dye of the black lines could spread into the surrounding wood, so I'd taken the precaution of pre-sealing the surface with a two-pot lacquer (Rustins' furniture-grade plastic coating). This meant that I could confidently borrow the greenhouse's water spray bottle and brush off the PVA glue squeeze-out.

With the clamps removed I was relieved to see I still had a twist-free frame and was not too surprised to find slight discrepancies in the back faces that needed cleaning up with the smoothing plane. Unwelcome experiences with panelled work (and edges of boxes) have shown that this job needs to be approached rather gingerly. As the plane turns the corner, it is all too easy for its fore edge to crash into the inside edge of the frame. However, in the case of this open frame, I could support the job with a vice-held offcut (photo 8) while the rest of the job was clamped to the bench-top with a forged 'spring holdfast'. The broad top of the vice cheek supported the frame, and the corner of the support offered a convenient turning post that made a doddle of an otherwise tricky job.

Riding a smoothing plane on the narrow frame borders could have been a little tricky, but for removing slight differences in level, my dinky bull-nosed rebate plane came in very handy (photo 9). It happens that I think a job's arrises can say much about the quality of a piece, and this action had modified the minute arris relief I'd formed before the glue-up. It would, of course, have been very difficult to reliably get any plane into the frame's inside corners, but I've found that one or two (and only one or two) careful passes of a 'dead-smooth' file can form a flat equal to one from a very finely-set plane. [www](http://www.getwoodworking.com)

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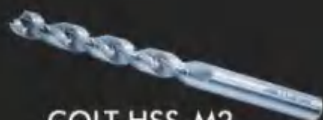
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A turned home for treasures

Using a little-known technique called 'flocking', Colin Simpson sets about turning a charming three-tiered trinket box

For this month's project I am going to make a three-tiered trinket box and also introduce a technique that may be new to many of you: it's called 'flocking'. It is not an essential part of this project – you can make the box without flocking, but the technique does line the tiers nicely. You can buy a flocking kit online via Amazon or at Turners Retreat (www.turners-retreat.co.uk) where I got mine some years ago.

Mounting the blank

As always, this project is scalable to whatever size you like. I started with a piece of ash about 130mm long x 100mm square. You will also need a piece of metal rod – I used brass – about 6mm diameter. Find the centre of both ends of the blank, mount the piece between centres and turn to a cylinder using a spindle roughing gouge (**photo 1**). Square off one end and cut a chucking spigot on it with a skew chisel (**photo 2**).

Start at the other end to this spigot and mark approximately 20mm in from the end and then marks at about 35mm spacing. The 20mm part will become the box's lid and the three 35mm pieces will be the three tiers. Draw these marks around the circumference of the box (**photo 3**) and then use a parting tool to cut a 10mm deep groove at each of the lines (**photo 4**). Mount the piece on the spigot in your chuck and face off the top of the lid. I have some chuck jaws (the Axminster jumbo jaws) that will comfortably hold the outside diameter of my box, but if you don't have this luxury, then you will need to turn another chucking point on the lid of the box or, alternatively, make a jam chuck. Draw a reference line along the length of the piece and number each 'part' (**photo 5**).

Drilling the tiers

Remove the blank from the lathe and use a pillar drill for the next step. Unless you have a long enough twist drill to drill the length of



1 Mount the blank between centres and convert to a cylinder



2 Square off one end and cut a chucking spigot



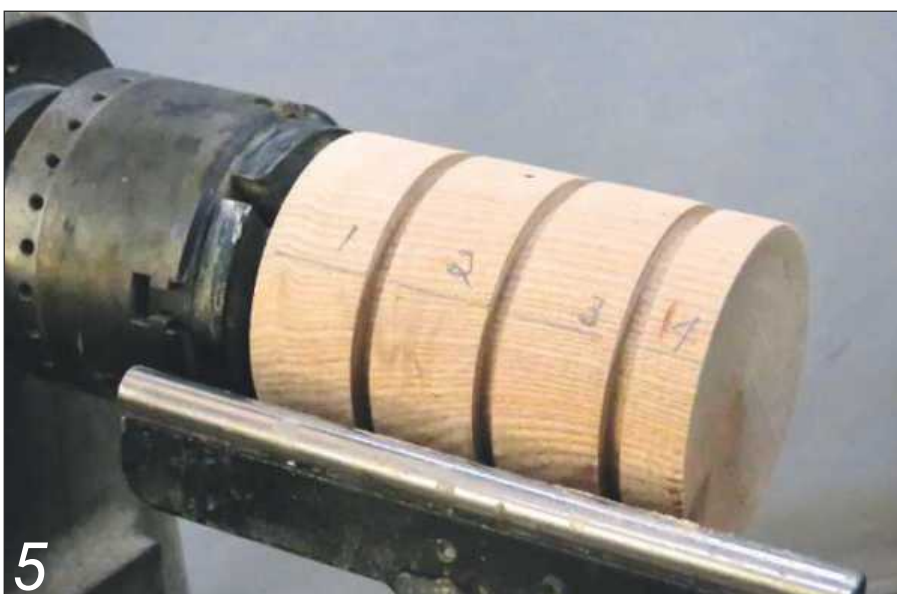
3

Mark out the lid and three tiers...



4

... and make a 10mm deep parting cut at each mark

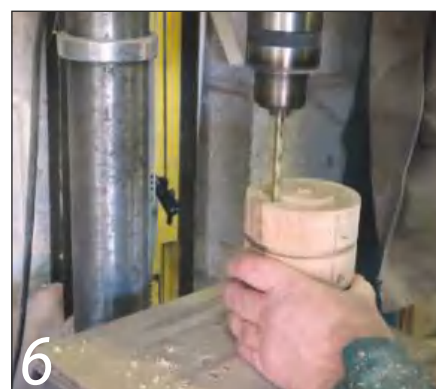


5

Make a reference line on and number each piece

the piece, you, like me, will have to drill a hole in stages. Mount a twist drill bit in the pillar drill the same diameter as your metal rod – in my case 6mm. Start at the bottom of the box and drill a hole about 15mm in from the circumference. Make sure you drill right the way through the bottom tier and into the middle one to start the hole in the middle tier (**photo 6**). Remount the piece on the lathe, chucking

it on the lid and part off the first tier using a narrow parting tool (**photo 7**). This parting cut should be made on the right-hand side of the 10mm deep groove cut earlier, leaving a spigot on the middle tier. I am happy to part all the way through using the narrow parting tool, but if you prefer, you can cut part way through and then use a saw to separate the two pieces (**photo 8**). You should be able to see the remains of



6

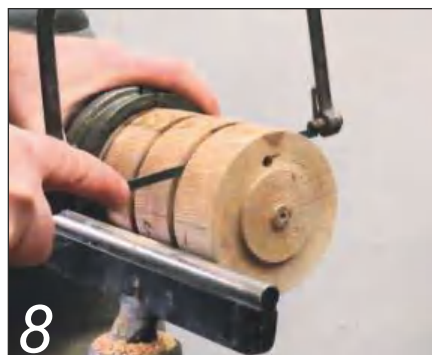
Drill a 6mm hole in the base, ensuring it is deep enough to mark the middle tier

the hole in the middle tier. Next, remove the piece from the lathe and repeat steps 6, 7 and 8 continuing the hole in the middle tier through to the top one (**photo 9**). Repeat these steps again to complete the hole in the top tier and part this off from the lid. Be careful not to drill all the way through the lid. A blind hole about 10mm deep is sufficient in the lid. This does seem like a tedious process and it is, but it does ensure that the hole in each piece is exactly aligned so the grain will match as closely as possible on the finished piece. Clearly, if you had a long enough drill bit, you could drill once from the base through to the lid and part each tier off without having to return to the pillar drill.



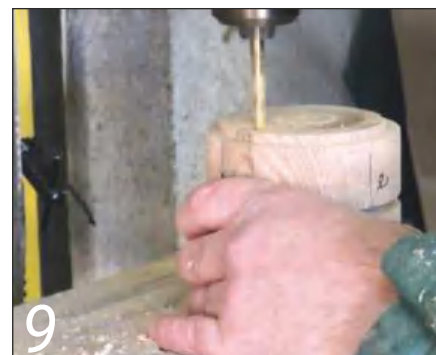
7

Return it to the lathe and part off the base completely...



8

... or cut it off with a saw



9

Back to the pillar drill to continue the hole in the middle tier



10
Hollow the base by first drilling a hole in the centre with a spindle gouge...

Hollowing the tiers

The next step is to hollow out each tier. Mount the bottom tier in the chuck using the spigot made in step 2 and drill a hole about 20mm deep in the centre using a spindle gouge (**photo 10**). Hollow it out, starting in the hole and cutting towards the rim (**photo 11**). Most of the waste wood can be removed using the spindle gouge. To cut a straight-sided, flat bottomed hollow I used a hardwood scraper (**photo 12**), but a skew chisel used on its side will work just as well. Keep checking the depth of the hollow and don't make the base too thin (**photo 13**). The diameter of the hollow must be wide enough for the spigot of the middle tier to fit into comfortably, but not too tightly.



11
... then make cuts from this hole towards the rim



12
Use a scraper to square up the side of the hollow and flatten the bottom

If you are not going to flock the inside of the tiers, you will need to sand and polish it now. Remove the bottom tier from the lathe and mount the middle tier to face off the spigot (**photo 14**). Sand and polish this spigot and then reverse it in the chuck to hollow in the same way as steps 10-13. Repeat these steps again for the top tier and then mount the lid to face off the underside. Sand and polish the underside of the lid and reverse it in the chuck to work on the top. I decided to cut a number of small beads on the top of mine, using a skew chisel (**photo 15**). You can then sand and polish the top of the lid.

Flocking

Flocking allows you to create a professional



13
You can then check the depth of the hollow using a depth gauge



14
Mount the middle tier and face off the spigot, then reverse it and hollow as before



15
I cut a number of decorative beads on the top of the lid with a skew chisel



16
My flocking kit



17
Paint on a generous amount of adhesive...



18
... and then use the pump to blow on the fibres



19 Reverse chuck the base onto a dolly to remove the chucking spigot

looking suede-like textured surface in a number of different colours. The kit comprises a tin of undercoat adhesive, the nylon or rayon fibres and a mini flocker, which is basically a cardboard pump (**photo 16**).

Coat the area you want to flock with a generous amount of the colour coordinated undercoat adhesive (**photo 17**), fill the pump with the fibres and blow them onto the adhesive. Do not skimp on the fibres; give the glue a very generous amount (**photo 18**). Do not be tempted to pat down or otherwise touch the flocked area until the adhesive has dried. I left mine overnight. It was now that I sanded and polished the outside of each tier, but, in hindsight, it would have been far better to sand and polish the outside before parting them off at step 7. Remove the spigot on the bottom tier by mounting it against a dolly in the chuck and bring the tailstock up to the original centre mark in the spigot. Use a spindle gouge to remove most of the spigot (**photo 19**).

Assembly

To assemble the box, put the pieces together in order and with the lid at the bottom. Put the



20 Mark the length of the rod

metal rod through all the pieces and ensure it sits in the blind hole of the lid. Mark the length of the rod (**photo 20**) and cut it to length.

Counterbore the hole in the underneath of the bottom tier using an 8mm hole, drilling about 6mm deep, but be careful not to drill out all of the previous 6mm hole (**photo 21**). There needs to be a step in this hole. Use a ball pein hammer to flare over one end of the metal rod so that it slides easily in the 8mm hole but cannot go



22 Flare over one end of the rod so that it cannot go through the 6mm hole



21 Drill an 8mm counterbore on the underside of the base about 6mm deep

through the 6mm section (**photo 22**). Next, reassemble the tiers in order and glue the unflared end of the rod into the blind hole in the lid. I used epoxy resin for this (**photo 23**). It is important to ensure that there is sufficient up and down movement of the metal rod to allow each spigot on the bottom of the tiers to clear the hole in the tier underneath (**photo 24**). Finally, allow the glue to cure and sit back and admire your work (**photo 25**). **WWW**



23 Reassemble the box and epoxy the rod into the hole in the lid



24 Check the rod moves in the stepped hole to allow each tier to open freely



25 The completed three-tiered trinket box



Don't despair of ring marks on your furniture, advises Stephen Simmons

RINGS OF DOOM



It's a curious thing but I've never met anybody who admits to making a white ring mark – it's always somebody else's fault. The usual candidates are 'my husband' or 'my wife'. But that's not the main problem. They are made by leaky vases and hot, wet mugs and are therefore left on conspicuous horizontal surfaces. Regardless of the culprit, there's no getting away from them.

Rings are caused by moisture being trapped in the polish, but not in the wood. They are therefore superficial and, despite being disfiguring, are surprisingly easy to tackle. But don't expect miracles. Depending on the type of polish and depth of penetration a vestige of the mark often remains and you may have to accept something less than perfect. And there's plenty of scope for creating an even bigger problem.

How bad is it?

It's critical to establish the type of polish used on the workpiece before you start, otherwise things can go horribly wrong. I use two broad categories: the soft vulnerable ones and hard robust ones. The soft ones are all waxes when used alone and the less durable oils, while the hard are all modern lacquers and varnishes, polyurethane, cellulose and back to French polish.

So, what to do? If the surface is badly defaced with multiple rings, stripping and repolishing is a realistic option but for the odd mark it's worth using less desperate measures.

Always try a bit of cleaning first. Ironically surface grime does protect and much of the mark can be there rather than in the polish. Clean a hard polish with a mixture of pure turpentine, raw linseed oil, meths and vinegar in equal proportions, applied with a soft cotton rag. But beware, this mixture can completely strip a soft finish. In this case, just use a beeswax and turpentine polish, applied very gently with '0000' grade wire wool and buffed off immediately. I have known marks reduced to a perfectly acceptable level in this way, with no other effort necessary. But you do have to clean the whole surface rather than just around the mark.

Set fire to it

If nothing happens, it's time to get serious. For hard finishes, the options range from the flamboyant to the elegantly simple. The modern ones are the most robust and the most difficult to mark but they get progressively more susceptible as you go back to the 19th century. French polish is the most vulnerable and given the huge amount of furniture polished in this way up to the 1930s, it is likely that a high proportion of marks will be in these shellac-based finishes.

The traditional trick is to set fire to it – a flash of controlled heat drives out the moisture. Wipe a little meths over the area with a cotton wool bud, put a match to it and then smother the flame after a couple of seconds; and make sure you keep everything under control. It looks dramatic and it usually works but there are disadvantages. The heat can deform a previously immaculate surface or loosen veneer, so you risk just substituting one problem for another.

French polish

When it comes to French polish you can forget the pyrotechnics... This is where the elegantly simple solution comes in. It may be the easiest finish to mark but it's by far the easiest to repair. Simply wipe the area with a rubber containing a little diluted shellac. Shellac is its own solvent and a wipe reactivates the existing polish, allowing trapped moisture to escape.

The mark often disappears completely at the first attempt but you may need three or four wipes for a stubborn mark deep in the polish. Should you try it on a surface other than French polish and nothing happens, it won't do any harm.

The treatment is most effective if you de-wax the surface first by cleaning with white spirit on a cotton rag and letting it dry thoroughly. And resist the temptation to use a mop (brush) – it will deposit too much polish and make a mess of the existing polish. To test for French polish, dab an unobtrusive place with meths – if it goes sticky when you work it with a finger you're in luck.

Go slow

Soft finishes demand a different approach, and the removal or reduction of the mark can be more of a gradual process than a one-off event. Repeated vigorous buffing with a cotton rag is often enough for a wax finish, and if this doesn't work, put a little beeswax polish on the rag. For an oil, follow the same principles, plain buffing first and then repeat with some of the same oil, again on a cotton rag. In both cases you may work up a bit of a sweat over several sessions.

White marks in all finishes sometimes have corresponding physical damage when heat has deformed or melted the surface. As it is more difficult to remove, always deal with the more disfiguring white ones first. Without them other damage becomes less obvious and often acceptable. **WW**

TIP

If you do create a white mark, don't tackle it straight away. Just wipe away the liquid, dry the surface and leave the polish to settle overnight. This reduces the risk of doing even more damage



1

Ring removers work on the same principle as heat but from friction rather than flame



2

Avoid white ring marks altogether using a simple device – the coaster!



Words: Mansoor Iqbal; **photos:** Paul Felix

FURTHER INFORMATION

To find out more about Robin and see more of his work, visit www.robin-wood.co.uk



FOOTPOWER

Meet Robin Wood, the traditional nest bowl turner who rescued a lost craft

In the mid '90s, Robin had reached a career crossroads. Having progressed as far as he could in a role at the National Trust that combined management and forestry, his next option there was to accept an office job, which he didn't much fancy; it would mean an end to the hands-on work that he had such a passion for. He had been apprenticed to a practitioner of "old style estate management," who learned his trade before the advent of the chainsaw, and from whom Robin learned to make use of what the estate provided. One particular fence he built in Kent from storm blown sweet chestnut stands as testament to this approach, some 20 years on.

At the time, the National Trust was reintroducing coppice management (felling trees in such a way that they will regrow rapidly from the stump, utilising the existing root system) in Hatfield Forest. "There was no market for small diameter wood," Robin recalls, as this was before the upsurge in demand for firewood. The small shoots were therefore redundant – or would have been had Robin not managed to find a solution that also helped him to solve his vocational dilemma.

You see, he had been researching medieval woodcrafts, and had stumbled across the work of George Lailey...

Nest bowl turning

George Lailey passed away in 1958, and with him went a part of English culture. Like his father and grandfather before him, Lailey was a bowl turner from Berkshire. Wooden bowls had been a staple of English households for centuries, but the specific trade plied by Lailey had been dying out due to industrialisation and the increasing prominence of ceramics.

What made Lailey so unique was his technique of using a foot-powered lathe to produce nesting bowls. This meant that a small amount of material could be made to yield a large amount of product; from one blank several bowls were made, making use of nearly every part of the wood, whereas in normal bowl turning there's a great deal of waste. Nest bowl turning was made possible by the extra control that a foot lathe offers and the use of long carving tools that allowed the turner to cut the inside very close to the bowl.

Lailey was the last of his kind, and had been for some time before his death. So when he passed away it appeared that this ingenious approach had been consigned to the history books, never again to grace the workshop of contemporary woodturners. Robin Wood had other ideas.

The efficiency of Lailey's technique



Robin will start a nest of bowls by shaping up the exterior of the large bowl blank using a hook tool



You can see just how large the bowl is here – from a 510mm 'mummy' bowl, Robin can get five bowls

provided Robin with the perfect solution for his surplus of small diameter wood from coppicing. "Using electric lathes to turn individual bowls would turn the whole inside of the bowl into shavings," Robin points out, and so nesting bowls had an immediate, obvious attraction. He was also enamoured with the traditional process – which was in keeping with his National Trust apprenticeship – and the natural look that Lailey's techniques



3 This technique of using the interior of a bowl to form further bowls saves so much on waste



4 The result is a beautiful nest of bowls, keeping alive a craft that was thought to have died with George Lailey



5 For various reasons, Robin makes all of his tools himself; they make for quite a collection

created. In rediscovering traditional bowl turning, Robin had found the basis for a new career and with a fresh sense of purpose, he set off on a journey that would change his life.

Taking up the craft

The first task he faced was the construction of a foot-powered pole-lathe that would be suitable for the task. Those of you interested in pole-lathes will know that there are variations on how to go about this, and different lathes for different tasks, i.e. bowl or spindle turning. Initially, Robin stuck with a bowl lathe. "Many bowl lathes were built by having a heavy headstock dug into the ground like a gatepost," he explains; if you go down this route then the bed doesn't need to be massive, as only the tailstock needs to move. The design Robin came up with was a compromise between easy build and mobility: "I used a log about 300mm diameter split in half with heavy legs socketed in chair style, then I cut a slot for the poppets with a chainsaw." He says that softwood will work for a pole-lathe, but that hardwood is preferable; ash, much-loved by green woodworkers, is highly suitable.

From the start, Robin's inspiration came from the timber itself. He buys all of his stock locally from a tree surgeon in Sheffield, selecting the finest pieces of wood and turning them into whatever works best. He's particularly fond of alder, a timber little used today but popular historically and therefore useful for the historical replica commissions he regularly receives (more on this later).

With the lathe in place and the timber selected, the next step is to make the bowl blanks. As his stock comes from the coppice trees, with a bit of work using a chainsaw, he has timber almost ready to use. "I tend to make about a week's worth of bowl blanks at a time," he says. Blanks are rough-shaped and then mounted onto a spiked mandrel.



6 Robin's recreations of medieval drinking bowls are pretty special...

The outside is turned using a hook tool, and then the bowl is reversed, allowing the inside to be shaped. "If I'm making a bowl 150mm inside, the inside is shavings," Robin states. "Anything bigger than that and I'll save the core and use it to make smaller bowls." From a 530mm bowl blank Robin can get as many as five bowls. Using a pole-lathe is physically far more demanding than an electric lathe but Robin believes that, overall, the process brings greater rewards.

Using long carving tools not only makes the nest bowl turning process possible, it also gives the pieces a tool mark finish and authentic appearance that complement the traditional manufacturing process: "Abrasive paper is a 20th-century invention," Robin reminds us, and so it has no place in his craft. The onus is firmly on the turner to get a clean finish using his tools.

It should be noted that Robin's tools, like his lathes, are all homemade. This stems in part from financial restraints, and also from a lack of appropriate tools on the market, but in any case, it supports his ethos of self-sufficiency: "Making your own tools is easier than you would imagine," he says. "It's a learning experience, it's fun and also very liberating."

After the bowls have dried out for a few weeks, Robin finishes them with vegetable oil, applied hot. They're then ready to use, the end product of traditional techniques that can be traced backwards from George



7 ... and involve collaborations with silversmith Owen Waterhouse. This one is a 'quaich'

Lailey to medieval times, when every town and village would have had their own pole-lathe bowl turner like Robin.

Coming to prominence

Having brought the traditional art of bowl turning back from the dead, Robin has naturally become an authority on the craft. In 2005 he penned *The Wooden Bowl*, a definitive history on the subject that stretches back to the pre-Viking era. He has worked with archaeologists on the *Mary Rose* project and has been featured in several publications including *The Telegraph*, *The Guardian* and *Country Life*, to name but a few. He's also a regular demonstrator at woodworking shows, entering competition races with bowl turners using electric lathes – which he nearly always wins, we're told. By the end of the show he's generally amassed the most shavings around his lathe, a source of pride for Robin that bears testament to the functionality of the pole-lathe and his techniques.

Apart from keeping a valuable tradition alive, the ancient techniques used have practical applications for those trying to recreate the aesthetics of the past. Robin's handiwork has graced many a period set, the discerning filmmaker appreciating the authenticity of his creations; one example is the set designer from Ridley Scott's *Robin Hood*, who owned a copy of *The Wooden Bowl*, and liked what she saw. If you've seen

the film, the bowls are all Robin's work, as is a lathe that appears in the background of one scene. "I was impressed with the authenticity of the set," confirms Robin, who was given the opportunity to visit the set during shooting. "I came across lots of other traditional makers while I was there, such as Owen Jones and P.H. Coate," who are oak and willow basket makers respectively (Owen Jones featured in *WW* Oct). An expert, Robin informs us, could easily spot the Eastern European antiques that are often used in period productions due to their availability at a fraction of the price of custom-made products.

Endangered species

As his profile has grown over time, Robin has begun to transcend his figurehead status in traditional turning, coming to stand increasingly for traditional crafts in general. He argues that over the last 25 years, traditional crafts have been neglected in favour of innovative ones

to the point that, "many of our crafts are down to their last practitioner. If they were to be hit by a bus that would be it, a whole craft gone forever." In an effort to help protect this heritage, Robin and a number of his fellow craftsmen set up the Heritage Crafts Association in February 2009. Their aim was to create a support network, so that endangered crafts can be preserved. Robin draws a parallel with listed architecture: "We try to preserve a good cross-section of buildings, so why not do the same thing with crafts?" he argues. With His Royal Highness The Prince of Wales as acting President and a long list of esteemed trustees, patrons and special advisors, the HCA (with Robin as chairman) has been making a massive difference since its inception, and continues to do so.

Outwards looking

Although he has made his name in British crafts, Robin's eyes aren't trained solely on old Blighty, either. In fact, he has a keen

appreciation for work stemming from other parts of the world: "It's easy to just think you know everything," he explains, "but you can learn a lot from other traditional woodworking cultures. I went to Romania in 1998 and saw a beam being hewed in a way I'd never seen before, for example..." He is particularly interested in Native American and Scandinavian work, and has incorporated elements of both into some of his pieces.

A few years ago, Robin and other European woodworkers visited Japan as part of the Kesurokai project (which means 'planning together' in Japanese), organised by Hannes Schnelle, who spent some of his journeyman years in the Far East. The idea being to demonstrate European techniques such as timber framing to Japanese master craftsmen, who made the opposite journey in 2005 and 2007.

Robin's approach to his craft is clearly an outward looking one, and as a result, it's doing much to reinvigorate the traditional woodwork of legends such as the late George Lailey. With the likes of Robin and his fellow craftsmen around, there's more hope than before that pole-lathe turning and other crafts will be safe for generations to come. But, of course, they rely on the interest of people like you to maintain their current momentum. Visit www.heritagecrafts.org.uk to see what you can do; whether it's making a donation, joining campaigns or just having a conversation, there are plenty of ways you can help. www.ww



The bowls shown here are based on a drawing Robin found from mid-15th century Braunschweig in Germany...



... while these were inspired by 10th-century bowls from Balinderry Crannog, Ireland



Not just for show, Robin's bowls and plates are meant to be used and enjoyed!



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Woodwork Course 2 (Wood and Things)

This is a continuation of course 1 (tools and things) with the emphases on timber, what are acceptable defects in timber and what isn't, how do you write out a cutting list that means something to your supplier, what to look for when buying wood and what to avoid.

You will ideally have done course 1 (tools and things) or have a good working knowledge of how to use hand tools and have used hand held power tools.

The projects for you to pick from will be more complicated and will involve the use of the more sophisticated hand tools and hand held power tools and will include using some of the static power tools in the workshop. We will also be looking at buying timber, making cutting lists and drawing plans.

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The **ultimate** worktop?

When it comes to benches, everyone has their own idea of what's best. Andy King goes his own way...

If you're ever in need of a lively debate, there's a question that's sure to provoke some discussion: what's the best worktop for woodworking? You'll probably find that there's general agreement about ready-made benches: they're the 'best' if you're looking for an off-the-peg solution, but they can be very expensive, and you'll often find that they're not quite what you need. Building your own, most woodworkers will say, is both satisfying and cost-effective, and just as importantly, you can make it to suit your own needs. And that, of course, is where everyone will have a different idea of 'best'...

Start with the basics: frame & legs

Though we're talking about worktops here, you also have to consider the bench as a whole. After all, the legs must be able to support not only the weight of the top and any work placed upon it, but also withstand the pushing, pulling and pounding of normal working practices.

For this reason, a basic framework is best, one that's solid enough to resist any racking when you start to push against it, when you're planing in the vice, say. Vertical legs are the most direct way to pass loads to the floor, and because their timber is in compression, it's at its strongest. Also, unlike splayed legs and their angled joints, vertical legs won't flex and so offer maximum deadening effect to stop the bench bouncing around.

The frame of my old bench, for example, has a pair of mortise & tenoned trestle ends with 75 x 75mm legs linked by two low, 100 x 50mm rails that are held in place with loose wedge tenons that allow the frame to be knocked down if necessary. The top simply sits on this trestle frame where it's located by cleats; its weight holds it there without the need for screws or other fixings. You can, of course, make the frame more elaborate than this by including storage and suchlike, but the leg assembly must be solid, true and stable.

How high?

The height at which the frame sets the top is up to you, though you're obviously

looking for something that requires you neither to stoop nor stand on tiptoes. The traditional way to determine optimal bench height is to stand with your arms at your side and your wrist cocked so that your hand is horizontal, and then measure the height from the ground to your wrist. It's a useful rule of thumb – unless you have the arms of a gibbon! Then again, different tasks require different stances, and the days of the bench being solely for hand tool work are long gone. So you either need to find a compromise – I find, for instance, that a bench height of around 800mm is comfortable for most of the tasks I do at it – or set the worktop at a lower height and raise it with blocks when necessary.

Old & proven designs

The old standard bench-top designs are a good place to start to look for ideas. School and college benches, for example, often have benches based on the old joiner's style – a couple of thick timber sections set either side of a ply or timber tool well, and fitted with a vice.

The bench in the first 'shop I worked in after my apprenticeship followed this arrangement: two planks of 229 x 50mm softwood with a central ply tool well, and a front and rear made of 180 x 25mm timber. The wear and tear showed that it had provided years of good service, proving the worth of this design: it's robust enough for basic hand tool work such as planing standard sectional stock to joinery sizes, or

chopping mortises by hand, while the boards provide sufficient width for working on wider materials and assembling pieces.

The tool well allows you to keep frequently used tools close to hand, though as they tend to be only 25-50mm or so deep, they'll only hold so much before projecting handles and what have you get in the way. An alternative would be to put the well at the back of the bench, and keep the full width of the bench for working on – something that's particularly useful if you often work with wide boards, say. You could always do away with the tool well altogether, of course, and keep the whole of the top to work on. This requires, however, a bit of discipline with your tools if you're to prevent your work from damage by putting it on stray tools, or risk having your chisels rolling off the edge and injuring either themselves or you.

However it's organised, your worktop must be flat, and in this respect fitting it with breadboard ends will help constrain any movement of the boards and will keep them from going into wind (twisting).

Vices & dogs

While bench-tops may have remained largely unchanged over the years, the





options for holding work certainly haven't: where woodworkers once tacked battens or laths to their worktops, we now have all sorts of hardware from which to choose. That said, a set of traditional bench dogs is a cheap and effective way of providing positive stops to secure your work. A dog need be no more complicated than a wooden wedge with a piece of strip wood to act as a spring and press against its side (see 'the simple bench dog' sidebar).

Of course, you'll also need a vice of some sort to press the workpiece against the dogs, and this is where an end vice comes into its own, as it gives you the whole length of the bench-top to work on. Otherwise, a couple of dog holes behind a front-mounted vice will work equally well for holding smaller pieces.

An example of the growth in workholding equipment, however, is the range of devices that has grown up around the simple dog hole: there's now a whole pack of accessories available to fit into 20mm diameter holes, and what could be simpler than drilling a 20mm hole..?



Making things better

Although my old bench-top had served me well, there are a couple of areas where I wish I'd considered other options when I made it. The size of the top is one: I limited it to what I thought would be good for my home workshop, but you can forget how much you use a bench, even with machines at your beck and call, and a bigger one would have been better. The end vice is another short-coming: I cobbled together an integral end vice, more for use in conjunction with

THE SIMPLE BENCH DOG

While proprietary round bench dogs are based on 20mm holes, you can make your own any size you like. Whatever the size, though, the aim is for there to be just enough friction between the dog and the hole to allow you to push it down level with the bench-top without it falling out. This is achieved by putting some kind of spring in the side of the dog: a length of coat-hanger wire will do the job, bent so that it protrudes out of the side of the dog and is squashed as the dog is pressed down

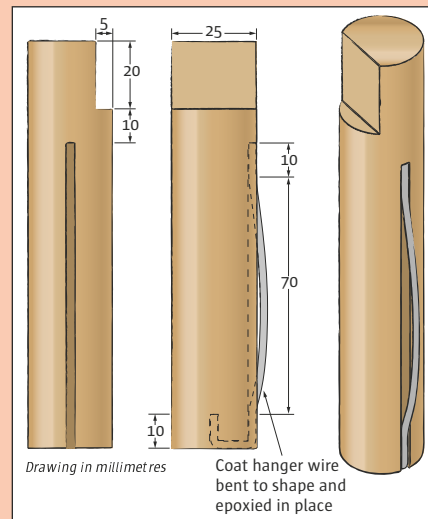


Fig 1. A simple bench dog

THE BENCH: a place of work or worship?

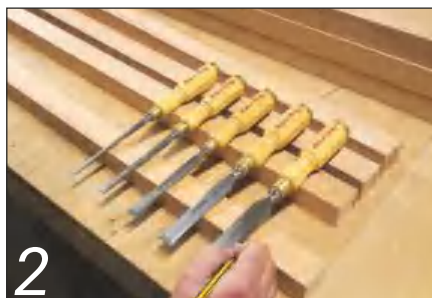
"The bench," wrote Jacques-Andre Roubo, "is the first and most necessary of the woodworker's tools." It's not hard to agree on this, but one issue that is sure to cause an argument is the question of whether a bench is a tool or an object of adoration! I've seen benches that were better built and finished than many dining tables, but I'd be too scared to work on them for fear of causing damage! In my view, a bench is a workhorse, and mine has pin holes all over it where I've tacked strips as stops or anchored folding wedges to hold a piece while it's being worked. I do try to keep the saw away from it, though, using bench hooks or sacrificial scraps to avoid making cuts in it

dogs than holding in its own right, and over time I found that its functions were limited.

Now, however, it was time to build a new top, something longer and wider, and with an end vice that holds stock in its jaw as well as up against dogs. Spending time considering how I wanted the bench to work for me I decided that, while I like tool wells, I didn't want to lose all of that extra width. Instead, the well will only run along part of the back edge; the rest of the bench-top will be full width with through mortises and holes in which to keep the small tools such as the chisels that I use frequently (photo 1), but which can easily be taken out of their slots if I need extra working room.



1 This mortised board was my idea for keeping my frequently used tools close at hand



2 After ripping the board into four, the mortises are marked...



3 ... the slots cut on the chop saw, and the pieces glued back together



4 Double rows of No.6 biscuits are used on the main boards

When it comes to choosing a timber for the job, I favour beech: it's not an overly expensive timber, it's easy to work yet durable, and its fine, close-grain pattern finishes well, and is easy to keep clean or clean up. Alright, it's a little bland to look at, but that's not a problem in a bench-top.

There are plenty who wouldn't favour beech, mind you, claiming that it's unstable and prone to movement. This is true in so far as beech, given the chance, can move quite considerably with seasonal changes, but the movement is much the same as other timbers, which is to say across the grain and in a uniform manner. As with any

timber construction, good timber selection is central to minimising distortion: you must make sure that it's seasoned appropriately, and at the very least orientate adjoining boards heart up, heart down; if you can find quartersawn timber, or growth rings that shows a pattern that's more straight than curved, then so much the better.

When all's said and done, if beech is good enough for benchmakers like Emir, which is regarded as the maker of premium benches, then it's good enough for me.

Building the bench

The main sections of the top are made from 2,000mm long 150 x 50mm boards. Removing bow and twist from such long boards meant that the final dimensions were 140 x 40mm; you may be luckier and find that you only have to remove the very minimum of material.

To make room for the tool well, I cut one of the boards down to 1,000mm and set about making the tool mortises by ripping this short board into four. Trenches sized to suit two sets of chisels (**photo 2**) were then formed in the freshly cut edges using the chop saw (**photo 3**) before gluing the pieces back together. This method is much easier than drilling and chopping the mortises, but you could do it that way if you prefer. All this still leaves plenty of room to the side of the slots for other tools, and I can drill the bench for screwdrivers,

hold-downs, and suchlike if the need arises.

The chisel storage ribs were glued together using No.20 biscuits, while the main boards were dry-jointed for the time being with over-sized S6 framing biscuits fitted in pairs, 10mm in from each face (**photo 4**). To form a wide enough slot for the S6 biscuits, you need to cut twice for each biscuit, moving the jointer along by about 10-15mm.

The main boards, which had been left long, were now cut square and any snipe was removed. The Veritas tail vice I planned to fit needs a clear area below it, so the boards were dry clamped to allow the mounting plate to be positioned before moving on to the next stage.

The aprons & breadboard ends

While the bench-top would probably have served its purpose very well as it was, there'd always be the risk of those wider boards distorting, so I decided to run the front and rear aprons around the ends of the bench too, effectively adding breadboard ends.

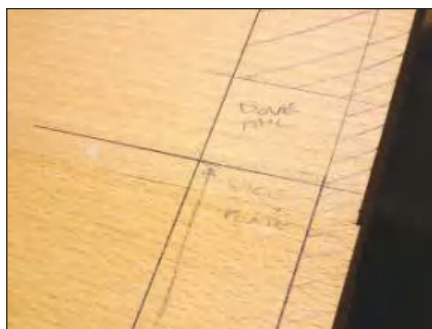
Again with an eye to movement, I planned to biscuit the aprons to the long-grain edges, and use an unglued loose tongue on the end grain to allow for any seasonal movement. To join the breadboard ends to the apron pieces at the corners, I borrowed an idea from my old bench, which uses dovetails orientated so that the pins on the short sides can slide in the sockets on the long sides to allow for cross-grain movement in the top. Yes, the joints could have been butted and screwed, housed, or finger-jointed, but I wanted a joint that looked good while also serving a useful purpose, and experience has shown that this construction will keep everything tight and in place.

The only difficulty in translating this to the new bench was posed by the end vice, whose sliding jaw obviously occupies the fourth corner of the top. Here, however, I planned to use a single dovetail on the short apron to tie it into a board on the top itself (**photo 5**).

Using the mounting plate as a guide, then, I cut the short apron piece (leaving it slightly



Planing the bow and twist from the bench-top's long beech boards involved removing 10mm of material



The end vice plate was used as a template to mark out the dovetail

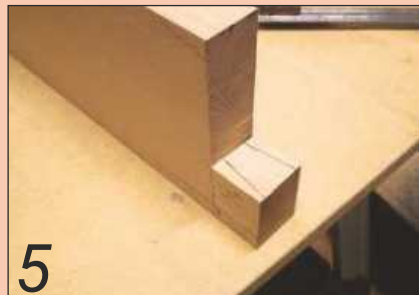
over-long at this stage), and marked it up for the dovetail – pin on the end of the board; socket on the end of the short apron. The long boards of the top were then re-marked and cut to their final length of 1,900mm.

The joint was then cut (**photos 6 & 7**) and, with the top still dry, clamped and fitted into

place so that I could mark the overall width of the top on the short apron prior to cutting the dovetails on the apron pieces. Normally, I'd cut the tails first and then mark the pins, but as the tails are on the long apron pieces, I didn't fancy using 1,900mm-plus pieces of beech as templates! Instead, I opted to

mark the tails from the pins (**photo 8**), as it's easier to handle and align the shorter length. Similarly, because I used two chunky tails at each corner, I drilled out the bulk of the waste and then pared back to the line rather than trying to cut out the waste with a coping saw (**photo 9 et seq**).

CHUNKY CUTS: making the apron dovetails



5
Around the end vice, a single dovetail ties the board to the breadboard end



6
The joint is cut using a tenon saw and paring with a chisel



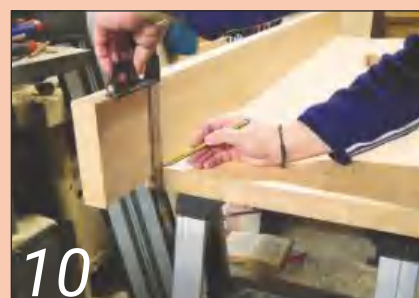
7
Using the joint as a template, the apron is marked up and cut



8
For reasons of practicality, I began with the pins rather than the tails



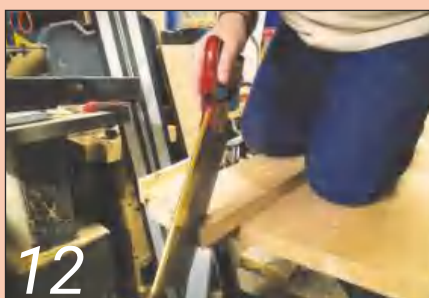
9
Drilling out the bulk of the waste made the chisel work substantially easier



10
The aprons' length is set using the dry clamped boards to mark the shoulders...



11
... and using the pins as templates to mark out the tails



12
There's no way the longer aprons will go in a vice...



13
... so it's easier to kneel over to cut the tails



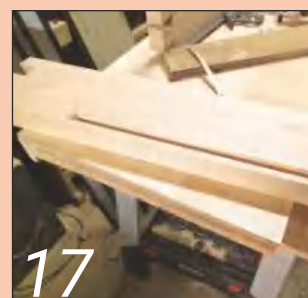
14
The joints are given a quick test fit but without driving fully home



15
The main top boards are glued up, clamped and left to dry...



16
... the end of the tops are grooved to take a ply tongue...



17
... and a corresponding groove is worked into the end aprons

The aprons & breadboard ends (contd.)

After gluing up the boards, a 15 x 10mm slot was routed into the ends of the bench-top and the short aprons ready for the loose tongue (photos 15-17), taking care to stop the slot before it broke through the dovetails. While this slot was routed in the centre of the apron at the right-hand end, at the left-hand it was set lower down.

This was because I wanted the ply base of the tool well to sit flush with the underside of the bench. In this way, two sides of the base were housed in slots in the apron, where they were free to allow for seasonal movement of the top, and the other two in rebates in the underside of the top (photos 19-21). The aprons were then glued into place (photos 22-25).



18 Make a test fit with the tongue in place to ensure that the joint will close



19 Using the well material as a gauge, the apron material was marked up



20 The groove was made in the rear and left-hand aprons cut using a router...



21 ... and on the underside a rebate was cut for the opposing edges of the tool well...



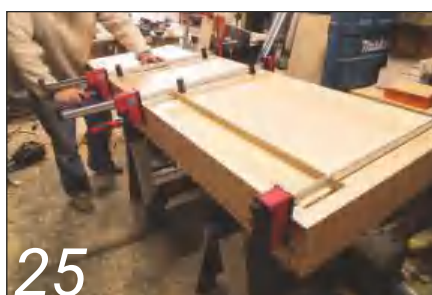
22 ... then the dovetails are glued up...



23 ... and with the front apron on the floor, the end aprons are set into place



24 The final stage of assembly is to get the rear apron on and driven up



25 Once back on a horizontal surface, the top is clamped up and left to dry



Fitting the vices: the front vice

The standard bench vice can be fitted by simply mounting the rear jaw onto the front apron. This is a quicker option, but I think it's better to have the vice sitting behind and slightly below the apron. Not only does this allow me to hide the metal jaws, but it also means that the apron itself effectively becomes a timber facing that runs along the full length of the bench. Of course, this means fitting the vice before the aprons, starting by marking the jaw width on the underside of the bench-top (photo 26), and then rebating it to allow the rear jaw to sit flush to the edge and below the surface. A router is the easy way to do this, but you can chisel by hand (photos 27 & 28).

The vice will need appropriate packers to allow it to sit at the correct position below the bench (photo 29). I used a couple of biscuits and glue to hold the packers in place before I drill for the bolts as the vice is very heavy, so it's easier to have the packers held firmly while you bolt it into place.

When it comes to securing a heavy vice like this, you can either use coach screws fitted from beneath the bench or from the top. Gravity being what it is, I prefer to hang the vice's weight on a coach bolt fitted through the top of the bench. This does mean that you have to let the bolt heads into big holes drilled in the top (photo 31), but it's a more solid option, and you can always turn some plugs to fill the bolt recesses.

The facing for the front jaw can be a simple block of wood, but I wanted something more substantial. This wasn't just a question of cosmetics; a wider,



heavier facing has greater grip, though it obviously reduces the overall jaw capacity. I went for a facing of the same depth as the apron, which meant that it had to be notched for the mechanism (**photo 30**) and about 120mm wider than the cast jaw.

To lend the facing some elegance, I added a quirked round-over to the end-grain, which was formed by first cutting a groove using the trenching function of the chop saw (**photo 33**), though it can also be done with a tenon saw. Then, after marking the rounded profile with a suitably sized tin, the profile was shaped using a block plane (**photo 34**). The Veritas skew block came in handy when dropping the quirk mould, before removing the bulk of the remaining waste with a 45° cut across the profile, and then shaping the main radius.

Fitting the end vice...

The Veritas tail vice is very straightforward to install. The location plate is fitted directly

to the underside of the bench using the instruction manual for positioning (**photo 35**). Two bushings then locate the vice into the plate before the coach screws are fitted (**photo 36**). The jaw, meanwhile, is cut from the apron itself (**photo 37**), and fitted directly to the vice using four bolts. And that's it, except to say that before fitting the jaw, I gave the hidden faces a couple of coats of finish to keep everything running smoothly. With the vices in place, the aprons were fitted, using double biscuits for additional strength.

... and finishing

Once dry, the top was sanded back, which is where you find out how good your prep' work has been: if it's good, you'll only need to give the top a light going over.

The holes for the bench dogs were then marked and drilled, before applying the finish, for which I wanted something that's both durable and easy-to-apply.



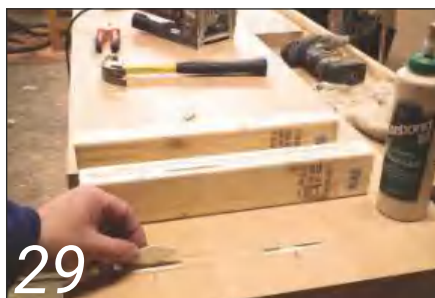
26 Mark the jaw width on the underside of the bench-top...



27 ... then rebate it to allow the rear jaw...



28 ... to sit flush to the edge and below the surface



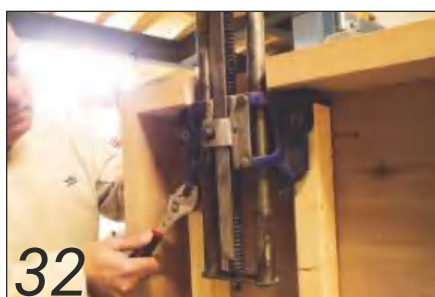
29 The packers are fitted with biscuits and glue before being drilled



30 The apron is notched for the mechanism...



31 ... and the top drilled for the top-mounted coach bolts...



32 ... that provide solid support for the weight of the vice



33 The jaw facing was shaped by first cutting the groove of the quirk...



34 ... sawing away the bulk of the waste, and finishing the profile with a block plane

On my old bench, I used Danish oil, which worked well; this time, however, I opted for Chestnut Products' Hard Wax Oil. It can be applied either by brush or cloth, and builds up to give a hard-wearing wax-enhanced finish from which it should be easy to remove any glue or finish spills.

A well-finished top is all very well, but you mustn't forget the underside: for all that the breadboard ends and sliding dovetails will accommodate movement, it's still good practice to seal both surfaces to ensure that the moisture levels remain balanced, and that any movement is uniform. You don't need to sand the

underside, of course – it's enough to apply a couple of coats of finish to seal it.

Afterword

Though my old bench worked well, I'd long wanted an effective end vice. In fact, if I'd had the 432mm of clear space that the Veritas end vice requires, I'd probably have fitted it to the old top, but I'm glad I didn't. The new worktop not only gives me the benefit of a variety of holding options, but it's set out as I want it, with extra workspace and my most frequently used tools close to hand. And all without a pin hole in sight – well, so far, anyway! [www](http://www.getwoodworking.com)



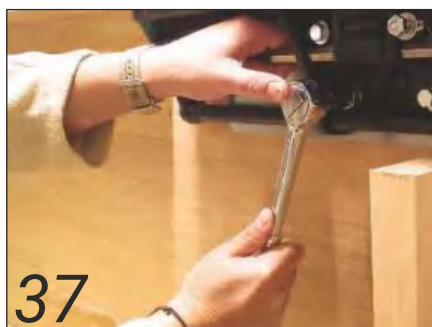
35

Fitting the end vice starts with the location plate...



36

... which helps to locate the vice on the underside of the bench



37

The jaw is cut from the apron and simply bolted to the vice...



38

... after sanding and drilling the holes for the bench dogs



39

The finished worktop is given several coats of Chestnut Products' hard wax oil



Thomas Flinn & Co.

Saw & Hand Tool Manufacturer
Sheffield, England



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The spindle sander must be one of the kindest and safest workshop machines to use, and with care, very satisfactory results can be achieved by anyone

Triton TSPS450 oscillating spindle sander



Approx.
£120

It's not until you have a number of curved furniture parts or similar to clean up that you find yourself thinking that there must be an easier way to do this. Certainly, if your curved components are big enough you can always make a template and rout them all into uniform perfection, but anything smaller will leave you with a lot of fussy cleaning up to do.

Tough construction

When I first encountered a spindle sander on a workshop visit I was hugely impressed and have remained in that condition ever since. Like many things – unfeasible as it may seem – the price of the aforementioned sander has become more affordable, partly because of newer stripped back designs. A good example of this phenomenon is this particular model from rugged Australian firm Triton, now well-established in a wider market than just workholding (they started out with the SuperJaws foot-operated clamping system).

Unlike the earlier models of bench-top spindle sander, which were constructed along the lines of free-standing machines (i.e. all steel body, solid cast-iron, multi-function, etc.), this one is a simple and basic version. The body is a one-piece tough plastic construction and houses the 450W single-speed motor. The working surface is a nice slab of machined cast-iron and adds to the weight and stability of the spindle sander. It sits on rubber feet positioned at each corner, although there is provision for fixing the sander to a (nice and solid) work surface.



The sanding sizes range from 13 to 76mm diameter



Storage for the table inserts



With the lower spindle washer fitted correctly, work can proceed



Tightening the spindle top nut to hold the drum and sleeve in place



The (increasingly) standard Festool extraction hose fits the dust outlet perfectly



Successful shaping with the aid of a small drum...

Setting up

Setting up is about as easy as you can imagine; it's a very straightforward machine and there's little more to do than selecting a spindle sleeve of the required diameter. Once you've decided which diameter to go for, be sure to fit the lower spindle washer first (this supports the base of each sanding drum, and assists with dust extraction). Then it's a simple job to drop in the appropriate table insert, which provides perforated support (for extraction air flow) up to the edge of the sanding surface. The abrasive sleeves come in six different diameters, and each fit to a corresponding rubber drum (except the smallest, which fits directly onto the steel spindle shaft itself). When the spindle top nut is tightened, the downward force (via a suitably sized washer) compresses the rubber drum and tightens it within the sanding sleeve.

As with all sanding machines, dust extraction is an important factor and in the case of the Triton spindle sander is as simple as hooking up your standard workshop vac hose and switching it on. If you don't have a vacuum handy, go and get one as you'll not only asphyxiate yourself but the quality of the job will be inferior too – not to mention clogging up your sanding sleeves more quickly into the (bad) bargain.

Complete storage

For the tidy woodworker (and aren't we all at heart?) there is provision for complete storage of all component parts. Certainly the rubber drums and matching sanding sleeves are clearly intended to be parked onto allocated stubs within graduated niches, and the circular table inserts slot nicely into snug-fitting grooves at the front of the machine. After a while I realised that there was even a mini-slot for the dedicated spindle top-nut spanner, but it took me even longer to work out where the three top-nut washers should live; clearly on top of the spindle, secured in place by this hard-working top-nut.

In summary

All in all, this is a nice little machine that will help improve your working standards, and an enhancement for any workshop. **MC**



... or a large one is equally easy

SPECIFICATION

VOLTAGE:	220-240V
POWER:	450W
NO LOAD SPEED:	2,000/min
OSCILLATIONS:	58opm
STROKE LENGTH:	16mm
SANDING SLEEVE SIZES:	13mm, 19mm, 26mm, 38mm, 51mm & 76mm dia
DUST PORT:	38mm
TABLE SIZE:	370 x 295mm
SPINDLE DIMENSIONS:	12.7 x 1.5mm thread
DIMENSIONS (L x W x H):	390 x 330 x 450mm
WEIGHT:	12.9kg

VERDICT

If you're in the market for a spindle sander, then this helping from Triton is a definite contender

PROS ■ Easy to set up and use ■ Affordable

CONS ■ The overall finish could be a bit better

VALUE FOR MONEY
PERFORMANCE



FURTHER INFORMATION

- Triton Tools
- www.tritontools.com



Tidy storage comes as standard

Any serious scrollsaw user looking to upgrade their existing model need look no further than this trade-rated model from Axminster, which includes a range of great features to make your journey as smooth and enjoyable as possible

Axminster Trade Series EX-16 scrollsaw



£496.96

One of the tools I rarely use is a scrollsaw, which is probably down to my impatience at having to slacken, remove and re-thread the blade constantly when working on pierced work, and I'll be the first to admit that I don't have a huge knowledge of scrollsawing, or indeed, scrollsaws themselves. I do, however, know good features when I see them, and this trade-rated model from Axminster has these in abundance.

Great features

Ticking my first box immediately is the tool-free blade changing: a cam lever on top of the sawing head applies and releases the tension while thumbscrew knobs clamp the blade, and as it takes pinless blades, this is very quick to do.

For any pierced fretwork-type applications, the saw arm can also be lifted up, which allows you to release the bottom of the blade, lift the arm and re-thread down through the top hole without having to remove the blade completely – a real boon if you are working on a very intricate fretted piece.

The saw also has variable-speed, which gives it more scope to work different materials and thicknesses and with the dial mounted at the front of the saw head, it's well positioned for any adjustments that need to be made.

Sited just below this is the on/off rocker switch, which again makes life easy during use. The switch is linked to a rear-mounted NVR that has to be engaged prior to using the front switch. This NVR acts as an isolator for blade changes, or if the power fails, preventing the saw from operating unexpectedly in such situations.

Efficient & diverse

What sets this saw apart from the rest of the pack is the way the saw head operates. Instead of the standard up and down pivot style, the saw head is linked to two stroke rods and by rotating the motor on its



The quick-release tensioning cam allows faster blade alteration or swaps



Blades are held with knobs so swapping for pierced work is quickly dealt with



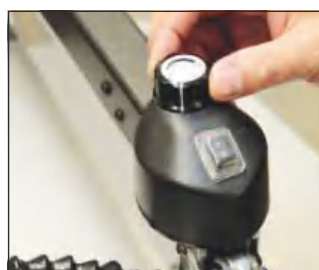
The hold down foot easily adjusts to minimise vibration and lifting as you work



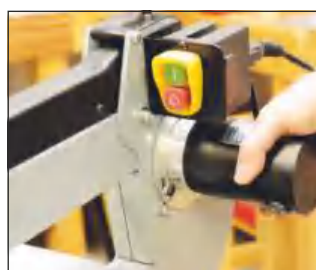
An articulated dust blower is built in to help keep the work area clear



A rear-placed NVR provides the main power to the saw



A small front-mounted rocker switch and variable-speed dial allow for fast control



Releasing the screws and twisting the motor allows you to set up a pendulum movement



An indented rack and pinion trunnion sits below the table

mounting, the position of the rods is altered. In doing so you now have a stroke that is cyclical, much the same as how a jigsaw pendulum operates. This gives a more efficient but aggressive cut, which is useful if you need to cut anything quickly but without worrying too much about the finish of the cut. You can alter the rod action infinitely within its scope to get the best cut for the work in hand, whether it is to suit the material, the thickness or the blade being used and when used in conjunction with the speed control, it makes the saw very efficient and diverse.

A tool-free adjustable hold down keeps things securely to the table as well as a built-in blower to keep the work area free of dust, plus there's a 63mm diameter dust port for hooking up to an extractor.

Intricate & accurate

With scrollsawing normally falling into the intricate and accurate end of the woodworking spectrum, following patterns and layout lines, for example, any bevel work normally requires having the table tilted, which makes the operation a little trickier as you have to keep the workpiece from sliding down the slope of the table under its own weight. That's not the case here, however, as the table stays level while the saw arm tilts so that you simply concentrate on steering the work as it remains flat on the table.

A solidly built rack and pinion swings the arm in either direction: 35° to the left and 45° to the right with indents at 90, 22.5, 30 and 45°. The 35° restriction is down to the dust port that is fitted below the table, but this can easily be removed if you need the full 45° scope in both directions.

It is worth mentioning that a slight incline, where the saw tilts slightly towards you, can be beneficial when you are sitting down, and as scrollsawing does take a lot of time, it's worth considering this. To this end, Axminster offer a dedicated leg frame that has adjustable legs designed for this purpose, allowing you to set the saw at either a level setting or at a slight incline to suit your own preference.

In use

So I guess it's time to talk about how the saw fares. Well, the major plus points of tool-free blade changes, the lifting head for quick threading and the oscillation of the blade, are all areas that appeal to me as I'm all about getting the work done as quickly as possible with minimal downtime.

My biggest downfall on a scrollsaw is my actual lack of ability: it's a bit like my colouring in; I keep going over the lines! I had a piece of 19mm pine as my test stock, and with a jigsaw pattern snail at my disposal, I soon found out that you have to be pretty nimble-fingered to get around all the curves and corners.

The saw itself was more than man enough for the task. I encountered very little vibration, which meant that I could concentrate on the work and it didn't take long to cut the entire pattern while at the same time leaving an excellent finish on the cut edges.

In summary

With practice, I think I'd soon become more proficient, and this saw in particular has masses of benefits that would appeal to anyone who enjoys this side of woodworking. The higher price in comparison to some others on the market becomes somewhat irrelevant with such features, and if it speeds up your output while at the same time giving you a better ride as you do so, then this can only be a good thing, surely? **AK**

SPECIFICATION

MOTOR	320W
SPEEDS	400-1,400 strokes per minute
MAX DEPTH OF CUT	50mm
STROKE LENGTH	18mm
TABLE SIZE	305 x 470mm
THROAT DEPTH	406mm

VERDICT

A great scrollsaw for the serious user. Well built with some great features, it is certainly a joy to use

PROS

- Tool-free blade swaps
- Pendulum movement
- Variable-speed
- Tilting arm

CONS ■ Limited tilt to the right with the dust port fitted

VALUE FOR MONEY
PERFORMANCE



FURTHER INFORMATION

■ Axminster Tools & Machinery
■ 0800 371 822
■ www.axminster.co.uk



The rack and pinion alters the arm so that the table remains flat and level



Working with the saw is sweet: using the pendulum action, it cuts very quickly



The finish on the cuts is clean and accurate, requiring minimal sanding



Not the most intricate piece of work, but quite a satisfying and relaxing hobby

These milk paints and stains from General Finishes are very easy to apply, available in an extensive colour palette and really help to make your work 'pop'!

General Finishes milk paint range



Milk paints have been around for thousands of years, and as the name implies, they are milk-based. Mixed with lime, chalk and natural pigments for colour, they stood the test of time and found great favour with early settlers in the USA, with the Shakers being fine exponents of their virtues.

Longevity as a product was the issue, however: while the paint remained fast once applied, shelf life of traditional milk paint is all but non-existent – only a day or so once mixed.

General Finishes have kept the tradition of milk paints alive with colours and finish that match the original concept but with formulas

that remove the problems of a milk base.

The same colours are available to match original traditional natural pigments but also with a range of other bright and contemporary colours that can be easily mixed to make other colours as well as mixing with stains to alter the colours and depth further.

They are water-based, so very easy to clean up after, and the colours are very deep so coverage is therefore superb.

Milk paints are often used to achieve a distressed and used look by overlaying colours and rubbing through the top coat at strategic points that would receive the most wear in normal use before protecting with



Sealing prevents stains drawing in and blotching on more porous timbers



All the finishes should be stirred thoroughly before mixing or applying



Mixing in small quantities for smaller jobs or experimenting is easy

a top coat, if you want to preserve the distressed look and go no further. However, with the deep colours, I gave the finishes a try on some woodturning to impart a different look. There are options that can be used to alter things and it's easy to do. I went for a bright yellow, muted to a pastel shade by mixing in some whitewash stain. The water-based stains and paints mix with each other very quickly and easily, and you don't need much as the coverage is bold, so a little goes a long way.

In use

Depending on the timber or the effect you're looking for, the surface can be sealed prior to the milk paint application. On coarser or more variable-grained species, it balances the suck of the grain to eliminate blotchiness.

I gave my test platter a thin coat of the Pre-Stain Conditioner for this, applying with a foam brush and wiping off any excess (a rag or standard brush can be used for applying). Once dry, the foam brush was used to apply the pastel yellow to the bowl part of the platter, covering the deep colour of the sapele with a single coat.

I then applied a band of deep red straight from the tin, working up to the edge of the bowl before applying an outer band in the yellow. This was all applied with the lathe set on a low speed, and when stopping the lathe, there was no sign of bleed between colours, although I did try to avoid overlapping to minimise this happening.

With a Patina Green also being sent to me, I then experimented by applying this directly over the wet yellow on the outer edge, allowing it to mix itself together as the lathe turned.

The result was a light turquoise, and quite pleasing! Applying the unmixed milk paint directly to an unsealed maple turning, I was able to get bold colour into it but without losing the grain pattern by applying it more sparingly. The yellow was especially effective against the red, essentially using it as a stain that can be finished with the High Performance Top Coat.

In summary

Being able to mix and match the paints and stains easily and in small quantities makes experimenting worthwhile, whether for furniture or, as I have done here, on turning work.

The colours dry a flat matt and can be left as that, especially if you want to eventually get a distressed look naturally rather than

SPECIFICATION

MILK PAINT	£20.30 (pint tin)
WHITWASH WOODSTAIN	£13.75 (pint tin)
HIGH PERFORMANCE TOP COAT	£20.45 (pint tin)
PRE-STAIN CONDITIONER	£13.75 (pint tin)
COLOURS AVAILABLE	28
CLEAN UP	Water

VERDICT

If you want to add a touch of colour to your turnings or any other woodworking projects, then these easy to use paints will allow you to achieve the exact look you're aiming for

PROS

- Easy to mix
- Easy to apply
- Ideal for experimenting
- Bold and muted colours available

CONS ■ None that spring to mind!

VALUE FOR MONEY



FURTHER INFORMATION

- General Finishes
- 01316 615 553
- www.generalfinishes.co.uk

self-imposed. If you want to preserve the vibrancy and finish, there is a top coat available in a variety of sheens, again water-based and equally easy to apply. Go for an external top coat and the milk paints can be used on outdoor work as well – especially ideal for bringing a touch of colour to the garden during the summer months.

There is an extensive range of colours available (28 in total), all of which are listed on the website – see above for further details. **AK**



A pre-sealed piece allows the paints to build a solid colour easily



Applying green over a wet yellow edge, the outer band easily mixed in to form a turquoise



On unsealed maple a thin coat allows the grain to show through for a stained effect

This handy work light ensures you won't be left out in the dark when it comes to all manner of DIY tasks

Ryobi R18 Hybrid 18V area light

Power tool manufacturer Ryobi is renown for its innovative design features, and the new area light is no exception. With a strong presence in garden machinery and kit besides power tools, it's hardly surprising that elements transfer across to workshop or site equipment and vice versa. Hybrid lawnmowers are an important part of Ryobi's line-up, where a 36V (two 18V batteries) cordless machine can also be plugged into a mains supply if necessary. Great news if you only have one or two batteries but can't quite manage to cut the lawn without running out of juice. But how is this relevant to work lights?

Cordless is better

Hybrid technology can be found in their new area light, powered by either an 18V battery or a 240V AC supply. On the downside no mains cable is supplied, which is slightly frustrating as the connector is a two-pin Euro pattern (known as a Schuko socket). Unless you already own a Ryobi Hybrid lawnmower you could be stuck, as I've discovered suitable adaptor cables are tricky to track down. You can actually get a 1m adaptor lead made for around £18 including delivery (www.leadsdirect.co.uk). Probably better to just accept that the area light is a cordless unit and forget the mains supply for now!

Powerful output

At 2,000 lumens the 25W LED lamp provides the most powerful output I've come across in a cordless lamp or torch. No battery or charger is included here, so you'll need to buy into Ryobi's cordless One+ 18V system, but that's certainly no bad thing...



£99.99

The LED lamp can be rotated through 360° and is stable at whatever angle it's set to. You can stand it on the floor or bench, suspend it from a wire fence or ladder, or just hang it up with a hook that can be unfolded. Battery or mains plug is inserted at the rear, while the light is activated with a single push button.

Long-lasting beam

The beam is useable for about 8m and fitted with a fully charged 1.5Ah battery, my unit ran for 70 minutes, while a 4.0Ah pack provided light for 210 minutes. Remember that with Li-ion cells you won't get a gradually diminishing beam as the battery runs out. Suddenly it's all or nothing, so to speak. Most of Ryobi's batteries now feature a fuel gauge, so hopefully you won't get left out in the dark.

In summary

This would make a great lamp for a shed or workshop with an erratic mains supply, or as bright emergency lighting. It'd be ideal for a house restoration project during the winter months, particularly when the sparky switches off the power at a crucial moment! **PD**

SPECIFICATION

LED WATTAGE	25W
MAX RUNTIME	4 hours (using P108 LITHIUM+ High Capacity Battery (not included))
TOOL WEIGHT	2.95lb

VERDICT

This powerful, cordless light would be ideal for the shed or workshop, thanks to the generous runtime

PROS

- A great replacement for a halogen work light
- Compact design allows for easy transportation
- Bright and easy to activate

CONS

- No mains cable is supplied
- No battery or charger included

VALUE FOR MONEY PERFORMANCE



FURTHER INFORMATION

- Ryobi
- www.ryobitools.eu



The two-pin Euro pattern connector, or Schuko socket



Ryobi's cordless One+ system is needed here



The thumbscrew allows for stability in use



A single push button activates the light

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01666 837 413 (Wiltshire)

Woodworker magazines: various issues from 1979–1995, all in first class condition – 160 in total. Sensible offers; collection only
01908 649 224 (Milton Keynes)

Large quantity of sandpaper (various grits). Hardwood including ash, oak, mahogany – all in assorted sizes
01613 395 101 Lancs

For sale – various Woodworker magazines from 1946–2013. All are in pristine condition. A wonderful collector's item – selling due to bereavement. Please call to make an offer; collection only.
07847 394 507 (Derbyshire)

Poolewood PW40 Superlathe – 40in centres, 28in bowl turning capacity, 1HP motor with variable-speed change. Comes with purpose-built base for easy, increased stability if required.

Full instruction and maintenance manual, plus lathe steady. Buyer collects; £250 ONO
01242 517 576 (Cheltenham)

Clarke Woodworker 900mm reversible head wood lathe – in good condition; £135, or willing to part exchange for bench-top model
07979 903 802 (Surrey)

Leigh D1600 dovetail jig with metric scales – also includes user manual and DVD. Ready mounted on base and has purpose-made storage box. Also includes Leigh seven-piece 8mm shank cutter set, chip extractor and guide bush for Elu. Very little used; offers over £250
07796 573 528 (Southampton)

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07888 657 527 (Barnet)



Selection of unusual Chinese hand tools in rosewood. Various sizes, two ploughs, shoulder and moulding planes, plus scraper. Beautiful finish; £185
01825 239 365 (Gloucestershire)

Proton DSH two-speed scrollsaw – hardly used; £120. Record DX1500 dust extractor on castors; £60
01208 733 334 (Cornwall)

Le-Matic AR500 edge-bander kit plus table, glue pellets and rolls of unglued edging; £495 ONO
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Windsor chair seat and splat templates. Bruce boiler and steam box, bending straps, crinoline. Back, arm and bow formers. Offers. Also rounders, ravishers and trapping plane available separately
01603 715 231 (Norwich)

Shopsmith – in very good condition – also bandsaw and dust extractor; offers invited
01923 256 466 (Herts)

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Titan 230V 1,500W 10in table saw with stand and extension – buyer collects; £60
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Hardwood blanks for turning; £450
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Nova 3000 lathe with Speed Genie; £500. Chucks: Nova (extra jaws), Axminster & eccentric; £120. Airshield Pro; £100
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Wards department store selling Lebus furniture and advertising the upcoming Festival of Britain in 1951

The salient factor was that it broke off below the surface of the moulding leaving a microscopic hole, which would be filled with 'grain filler' in polishing. This operation was almost exclusively performed by one 'Chalky' White. All Whites are called 'Chalky'. The story of Chalky was that, during the war when there were no street lights, having finished his late shift and making his way home on his motor bike through Epping Forest, he ran into the back of a loose horse. The shock first of all turned all his hair white and then he lost all the hair on his body – even his eyebrows and his eyelashes! The latter I guarantee for I often talked with Chalky.

An inspector calls

After a carcass had been assembled at the beginning of the line, the doors hung thereon and the mouldings applied, the

A walk around the factory **PART 4**

Continuing his tour of the factory, Peter Baker visits the makers' shop, introduces us to 'Chalky' White and further explains the efficient assembly process

Inevitably those little electric tugs came and took each barrow load of sub-assemblies off to their final assembly location, which was in 22 shop, the makers' shop. This was located on the 'main road end' of the factory, which required crossing the conveyor belts of the polishing shop. This was a feat of great dexterity and required the tug driver to enter through the huge rubber doors, push furniture back down each of the 10 conveyor belts to give clearance while he then drove his little train of trolleys across the belts to the other side, before running back and redistributing the pieces of furniture along the polishing belts and returning to his charges to finish the journey. This didn't happen too often for the correct route was around the outside of the building, but there were occasions when the components were required at a particular point in the makers' shop.

The layout of the makers' shop is another illustration of the vision and perception of this family. At the eastern side of the shop were the assembly jigs and cramps with the small pieces at the north or far end and wardrobes closer to the beginning of the polishing shop conveyor belts, or south end, with lines between for pieces, which gradually increased in size as they neared the polishers. Starting with coffee tables

and 'occasional' pieces like that, working through chests of drawers and dressing tables until reaching gent's 3ft fitted wardrobes and ladies' 4ft 'all hanging' wardrobes. All traversing the shop from east to west.

'Chalky' White

Off to one side was a separate bench where appropriate mouldings were applied to the faces of the furniture. These mouldings were 'bought-in' for they were 'steam-pressed' in very thin beech or thin oak-faced plywood and applied with animal glue and 'needle points'. The back was glued and the moulding stuck in place and retained there with the 'needle points' while the glue set. A needle point is exactly like a needle but missing the eye and the beauty of their use was that one could, with a 'toffee hammer', drive the needle point through the moulding and into the panel beneath, break it off and use the remainder on another moulding or two.

carcass moved to the makers, who cleaned up the finished article, fitted all the fittings – locks, shot bolts, stays, hanging rails, shelves, tie and stud racks – ensured that the doors fitted the carcass correctly and locked properly, removed their 'piece work ticket' and passed the wardrobe on to the inspector who checked it over and sent it on to the polishing shop. The first 'robe' that I sent to the inspector was pushed back to me covered in white chalk! Chalk was used to indicate faults as it did not mark the 'in the white' furniture. 'In the white' means that it is not polished. I turned to the much older maker next to me and exclaimed "what the \$%£*&!!!". He grinned and said: "He's testing you, son. Wipe the chalk off with your cork block and send it back." I did and it went straight through into the polishers. A cork block is about 100 × 64 × 25mm, solid cork and used to wrap a piece of abrasive around in order to 'paper' all surfaces smooth and flat. Everything we did at Harris Lebus had a value in time recorded on a 'punch card' and the aggregate of all that time was the basis of our pay-packet at the end of the week: payment by results. **WW**

GET IN TOUCH

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In part 12 of this series, Peter continues his tour of the factory and this time visits the polishing shop. And if any other readers have a story to tell, we'd be glad to listen. Just write to editor.ww@mytimemedia.com and we'll see how we get on





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